NEC S4900 S-Series Storage User Guide

NEC provides a full range of storage products
— from the NEC Storage S4900, which is a high end
storage system with advanced crossbar technology to
an entry-level model that is very cost-effective. These
products provide for high-performance and function
including 4Gbps FC host interface and low cost
backup/archive with mixture of high-perfor-mance FC
and low cost SATA disk drives*1. These functions are
maintained by a very functional series of NEC storage
management and control software. NEC S-Series
Storage opens the path to a new IT environment.

NEC *S-Series Storage*

S4900 / S2900 / S2500 / S1500

Empowered by Innovation **NEC**

NEC *S-Series Storage* meets the most advanced requirements for data storage from small to large enterprises.
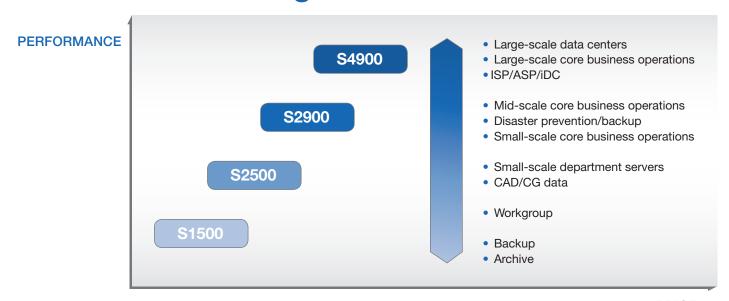
The growing volume of data has a tremendous impact on all facets of a business from the enterprise to the workgroup. That is why it is essential to have storage products that increase data efficiency, provide full availability and allow the business to realize an extremely low cost of ownership. To meet this require-ment, NEC provides a full range of storage products — from the NEC Storage S4900, which is a high end storage system with advanced crossbar technology to an entry-level model that is very cost-effective. These products provide for high-performance and function including 4Gbps FC host interface and low cost backup/archive with mixture of high-perfor-mance FC and low cost SATA disk drives[1]. These functions are maintained by a very functional series of NEC storage management and control software. NEC *S-Series Storage* opens the path to a new IT environment.

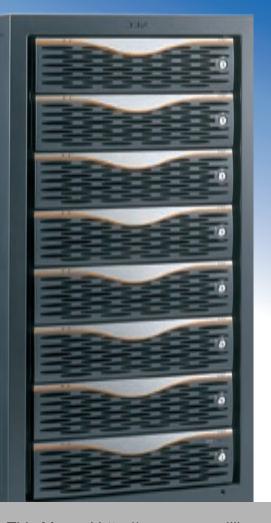[1]: NEC Storage S2900, NEC Storage S2500, NEC Storage S1500

NEC Storage S4900
High-end model

2

NEC *S-Series Storage*

S4900

S2900

S2500

S1500

- Large-scale data centers
- Large-scale core business operations
- ISP/ASP/iDC

- Mid-scale core business operations
- Disaster prevention/backup
- Small-scale core business operations

- Small-scale department servers
- CAD/CG data

- Workgroup

- Backup
- Archive

PRICE

NEC Storage S2900
Mid-high-range model

NEC Storage S1500
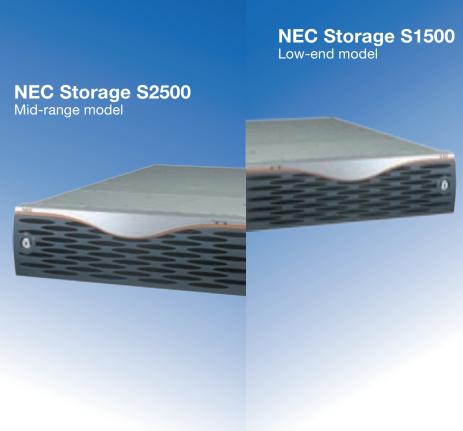Low-end model

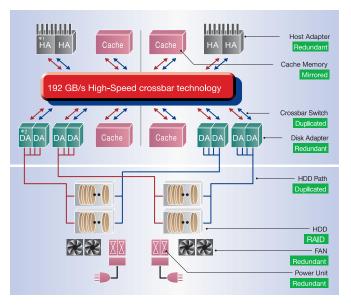## NEC Storage S2500
Mid-range model

3

Excellent Management and Operational Functions

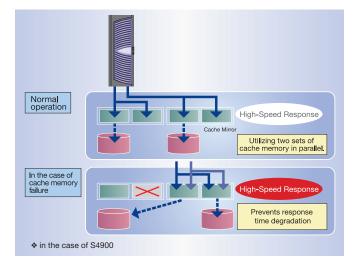## ■ Ultra high-performance with ultra high availability

Using ultra high speed cross bar technology connecting cache function and node function the NEC S Series storage provides for end-to-end performance and availability. The S4900 has a bandwidth of 192GB/s which allows for high-speed access to data even with many servers attached. Redundancy provides for full data availability even in the event of a component failure.

