The second generation:
Exploiting the power of intelligent storage to simplify management.

How do you simplify your storage infrastructure, protect your valuable information, and optimize your resources so that you can fully leverage your enterprise's knowledge capital? How do you ensure that your data is available 24/7 even when it's quickly outstripping your resources? How can you establish a flexible and quickly scalable infrastructure that will allow you to deploy new strategic applications easily?

The Lightning 9900™ V Series is designed specifically to serve as the foundation for intelligent pooling of storage resources and breakthrough simplification through massive consolidation. Bringing new levels of availability and performance, the Lightning 9900 V Series, combined with advanced storage applications, storage area networking technologies, and the HiCommand™ management framework, delivers the information infrastructure you need to gain a competitive advantage.
Lightning strikes—twice!

Introducing the next-generation intelligent storage systems with world-class benefits: Simplified infrastructure and management. Protection for your critical information. Optimized resource utilization.

A reduced total cost of ownership (TCO) and a more rapid return on investment (ROI).

Hitachi Freedom Storage Lightning 9970V and Lightning 9980V—Benefits

> Simplify management and provide high availability to internal operations—and your customers
  • Consolidate systems and pool storage resources
  • Scalable with non-disruptive expansion to over 70TB
  • Global 24/7/forever availability
  • Industry-leading performance driven by our second-generation Hi-Star™ switched architecture
  • Over 15GB/sec aggregate internal system bandwidth
  • Single system management through virtualization-enabled functions
  • Concurrent UNIX®, Microsoft® Windows NT®/Windows® 2000, Linux®, Novell® NetWare®, OpenVMS™, TPF, and OS/390® connectivity

> Protect your business continuity and grow sales with built-in backup
  • 100% data availability guarantee
  • Instant, user-defined point-in-time copies—recover quickly from disasters
  • Non-disruptive, real-time copies for backups, application testing, and data warehousing/data mining
  • Off-site redundancy with complete data integrity
  • “Server-less” any-to-any copies
  • Tapeless data vaulting
  • Power to speed up complex decision support queries
  • Real-time analysis of customer behavior

> Optimize resources, increase your ROI with massive consolidation and simplified management for a reduced TCO
  • Multi-dimensional scalability, including capacity, bandwidth, connectivity, workload mix, and embedded applications
  • Investment protection—connect Lightning 9960 array frames to Lightning 9980V control frames
  • Centralized storage management with the 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
    • Multiprotocol compatibility—Fibre Channel, FICON®, and ESCON®
    • Simplified heterogeneous host access to dynamic storage pools
    • Easy convergence of SAN and NAS
    • Reduced licensing and maintenance costs
    • Set-and-forget management

> Count on exceptional service and support
  • Survey by FIND/SVP places Hitachi Data Systems Number One in overall service and support as well as technical performance
The Lightning 9900 V Series, with built-in virtualization-enabled functions, is designed specifically to serve as the foundation for your information infrastructure. These unique systems are made for intelligent pooling of storage resources and breakthrough simplification of complex infrastructures. Their broad capabilities allow for massive consolidation, flexible capacity, extreme bandwidth, and native connectivity/protocol options—while actually reducing your total cost of ownership (TCO) and accelerating your return on investment (ROI).

INFORMATION AND THE ABILITY TO COLLECT, ANALYZE, AND ACT ON IT QUICKLY, ARE THE ENABLERS FOR SUCCESS. OUR HI-STAR™ SWITCHED ARCHITECTURE DELIVERS.

The world’s economy presents all of us with once unimaginable challenges—and opportunities. Both are often accompanied by billions of transactions and enormous amounts of text, video, graphical, and audio data that are transferred every day, and growing exponentially. Just adding more storage is not the answer.

Now is the time to take a long-term look at your IT environment. Control is within reach. Start with a storage platform that combines power and intelligence to simplify, protect, and optimize—putting you in charge, instead of at the mercy of a reluctant information infrastructure.

The Lightning 9970V and Lightning 9980V systems are powered by our second-generation Hi-Star switched architecture. In fact, today’s bottleneck-free Lightning 9980V system is twice as powerful, provides twice the cache, and offers twice the capacity of the first Lightning 9900 Series generation.