*1 HA HA	Host Adapter **Redundant**
Cache Cache	Cache Memory **Mirrored**
192 GB/s High-Speed crossbar technology	Crossbar Switch **Duplicated**
*2 DA DA DA DA Cache Cache DA DA DA DA	Disk Adapter **Redundant**
	HDD Path **Duplicated**
	HDD **RAID**
	FAN **Redundant**
	Power Unit **Redundant**

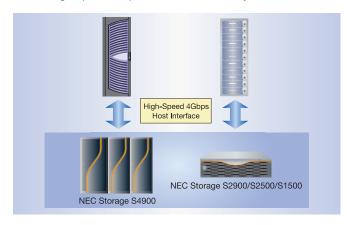*1: HA: Host Adapter *2: DA: Disk Adapter ❖ in the case of S4900

■ Cache redundancy prevents response degradation

The cache for the S4900 has two sets of mirrored cache. The redundancy permits cache writes even in the event of a cache failure. This provides for safe and high-speed response.

Normal operation

Cache Mirror

High-Speed Response

Utilizing two sets of cache memory in parallel.

In the case of cache memory failure

High-Speed Response

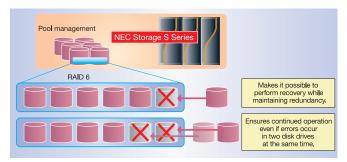Prevents response time degradation

❖ in the case of S4900

■ Equipped with 4Gbps FC host interface

Maximum bandwidth of 400MB/s with 4Gbps FC host interface allows high speed response even with many servers connected.

High-Speed 4Gbps Host Interface

NEC Storage S2900/S2500/S1500
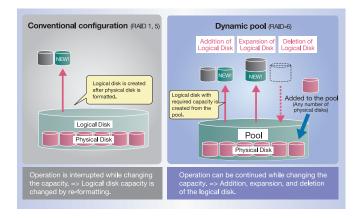
NEC Storage S4900

■ RAID 6 substantially increases availability

As the capacity of disk drives increase, it takes substantially longer to re-build data in the event of a disk drive failure. Using RAID 6, which utilizes dual parity, this is minimized and can also accommodate two drive failures without any loss of data availability.

Pool management

NEC Storage S Series

RAID 6

Makes it possible to perform recovery while maintaining redundancy.

Ensures continued operation even if errors occur in two disk drives at the same time.
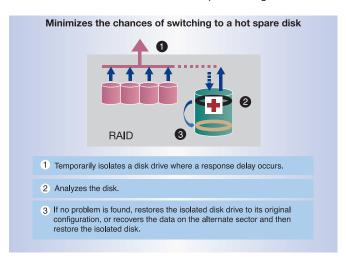
■ Virtual capacity management

The Dynamic Pool function allows LUN capacity to be expanded or reduced in a RAID 6 environment without disruption to the application. *1: Expansion by 6 or 10 HDDs for S4900

Conventional configuration (RAID 1, 5)

NEW!

Logical disk is created after physical disk is formatted.

Logical Disk

Physical Disk

Operation is interrupted while changing the capacity. => Logical disk capacity is changed by re-formatting.

Dynamic pool (RAID-6)

Addition of Logical Disk | Expansion of Logical Disk | Deletion of Logical Disk

NEW! NEW!

Logical disk with required capacity is created from the pool.

Added to the pool (Any number of physical disks)

Pool

Physical Disk

Operation can be continued while changing the capacity. => Addition, expansion, and deletion of the logical disk.
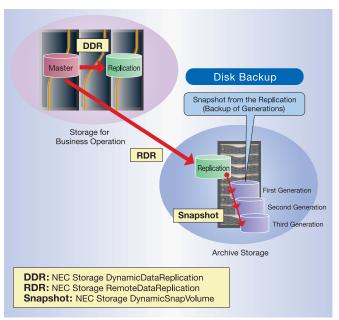
■ Phoenix technology to prevent business operations being interrupted

This technology first isolates the disk drive where a response delay has occurred, and automatically checks this isolated disk drive. If no problem is found, the isolated disk is restored to the original RAID configuration, minimizing the chance of switching to the hot spare disk. This technology also minimizes the delay in accessing from a server, because a disk drive where a response delay occurs is isolated temporarily, and other disk data in the RAID is used to continue processing.