Open for business, the Lightning 9900 V Series provides instant access to data around the clock:

> No single point of failure
> Highly resilient switched architecture
> Redundant, hot-swappable components
> Global dynamic hot sparing
> Mirrored write cache with battery backup
> ECC memory
> Hi-Track™ “call-home” predictive maintenance service
> Host failover and alternate path support
> Non-disruptive microcode upgrades
> RAID-1+ and RAID-5 support
> Industry-leading point-in-time and remote copy software for data backup and rapid recovery
> Proven GDPS™ support
Simplify Your Infrastructure and Management

The Lightning 9900 V Series systems are made for massive consolidation

Traditional bus-based storage systems constrain capacity growth. As capacity is added, buses become a bottleneck, and performance degenerates. With the Hi-Star switched architecture and bandwidth-rich Lightning 9900 V Series storage systems, you can consolidate your current enterprise storage systems into one footprint while acquiring unmatched capacity and performance scalability. The savings are significant. You not only reduce your initial purchase costs, but you also lower your TCO over the lifetime of your system. By simplifying your information infrastructure and management efforts, you save on operating and resource expenditures.

This massive consolidation is made possible by the latest version of our Hi-Star switched architecture, which powers the second-generation Lightning 9970V and Lightning 9980V systems. Hi-Star allows the Lightning 9900 V Series to support the information management demands of dynamic enterprises—no matter how big your data warehouse or how high your transaction rates.

Choosing the system that’s best for your operations

The Lightning 9900 V Series supports both open systems and S/390® servers simultaneously in direct attached or networked configurations, allowing you to choose the optimal server for your applications. The Lightning 9900 V Series is available in two models: the Lightning 9970V and the Lightning 9980V.

Lightning 9980V—the world’s first storage solution for massive consolidation.
The Lightning 9900 V Series, powered by the lightning-fast, Hi-Star switched architecture, removes the downtime and bottleneck risks normally associated with typical consolidated storage approaches. The performance and scalability of the multi-cabinet Lightning 9980V system enables you to consolidate vast amounts of storage across open systems and mainframe servers. You can replace your previous storage systems with just one Lightning 9980V system, dramatically lowering your IT costs and extending your capital investment by consolidating storage resources and sharing information across disparate platforms.

> Form centralized host group pools
> Replace several systems with one to simplify and save
> Reduce management tasks, lower staff costs

Lightning 9970V—a key piece for your enterprise infrastructure.
The Lightning 9970V system, with its open systems and OS/390® robust channel connectivity, offers you all the high-speed, high-availability characteristics of the advanced Lightning 9900 V Series in a single cabinet. This enables the Lightning 9970V system and its 9TB hot-swappable component design to play an important position in any number of environments. Assign the Lightning 9970V system to a typical storage role for sustained growth. Or, enact your essential distributed strategies for ensuring data replication, disaster recovery, and information sharing.

> Deploy for truly manageable SAN strategies
> Implement for disaster recovery assurance
> Utilize for company-wide information sharing

Major Platforms Supported

Open Systems
- SUN® Solaris®
- Microsoft Windows NT
- Microsoft Windows 2000
- IBM® AIX®
- HP-UX®
- IBM (Sequent*®) DYNIX/ptx®
- SGI™ IRIX®
- Novell NetWare
- HP* (Compaq)™ Tru64® UNIX
- Linux
- HP(Compaq) OpenVMS

Mainframe
- OS/390
- MVS/ESA®
- MVS/ESA®
- TPF/M PLF
- VM/ESA®
- VM/XA
- VM/MPO
- VSE/ESA®
- VSE/SP(4.1)
- TPF
Virtualization-enabled to reduce connectivity complexity

We anticipated your information management needs and industry trends with two enterprise-class, virtualization-enabled storage systems built specifically to support far-reaching business and IT objectives. The new Lightning 9900 V Series systems offer a virtualization assist layer to ease storage management and better utilize resources. Host Storage Domains allows host pooling at the Logical Unit level, optimizing connectivity and reducing network infrastructure. Priority Access guarantees that your most critical applications get the highest level of service, while Hitachi SANtinel™ ensures authorized access.