Minimizes the chances of switching to a hot spare disk

RAID

1. Temporarily isolates a disk drive where a response delay occurs.
2. Analyzes the disk.
3. If no problem is found, restores the isolated disk drive to its original configuration, or recovers the data on the alternate sector and then restore the isolated disk.
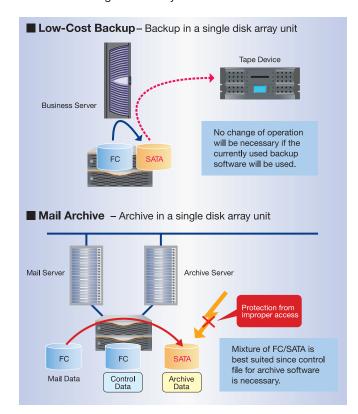
■ Replication functions

NEC S Series storage can satisfy a variety of needs including high-speed disk backup as well as low-cost backup with its full suite of replication functions.

DDR
Master → Replication

Disk Backup

Snapshot from the Replication
(Backup of Generations)

Storage for
Business Operation

RDR

Replication

First Generation
Second Generation
Third Generation

Snapshot

Archive Storage

DDR: NEC Storage DynamicDataReplication
RDR: NEC Storage RemoteDataReplication
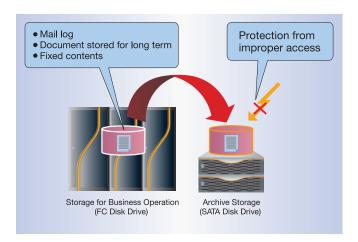**Snapshot:** NEC Storage DynamicSnapVolume

■ Low-cost backup/archive by mixture of FC/SATA disk drives

S2900/S2500/S1500 supports large capacity, low cost SATA disk drives as well as FC disk drives. FC disk drives for core business operations which require non-stop operation and high performance, and SATA disk drives for backup which requires large capacity and low cost. Both kinds of disk drives can be installed in a single disk array unit.

■ Low-Cost Backup – Backup in a single disk array unit

Tape Device

Business Server

FC   SATA

No change of operation will be necessary if the currently used backup software will be used.

■ Mail Archive – Archive in a single disk array unit

Mail Server   Archive Server

Protection from improper access

FC   FC   SATA
Mail Data   Control   Archive
            Data   Data

Mixture of FC/SATA is best suited since control file for archive software is necessary.

■ Security access control

Access to individual logical disks can be controlled. Write access can be restricted from any server providing for complete security and integrity of data.

● Mail log
● Document stored for long term
● Fixed contents

Protection from improper access

Storage for Business Operation   Archive Storage
(FC Disk Drive)   (SATA Disk Drive)

High-end Model

For the new area of core business operations and net-business that require uninterrupted, high-reliability, high-speed systems. Equipped with state-of-the-art technologies, including NEC's independently developed "crossbar technology."

S4900

High-end model equipped with state-of-the-art technologies
(up to 360TB - raw)

NEC Storage S4900

Host interface		Fibre channel (up to 400 MB/s)		
Number of host ports		8 to 128 ports		
Cache memory	Capacity	8 GB (effective capacity: 4 GB) to 128 GB (effective capacity: 64 GB)		
	Battery backup time	Up to 96 hours[*1]		
RAID level		RAID-1, 5, 10, 50, 6		
Disk drive specification	Disk interface	Fibre channel (up to 200 MB/s)		
	Capacity[*2] (Formatted)	73 GB disk drive	66.6GB	
		147 GB disk drive	133.1GB	
		300 GB disk drive	268.1GB	
	Rotational speed	73 GB disk drive	10,000rpm / 15,000rpm	
		147 GB disk drive	10,000rpm / 15,000rpm	
Storage capacity[*3] [*4]		300 GB disk drive	10,000rpm	
		73 GB disk drive	282GB~63.8TB	
		147 GB disk drive	569GB~127.8TB	
		300 GB disk drive	1.1TB~257TB	
			Basic configuration	Maximum configuration
Number of disk drives			12 to 60 (hot spares: 4)	1,200 (hot spares: 80)
Supported operating systems[*5]			HP-UX, Solaris, Microsoft® Windows® 2000 Server, Microsoft® Windows Server® 2003 Red Hat Enterprise Linux, MIRACLE LINUX, AIX	
Cabinet dimensions (W x D x H)[*6]			12 to 60 (hot spares: 4)	1,200 (hot spares: 80)
Weight			882 lbs.	10,340 lbs.
Power requirements			AC200~240V Single phase 50 / 60Hz	
Power consumption			5.4kW	31.4kW

*1: 96 hours with 8 to 64 GB cache memory, 72 hours with 80 to 128 GB cache memory. *2: Value obtained by calculation using 1 GB = 1,000,000,000B. *3: With seven expanded cabinets with the same disk drives and RAID configurations linked together. *4: RAID-6 (4+PQ) configuration for minimum capacity, RAID-6 (8+PQ) configuration for other capacity. *5: There are some restrictions on how disk drives are connected by fibre channel with these operating systems. New operating systems will be added to the list when they are supported. For more information, please feel free to contact NEC.
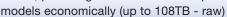
This Manual:http://www.manuallib.com/nec/s4900-s-series-storage-user-guide.html

For the core business operations of medium-sized enterprises that require high reliability, high-operability, and high-speed systems, and disaster contingency planning that pursues cost effectiveness. Advanced functions of the high-end models are provided by the mid-range models.

S2900

Equipped with high-speed 4Gbps FC host interface, both FC and SATA disk drives are installable. A mid-high-range model, providing the functions and operability of large-sized models economically (up to 108TB - raw)

NEC Storage S2900

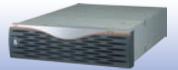|			
Cabinet configuration			Up to 16 disk enclosures can be connected to the disk array controller. One disk enclosure can house up to 15 disk drives.
Host interface			Fibre channel (up to 400 MB/s)
Number of host ports			8 ports
Cache memory	Capacity		4 GB (effective capacity: 2 GB) to 16 GB (effective capacity: 8 GB)
	Battery backup time		Up to 96 hours
RAID level			RAID-1, 5, 10, 50, 6
Disk drive specification	Disk interface		Fibre channel (up to 200 MB/s), Serial-ATA (up to 150MB/s)
	Capacity[1] (Formatted) FC	73 GB disk drive	66.6GB
		147 GB disk drive	133.1GB
		300 GB disk drive	268.1GB
	SATA	500 GB disk drive	458.3GB
	Rotational speed FC	73 GB disk drive	10,000rpm / 15,000rpm
		147 GB disk drive	10,000rpm / 15,000rpm
		300 GB disk drive	10,000rpm
	SATA	500 GB disk drive	7,200rpm
Storage capacity[2]	FC configuration	73 GB disk drive	143GB~13.7TB
		147 GB disk drive	285GB~27.4TB
		300 GB disk drive	576GB~55.2TB
	SATA configuration	500 GB disk drive	2.1TB~84.6TB
Number of disk drives			4 to 240
Supported operating systems[3]			HP-UX, Solaris, Microsoft® Windows® 2000 Server, Microsoft® Windows Server® 2003, Red Hat Enterprise Linux, MIRACLE LINUX, AIX
Cabinet dimensions (W x D x H)	Disk array controller		19" x 23.5" x 5.25"
	Disk enclosure		19" x 23.5" x 5.25"
Weight	Disk array controller		80 lbs.
	Disk enclosure		100 lbs.
Power requirements			DC-48V / plus 5-15 receptacle
Power consumption			839W~8,564W

*1: Value obtained by calculation using 1 GB = 1,000,000,000B. The capacity of each disk drive is slightly lower with RAID-6 configuration. *2: For FC HDD, RAID-1 configuration for minimum capacity, RAID-5 configuration for maximum configuration. For mixture of FC and SATA HDD, RAID-6 (4+PQ) with SATA HDD and RAID-1 with FC 73GB HDD configuration for minimum capacity, RAID-6 (8+PQ) with SATA HDD and RAID5 with FC 300 GB HDD configuration for maximum capacity. *3: There are some restrictions on how disk drives are connected by fibre channel with these operating systems. New operating systems will be added to the list when they are supported. For more information, please feel free to contact NEC.