The strategic combination—Host Storage Domains, Priority Access, and SANtinel—form the basis for a new virtualization assist layer within the Lightning 9900 V Series systems, clearing the way for massive consolidation and simplified infrastructure management. The Lightning 9980V and Lightning 9970V systems are open to dynamic resource and performance management, truly massive consolidation, plus compatibility with Hitachi and other vendor virtualization strategies.

Manage it all with the HiCommand™ Management Framework

HiCommand software is the storage management framework that provides open and intuitive tools for streamlined storage management. With the HiCommand Management Framework, storage administrators can manage, monitor, and tune Lightning 9900 V Series, Lightning 9900 Series, Hitachi Freedom Storage™ Thunder 9200™, and Sun StorEdge™ storage systems via a single graphical user interface (GUI).

HiCommand Management Framework:

- Shortens the storage administration staff training ramp and enables faster response to change
- Lowers your TCO by simplifying storage management, streamlining processes, and increasing productivity
- Delivers real freedom of choice—the HiCommand Management Framework seamlessly integrates with a variety of independent software vendor products

Connectivity simplified for the future: ready for SAN, NAS, ESCON, and FICON

These days, a number of storage network protocols and connectivity methods are available to match application requirements. Whether Fibre Channel SANs, or gigabit Ethernet NAS for open systems and SAN interconnect, or ESCON and FICON for z/OS™ and S/390 mainframes, the Lightning 9900 V Series will support them all natively.

Backed by the Hi-Star switched architecture, end-to-end Fibre, and high-performance disks, the second-generation Lightning 9900 V Series systems easily handle simultaneous information access through multiple protocols and connections.
The Lightning 9900 V Series—an infrastructure solution that protects your data and your IT investment

The capacity to store your data—up to over 70TB. The speed to make it earn its keep. The Lightning 9900 V Series super carrier-class capabilities position it to handle enormous challenges. From this day forward, your information infrastructure can be designed to withstand the onslaught of strategic initiatives that will determine your company's outcome while providing the rapid ROI management mandates.

> Second-generation, high-speed switched architecture
> Virtualization-enabling layer
> Web-based management and Java™ SPI/RMI
> Extended SCSI copy support
> Network storage blades
> Extended RAID group support
> High-throughput 10,000RPM and 15,000RPM dual-ported Fibre Channel disk drives
> 32 concurrent data transfers
> Fully addressable 64GB cache
> Optional Hitachi FlashAccess™ permanently assigns LUNs or LVIs into cache
> Extremely fast and intelligent cache algorithms
> Flexible LUN support
> Automated performance tuning
> Support for Hitachi Parallel Access Volumes (HPAV) and Multiple Allegiance (MA)
> Separate, redundant data and command paths
> Support of existing Lightning 9900 Series array frames and disks for investment protection

Plus, extensive connectivity

> Fibre Channel, FICON, HPAV, and IBM® FlashCopy™ compatibility enable integration for SANs and large S/390 systems
> Priority Access/port throttling provides guaranteed quality of service (QoS), maximum control

Data Protection Services for special projects, including migration and massive consolidation

Our Data Protection Services team is trained in architectural analysis, configuration planning, and enterprise assessment. We work with structured methodologies that promote consistent results. Our industry-leading software—TrueCopy™, ShadowImage™, and NanoCopy™—plus proven support for GDPS, further ensure that your Lightning 9900 V Series system will keep your business running. By supporting your special project activities and fully exploiting the capabilities of our Hitachi Freedom Storage Software Suites, we help you quickly address storage management challenges while preserving critical business continuity.
Always available, always up

> Provides point-in-time copies for disaster recovery, tapeless data vaulting, data warehousing/data mining, or application testing
> Enables real-time data movement and online data migration over virtually unlimited distances
> Allows sophisticated and scalable backup/restore functions
> Provides alternate path and clustering support

Optimize Resource Utilization

Use powerful Hitachi Freedom Storage Software to automate high performance and maintain your competitive edge

Companies continue to shift attention and resources in support of e-business efforts and breakthrough initiatives to better position themselves for the future. When it comes to achieving these corporate goals, downtime is the enemy. Adapt—or else.

It’s increasingly important to anticipate surges in customer requests and to adjust to sudden increases in user demand. Supported by the bottleneck-free architecture of the Lightning 9900 V Series, Hitachi CruiseControl™ provides automatic self-tuning, eliminates “hot spots” through load balancing, and maintains predetermined performance levels. Hitachi FlashAccess brings lightning-fast speed to both Lightning 9900 V Series systems by “locking” (and unlocking) data into cache in real time with read and write functions performed at cache speeds without disk access delays. Hitachi Dynamic Link Manager™ takes high performance out to the paths by providing dynamic load balancing. These functions, coupled with the virtualization assist layer in the Lightning 9900 V Series systems, ensure maintenance-free performance for seamless scalability.

HITACHI FREEDOM STORAGE SOFTWARE SOLUTIONS

Our Hitachi Freedom Storage Software Solutions include the following suites: Storage Area Management Suite, Business Continuity Suite, Backup and Recovery Suite, Performance Enhancement Suite, and Data Movement Suite.

Accelerates access to information

> Optimizes performance for business-critical online applications
> Maximizes usage of unparalleled scalability

Empowers the transformation of information into knowledge

> Supports information sharing in heterogeneous environments
> Allows data exchange among UNIX, Windows NT and Windows 2000, Linux, and S/390 platforms

Reduces storage management complexity and cost

> Supports consistent procedures and policies for very large installations
> Provides event, performance, and configuration management
> Enables Hitachi Freedom Storage systems management from any location

Optimize Resource Utilization

Use powerful Hitachi Freedom Storage Software to automate high performance and maintain your competitive edge

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HITACHI FREEDOM STORAGE SOFTWARE SOLUTIONS

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OPTIMIZE

Simplified and optimized storage management. 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, the HiCommand Management Framework 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 Lightning 9900 V Series, Lightning 9900 Series, Hitachi Freedom Storage Thunder 9200™, 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, the 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

> **enables 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.
The Storage Area Management Suite, including HiCommand and its unique management framework and tools and Hitachi Resource Manager™, dramatically reduces storage management concerns, and makes it possible for you to increase your own productivity. Resource Manager, a package of management utilities, includes Hitachi Graph-Track™, FlashAccess, Hitachi Virtual Logical Volume Image (VLVI) Manager, Hitachi LUN Manager, and SANtinel. Resource Manager eases storage management processes and enhances your ability to address oncoming performance and capacity requirements.

Hitachi Command Control Interface allows open systems users to manage TrueCopy and ShadowImage from programs running on their host. This enables you to create batch streams that automate TrueCopy and ShadowImage operations using the command line interface.

VERITAS® Volume Manager™, a component of the VERITAS Foundation Suite™, is available for flexible storage configuration, ensuring powerful, reliable performance.

With the addition of Sun StorEdge Resource Management Suite software, you can also access centralized control, reporting, and analysis for storage management across the enterprise. The Sun StorEdge Suite automates the discovery, monitoring, alerting, collecting, and reporting of hundreds of key storage statistics. Reports include information on distributed logical resources, such as file systems and directories, and physical resources, such as disks, SAN interconnects, and computers within open systems environments. With this information, you can optimize storage utilization and better manage capacity upgrades, saving money in the process. SANtinel controls host access to the Lightning 9900 V Series system LUNs in SAN environments, preventing unauthorized users from overriding other server disks.

Business Continuity Suite

A well-planned business continuity strategy is essential if your organization is to survive planned or unplanned downtime. Our Business Continuity Suite includes TrueCopy technology, NanoCopy, Shadow Image, Dynamic Link Manager, Hi-Track, Hitachi SplitSecond™ Solutions, Hitachi Extended Remote Copy (HXRC), Hitachi Parallel Access Volume (HPAV)/Multiple Allegiance (MA), Geographically Dispersed Parallel Sysplex™, and our Data Protection Services.