For areas such as operations and other work groups that require high reliability, space-savings, and expandable systems. By mixing FC/SATA disk drives[*1], large amounts of data can be stored cost-effectively. *1: Optional disk enclosure is required to install SATA disk drives.

S2500

Mid-range model with high-speed 4Gbps FC host interface, FC/SATA disk drives installable, and space saving (up to 48TB - raw)

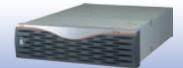| NEC Storage S2500				
Cabinet configuration			Up to 7 disk enclosures can be connected to the disk array controller. One disk array controller or disk enclosure can house up to 15 disk drives.	
Host interface			Fibre channel (up to 400 MB/s)	
Number of host ports			4 ports	
Cache memory	Capacity		4 GB (effective capacity: 2 GB) to 8 GB (effective capacity: 4 GB)	
	Battery backup time		Up to 72 hours	
RAID level			RAID-0, 1, 5, 10, 50, 6	
Disk drive specification	Disk interface		Fibre channel (up to 200 MB/s), Serial-ATA (up to 150MB/s)	
	Capacity*1 (Formatted)	FC	73 GB disk drive	66.6GB
			147 GB disk drive	133.1GB
			300 GB disk drive	268.1GB
		SATA	500 GB disk drive	458.3GB
	Rotational speed	FC	73 GB disk drive	10,000rpm / 15,000rpm
			147 GB disk drive	10,000rpm / 15,000rpm
			300 GB disk drive	10,000rpm
		SATA	500 GB disk drive	7,200rpm
Storage capacity*2	FC configuration		73 GB disk drive	143GB~6.8TB
			147 GB disk drive	285GB~13.7TB
			300 GB disk drive	576GB~27.6TB
	SATA configuration		500 GB disk drive	2.1TB~37.4TB
Number of disk drives			4 to 120	
Supported operating systems*3			HP-UX, Solaris, Microsoft® Windows® 2000 Server, Microsoft® Windows Server® 2003, Red Hat Enterprise Linux, MIRACLE LINUX, AIX	
Cabinet dimensions (W x D x H)	Disk array controller		19" x 23.5" x 5.25"	
	Disk enclosure		19" x 23.5" x 5.25"	
Weight	Disk array controller		80 lbs.	
	Disk enclosure		100 lbs.	
Power requirements			DC-48V / plus 5-15 receptacle	
Power consumption			680~4,285W	

*1: Value obtained by calculation using 1 GB = 1,000,000,000B. The capacity of each disk drive is slightly lower with RAID-6 configuration. *2: For FC HDD, RAID-1 configuration for minimum capacity, RAID-5 configuration for maximum configuration. For mixture of FC and SATA HDD, RAID-6 (4+PQ) with SATA HDD and RAID-1 with FC 73GB HDD configuration for minimum capacity, RAID-6 (8+PQ) with SATA HDD and RAID5 with FC 300 GB HDD configuration for maximum capacity. *3: There are some restrictions on how disk drives are connected by fibre channel with these operating systems. New operating systems will be added to the list when they are supported. For more information, please feel free to contact NEC.

Low-end model for departmental operations and work groups. By mixing FC/SATA disk drives[1], large amounts of data can be stored cost-effectively. *1: Optional disk enclosure is required to install SATA disk drives.

S1500

Low-end model with high-speed 4Gbps FC host interface, FC/SATA disk drives installable, and excellent price performance (up to 27TB - raw)
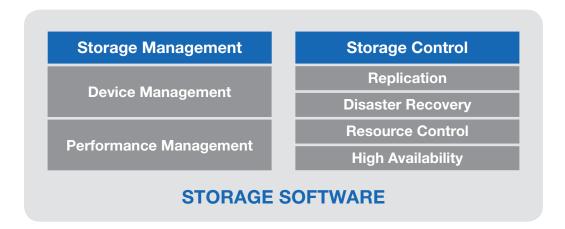
NEC Storage S1500