Designed for continuous access, TrueCopy software updates and maintains reliable data copies at a secondary site from one Lightning 9900 V Series system to another. TrueCopy replicates information locally between the Lightning 9900 V Series systems within one data center, or to remote models in geographically dispersed locations—with minimum impact on your applications. TrueCopy seamlessly protects your critical information right up to the point of an outage, eliminating the complexities of multi-step, manual, tape recovery processes.

Hitachi ShadowImage software simultaneously duplicates logical volume images (LVIs) and logical units (LUNs) without disrupting service or performance of business-critical applications. ShadowImage delivers parallel processing capabilities that significantly improve productivity by consolidating workload operations. ShadowImage rapidly replicates information within the Lightning 9900 V Series systems without disrupting or affecting operations and performance levels. As a result, backups and tests can be conducted more completely and more frequently. Deploy applications faster—while safeguarding your critical information.

NanoCopy software, based on TrueCopy, is an industry first and can replicate data between any number of primary systems and any number of secondary systems anywhere in the world—with full data integrity. Using ShadowImage, SplitSecond Solutions extend the functionality of NanoCopy to duplicate critical data with full protection against rolling disasters, allowing you to initiate production at a backup location immediately following an outage. Dynamic Link Manager provides automatic load balancing, path failover, and recovery capabilities in the event of path failure, ensuring no single path becomes overworked while others are underutilized. HPAV permits multiple applications running on an S/390 server to simultaneously access the same information. HXRC creates OS/390 synchronous remote copies over long distances using extenders. And the Hi-Track “call-home” system, our predictive maintenance system, ensures maximum availability. Hi-Track continuously monitors Lightning 9900 V Series systems and automatically transmits collected hardware status information to a Hitachi Data Systems support center for proactive corrective action.

We offer a number of services to help you plan, integrate, and deploy your Geographically Dispersed Parallel Sysplex™ environment with proven TrueCopy support for Lightning 9900 V Series systems.

Backup and Recovery Suite

This suite offers you the Hitachi Multiplatform Backup/Restore (HM BR) software for open systems, Hitachi e-Copy, VERITAS NetBackup™, and Tantia Technologies’ HARBOR® Backup. HM BR allows you to save data, including important data, that can be used in the event of an outage. Hitachi e-Copy allows you to manage data for Lightning 9900 V Series systems, HARBOR Backup protects data while improving recovery processes.

Performance Enhancement Suite

This robust suite comprises CruiseControl, Priority Access, FlashAccess, Parallel Access Volume/Multiple Allegiance, Hitachi Graph-Track, Dynamic Link Manager, and the Performance Maximizer Package, to accelerate information access and help you keep pace with today’s evolving business environment.

CruiseControl addresses the problem of scarce technical resources by providing automated and intelligent performance tuning capabilities to eliminate performance bottlenecks. Priority Access allows you to define host access priority into the Lightning 9900 V Series systems,
This suite includes Hitachi RapidXchange®, Data Protection Services, and Tantia Technologies HARBOR File Transfer. It is designed to eliminate many of the constraints related to exchanging information in heterogeneous environments. This enables you to rapidly share and deliver information more efficiently throughout the enterprise.

Hitachi RapidXchange delivers high performance, reliable data sharing among heterogeneous host platforms. Swift information transfer is achieved without placing additional burdens on the network infrastructure or tape transport equipment. Combined with FlashAccess technology, RapidXchange quickly delivers information for applications such as data mining and data warehousing. Tantia Technologies HARBOR File Transfer adds automation to large data file transfers at ultra-high channel speeds in either direction between open systems and mainframe servers. After splitting large files into more manageable pieces, HARBOR File Transfer directs the data in multiple streams through Lightning 9900 V Series systems, making your information available and accessible at stellar rates.

Our Data Protection Services team ensures continuous access to information while we carry out plans to restructure operations or consolidate decentralized systems into an existing center. Data Protection Services incorporates components of the Business Continuity Suite for application with Hitachi Freedom Storage systems. By combining our services and software with our virtualization-enabled Lightning 9900 V Series systems, we offer you a complete solution not only for day-to-day business applications, but also to implement the processes involved in duplicating data to both local and remote locations for disaster recovery.