Cabinet configuration				Up to 3 disk enclosures can be connected to the disk array controller. One disk array controller or disk enclosure can house up to 15 disk drives.
Host interface				Fibre channel (up to 400 MB/s)
Number of host ports				4 ports
Cache memory	Capacity			2 GB (effective capacity: 1 GB) to 4 GB (effective capacity: 2 GB)
	Battery backup time			Up to 72 hours
RAID level				RAID-0, 1, 5, 10, 50, 6
Disk drive specification	Disk interface			Fibre channel (up to 200 MB/s), Serial-ATA (up to 150MB/s)
	Capacity[1] (Formatted)	FC	73 GB disk drive	66.6GB
			147 GB disk drive	133.1GB
			300 GB disk drive	268.1GB
		SATA	500 GB disk drive	458.3GB
	Rotational speed	FC	73 GB disk drive	10,000rpm / 15,000rpm
			147 GB disk drive	10,000rpm / 15,000rpm
			300 GB disk drive	10,000rpm
		SATA	500 GB disk drive	7,200rpm
Storage capacity[2]	FC configuration		73 GB disk drive	71.6GB~3.4TB
			147 GB disk drive	142GB~6.8TB
			300 GB disk drive	288GB~13.8TB
	SATA configuration		500 GB disk drive	2.0TB~21.1TB
Number of disk drives				3 to 60
Supported operating systems[3]				HP-UX, Solaris, Microsoft® Windows® 2000 Server, Microsoft® Windows Server® 2003, Red Hat Enterprise Linux, MIRACLE LINUX, AIX
Cabinet dimensions (W x D x H)	Disk array controller			19" x 23.5" x 5.25"
	Disk enclosure			19" x 23.5" x 5.25"
Weight	Disk array controller			80 lbs.
	Disk enclosure			100 lbs.
Power requirements				DC-48V / plus 5-15 receptacle
Power consumption				590~2,135W

*1: Value obtained by calculation using 1 GB = 1,000,000,000B. The capacity of each disk drive is slightly lower with RAID-6 configuration. *2: For FC HDD, RAID-1 configuration for minimum capacity, RAID-5 configuration for maximum configuration. For mixture of FC and SATA HDD, RAID-6 (4+PQ) with SATA HDD and RAID-1 with FC 73GB HDD configuration for minimum capacity, RAID-6 (8+PQ) with SATA HDD and RAID5 with FC 300 GB HDD configuration for maximum capacity. *3: There are some restrictions on how disk drives are connected by fibre channel with these operating systems. New operating systems will be added to the list when they are supported. For more information, please feel free to contact NEC.

NEC provides software products to meet a diverse range of customer needs.

Storage Management	Storage Control
Device Management	**Replication**
	Disaster Recovery
Performance Management	**Resource Control**
	High Availability

STORAGE SOFTWARE

Storage Management

As IT systems store more and more data every year, it is becoming more important to operate and manage data efficiently. Storage Management Software provides a group of integrated operation management products to perform total management of storage systems. It provides more efficient storage operation management by supporting management tasks including fault and performance monitoring and making backups in a unified way, decreasing the TCO (Total Cost of Ownership).

Device Management
The NEC Storage Manager keeps track of the status, configuration, and conditions of the disk arrays. These functions are tightly integrated with operation management software, making total system management possible.

Performance Management
Storage Management Software provides management information about the performance and capacity of disk arrays, making efficient storage management possible.

NEC Storage Manager

The operating status and messages for the system as a whole can be monitored using the integrated viewer.

Business operations can be managed in a single way across the system.

System administrator

NEC Storage Manager

Cooperation

· **Message cooperation**
· **NEC Storage Manager can be activated from the integrated viewer screen (launcher function).**

NEC Storage S Series

Servers

Storage Control

Building an IT system where a diverse range of business activities are carried out requires the efficient use of data and a system with high availability. Storage Control Software provides the basic system functions to ensure that the system is highly available and operable, with a data protection function with no influence on online operations, a disaster recovery function, autonomous resource management, and the efficient use of resources.

Replication

Storage Control Software provides functions for protecting data and improving the operability of data without affecting online operations by duplicating volumes in the storage system.

Disaster Recovery

Storage Control Software provides the function to implement disaster recovery by providing the basic functions for disaster control solutions.

Resource Control

Storage Control Software provides functions which autonomously adjust resources, by eliminating bottlenecks and setting access controls, so that resources can be used safely and efficiently.

High Availability

Storage Control Software has a path switching function to provide for high availability.

Replication

- NEC Storage DynamicDataReplication
- NEC Storage RemoteDataReplication
  These provide replication functions for systems that require high performance and high reliability.
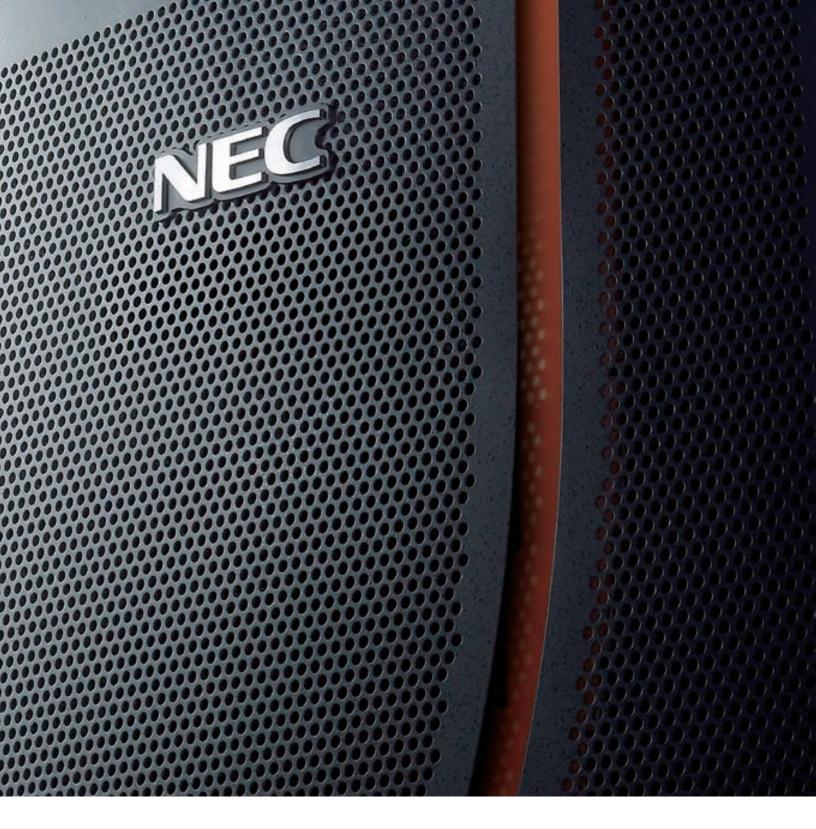- NEC Storage DynamicSnapVolume
  Provides a replication function for cost-performance-oriented systems, with the ability to create snapshots holding the differences in updated data only.

Software

Type		Product name	S1500	S2500	S2900	S4900	Feature
Storage Management	Device Management	NEC Storage Manager *1	✔	✔	✔	✔	Basic storage management functions (monitoring status and displaying configurations)
		NEC Storage ReallocationControl	✔	✔	✔	✔	Disk resource optimization function
	Performance Management	NEC Storage PerformanceMonitor	✔	✔	✔	✔	Performance monitoring function
		NEC Storage PerformanceNavigator	✔	✔	✔	✔	Function for increasing the efficiency of performance analysis
	Replication Management	NEC Storage ReplicationControl SQL Option	✔	✔	✔	✔	Option to enable non-disruptive backup of Microsoft® SQL Server™ 2005 *2
		NEC Storage ReplicationControl FileSystemOption	✔	✔	✔	✔	File system synchronized disk separation option
Storage Control	Replication	NEC Storage DynamicDataReplication	✔	✔	✔	✔	Function for replicating volumes within the same storage system
		NEC Storage RemoteDataReplication	✔	✔	✔	✔	Function for replicating volumes across different storage systems
		NEC Storage DynamicSnapVolume	✔	✔	✔	✔	Function for creating snapshots using the disk capacity efficiently
	Disaster Recovery	NEC Storage RemoteDataReplication/DisasterRecovery			✔	✔	Basic function to enable the recovery of business operations in a disaster
	Resource Control	NEC Storage AccessControl	✔	✔	✔	✔	Function to enable and disable disk access
		NEC Storage PerformanceOptimizer			✔	✔	Function to optimize disk performance
		NEC Storage CachePartitioning			✔	✔	Cache partitioning function
	Performance Management	NEC Storage VolumeProtect	✔	✔	✔	✔	Function to protect the data from improper access
		NEC Storage PathManager	✔	✔	✔	✔	Path redundancy function

*1: included in NEC Storage BaseProduct *2: Microsoft® SQL Server™ 2000 is also supported

For further information please contact:
NEC Corporation of America
2890 Scott Boulevard
Santa Clara, CA 95050
www.necam.com

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This Manual:http://www.manuallib.com/nec/s4900-s-series-storage-user-guide.html