With the Lightning 9980V and Lightning 9970V systems, optimizing your resources ensures that a reduced TCO is part of the deal.

Simpler. Bigger. Faster. The next-generation Lightning 9980V and Lightning 9970V systems enable massive consolidation and centralization, resulting in newly simplified storage networking environments. Spend less time managing storage. Gain more time for planning and new business efforts. Reduced amount of software, less money spent on licensing and maintenance fees. The payback is visible on the IT floor—and on the books.

- Fewer connections
- Fewer storage management activities
- Easy-to-handle, automated tools; staff can be assigned to other tasks
- Aggressive use of embedded software applications
- Reduced licensing and maintenance costs
- Improved capacity utilization; less equipment required; lower costs
- Reduced floor space, power, and cooling; reduced environmental expenses

Absolutely bottleneck-free, the Lightning 9900 V Series systems deliver optimum service—the experience your customers demand.

Customers, partners, and employees have learned to expect instantaneous information access. With the Lightning 9900 V Series systems, you can give them what they want as you increase productivity, shorten time to market, and mitigate risk. The Lightning 9900 V Series systems, powered by the revolutionary Hi-Star switched architecture, are the world’s first truly bottleneck-free carrier-class storage systems that support a “no wait” experience.

Our second-generation Hi-Star switched architecture lets you scale infinitely—without slowing down. As the need for capacity increases, both Lightning 9900 V Series systems leverage your initial investment and scale up seamlessly without disrupting mission-critical business applications. Unlike traditional shared-bus technology, the Hi-Star internal switched architecture lets you add capacity without affecting performance. This means faster information access and faster conversion of information to knowledge that you can act on. And, more time for you to make decisions.

Cost of Risk and ROI Analysis: the reality check managers appreciate

Our Professional Services consultants can work with your business continuity planners to fully exploit the capabilities of the Lightning 9980V and Lightning 9970V storage systems. Our Cost of Risk Analysis and ROI methodology can help to identify the cost, benefit, ROI, and TCO in your information technology infrastructure. This allows you to reduce outage windows and their impact on your business, while you fine-tune your operations strategy. Our recommendations are aligned with your business objectives and presented in terms that you can take to your executive team.

Experience peace of mind with Hitachi Data Systems at your side. After installing your Lightning 9900 V Series system, we monitor it from our support center and handle routine system maintenance to keep it running at maximum efficiency. And you will continue to have rapid access to our time-honored service and support team throughout the life of your Hitachi Freedom Storage investment.
### Technical Specifications

**Logical Paths per System**

- **Interface Speed (Fibre Channel):** 2Gb/sec
- **Fibre Channel (fiber-optic cable):** 0, 8, 16, 24, 32

**Weight:** 553kg (1,216.6 lbs)

**Dimensions:** 800mm (31.5 in.)

**Height:** 1,860mm (73.2 in.)

**Logical Device Support:** Up to 8,192

**Control Memory:**
- **Maximum:** 3GB
- **Minimum:** 2GB

**Spare drives per system (maximum):**
- 16

**Maximum number of RAID groups/system:**
- 254 (with 8 spares)
- 252 (with 16 spares)

**Data Cache:**
- **Maximum:** 64GB
- **Minimum:** 4GB

**Control Memory Increments:**
- 4GB

**Logical Device Support:**
- Up to 8,192

### Control Frame

**CLIENT-HOST CHANNEL ADAPTERS (CHAs):**

- **Up to 4**

**Extended Serial Adapters:**

- No additional information provided.

**Fibre Channel (fibre-optic cable):**

- 0, 8, 16, 24

**Interface Speed (Fibre Channel):**

- 2Gb/sec

**Logical Paths per System:**

- Extended Serial Adapters

**Per ACP pair (to cache):**

- Up to 800MB/sec

**To disk array:**

- Up to 100MB/sec

**Array Frame:**

- **Lightning 9980V:**
  - 1 ACP pair
  - 32GB cache
  - 8,192 disk drives

- **Lightning 9970V:**
  - 1 ACP pair
  - 32GB cache
  - 8,192 disk drives

### Physical Specifications

**Height:**

- 1,860mm (73.2 in.)

**Width (with two side panels):**

- 780mm (30.7 in.)

**Depth:**

- 800mm (31.5 in.)

**Weight:**

- 553kg (1,216.6 lbs)

**Heat:**

- 796kW

**Power:**

- 5.76kVA

**Hard Disk Drives**

**GMR (Giant Magnetoresistive) Head Technology:**

- 73GB

**Rotation Speed:**

- 10,025RPM

**Form Factor:**

- 3.5-inch LP

**Media Diameter:**

- 3.0 in.

**Actuator:**

- Rotary

**Servo System:**

- Digital

**Interface:**

- FC-AL

**Internal Transfer Rate:**

- Inner Zone: 44.2MB/sec
- Outer Zone: 74.0MB/sec

**Average Seek Time:**

- Read: 4.9ms
- Write: 5.7ms

### Hitachi Freedom Storage Software

**Hitachi Freedom Storage Software**

- **Storage Area Management Suite**
  - Hitachi HiCommand Management Framework

- **Resource Management:**
  - Hitachi Graph-Track
  - Hitachi FlashAccess

- **Virtual Logical Volume Image (VLV):**
  - Manager
  - Hitachi LUN Manager

- **Command Interface:**
  - Sun StorEdge Resource Management Suite

- **Volume Management:**
  - VERTAS Volume Manager

- **Business Continuity Suite**
  - Hitachi TrueCopy
  - NanoCopy
  - Hi-Track

- **Parallel Access/Volume (HPAV/Multiple Allegiance (MA))**

- **Geographically Dispersed Parallel Sysplex (IBMs)**

- **Split Second Solutions**

- **Data Protection Services**

- **Backup and Recovery Suite**
  - Hitachi Multiplatform Backup/Restore (HMBR)
  - Hitachi e-Copy
  - VERTAS NetBackup

- **Data Protection Services**
  - Tantia Technologies HARBOR Backup

- **Performance Enhancement Suite**
  - Hitachi CruiseControl

- **Performance Maximization Package**

- **Hitachi Performance Monitor**

- **Hitachi CruiseControl**

- **Hitachi Priority Access**

- **DATA MOVEMENT SUITE**

- **Hitachi RapidXchange**

- **Data Protection Services**

- **Tantia Technologies HARBOR File Transfer**

- **Operating System Support**

- **OPEN SYSTEMS**
  - HP (Compaq) Tru64 UNIX
  - HP-UX
  - IBM AIX
  - Novell NetWare
  - Linux
  - IBM (Sequent) DYNIX/pixt
  - Solaris
  - Windows 2000
  - Windows NT
  - HP (Compaq) OpenVMS

- **S/390**

- **MVS/ESA**

- **MVS/XA**

- **OS/390**

- **S/390**

- **VSE/ESA**

- **VSE/SP (4.1)**

- **TPF**

**Notes:**

1. Extended Serial Adapters are compatible with ESCON protocol.
2. One controller, 64GB cache, 4 ACP pairs, 32 Fibre Channel ports.
3. One disk array frame, 256 disk drives, 18,371GB raw capacity using 73GB hard disk drives.
4. One full system, 32GB cache, 1 ACP pair, 24 Fibre Channel ports, and 128 disks.
5. Up to six Lightning 9960 frames can be attached to a Lightning 9980V control frame.
HOST FAILOVER AND ALTERNATE PATH SUPPORT

<table>
<thead>
<tr>
<th>HOST FAILOVER</th>
<th>ALTERNATE PATH</th>
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<tbody>
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<td>HP-UX Logical Volume Manager</td>
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<td>Sun Solaris</td>
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<tr>
<td>AIX</td>
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<td>Windows NT/2000</td>
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<tr>
<td>Linux</td>
<td>proprietary software</td>
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Superlative Service and Support—Ranked Number One

When you partner with Hitachi Data Systems, we’re with you every step of the way. Our service and support teams provide expert 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.

Hitachi TrueNorth™ — the Direction You Can Trust

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 total cost of ownership and ensuring a more rapid return on investment.

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 an open and collaborative storage management framework, policy-based automation tools, virtualization capabilities, and the world’s finest storage systems.

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