


SAN Storage Product Family

NEC Storage D Series D1/D3/D8

To the new generation
of storage.



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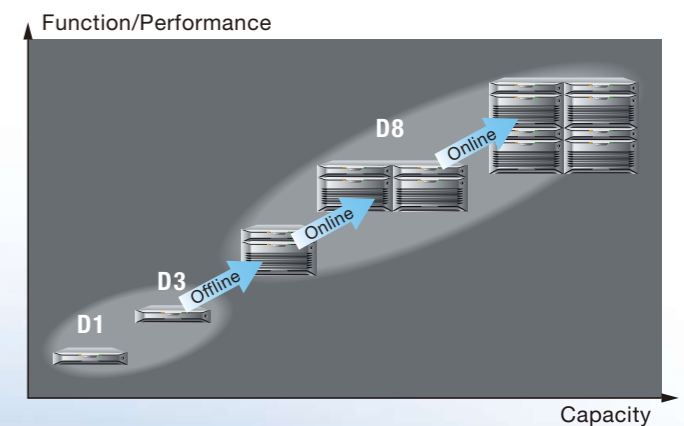
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To the new generation of storage.

The amount of data used within the enterprise is growing at an unprecedented rate. Key drivers for this growth are regulatory requirements, e-business, consolidation and general business expansion. The storage beyond the limit of conventional storage is required today.

The whole new storage “D Series” is the solution for this requirement. “D8” provides dynamic scalability realized by building block architecture. “D1/D3” provides simple installation and operation. “D8” has the online upgrade path from small to enterprise class in just one single model*. It provides both flexibility and scalability at the same time by “Dynamic Resource Management”, which is advanced virtualization technology.



* D3 to D8 offline upgrade is also available.



Storage with online scalability

D8

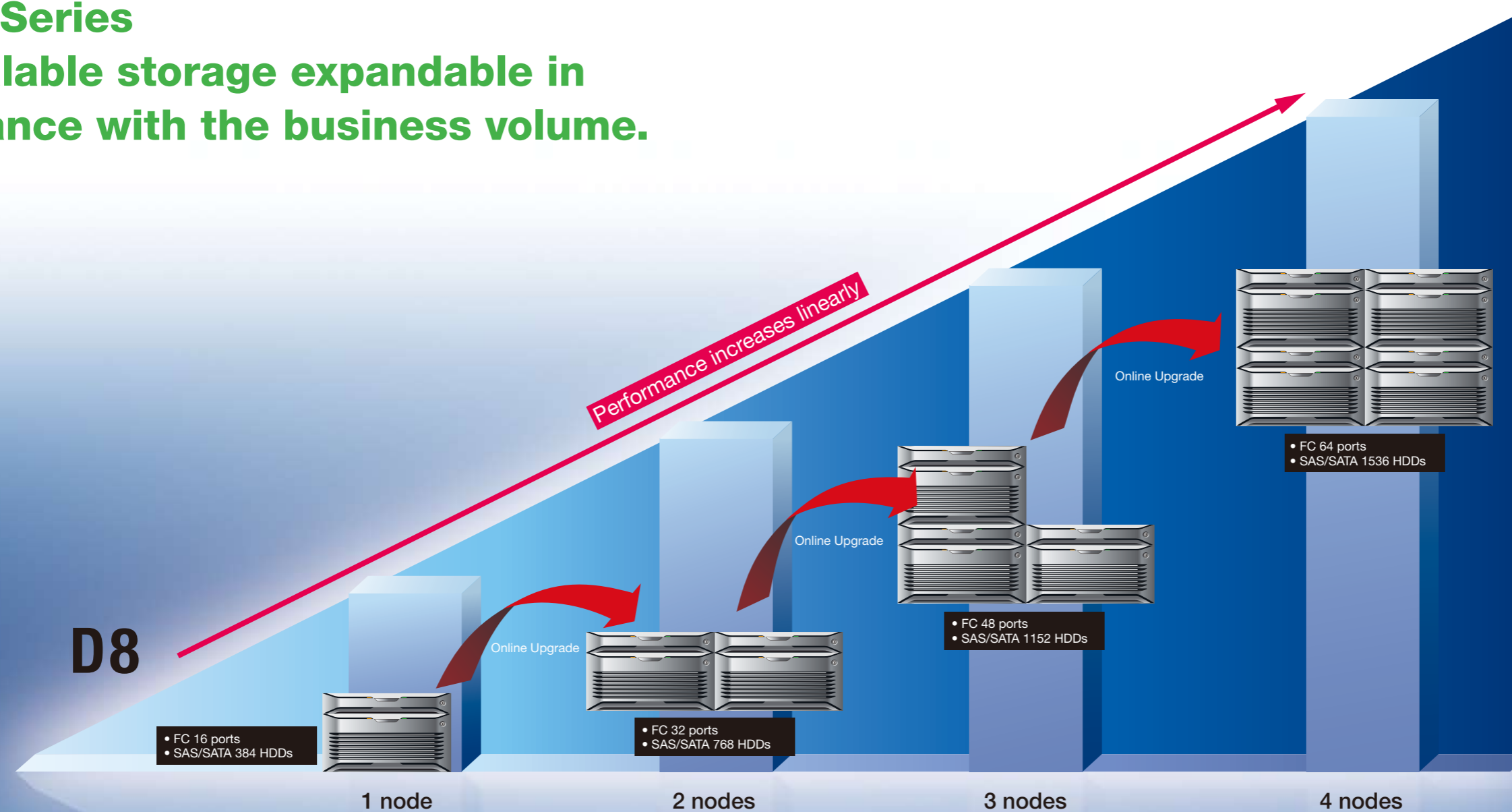


Storage with simple installation and operation

D1/D3

The D8 Series

The scalable storage expandable in accordance with the business volume.



The volume of data within the enterprise is increasing in relation to the growth of the enterprises' activities. Conventional storage does not have the scalability to match such dramatic growth. But the initial cost of introducing a storage solution capable of matching a company's growth can be excessive. The D8 Series storage system offers the ability to be expanded in both capacity and performance, with minimal cost and while retaining full access to the data.

The D8 Series is designed to meet the performance, reliability and functionality of a high-end storage system. Utilizing high performance and high availability RAID technologies, a disk/controller interface of 12Gbps (4 x SAS 3Gbps Wide Link), and the efficient use of virtualization, the D8 Series is the value storage product for today and for the future.

Flexibility

The D8 Series can be upgraded using a building-block approach. Additional host ports, cache memory and disks can be added as the business grows. The resources of the storage system can be virtualized and distributed dynamically within the business. Starting with a minimal configuration, then expandable to a midrange or high-end system, the D8 Series can maintain an optimal storage capacity in line with the company's requirements.

Operability

With conventional storage systems, some physical disks can experience excessive or sudden bursts of activity, while other disks are rarely used. The D8 Series uses enhanced virtualization technology to create virtualized resource pools, optimizing the access to the disks, even when under heavy load.

Availability

Business continuity has become one of the most important issues of storage systems. With redundant storage processors, power supplies and mirrored cache memory, the D8 Series has no single point of failure; and its use of advanced RAID technologies can safeguard data even in the event of a multiple disk failure.

The D Series makes change in "Flexibility".

The change is the norm in today's business environment.

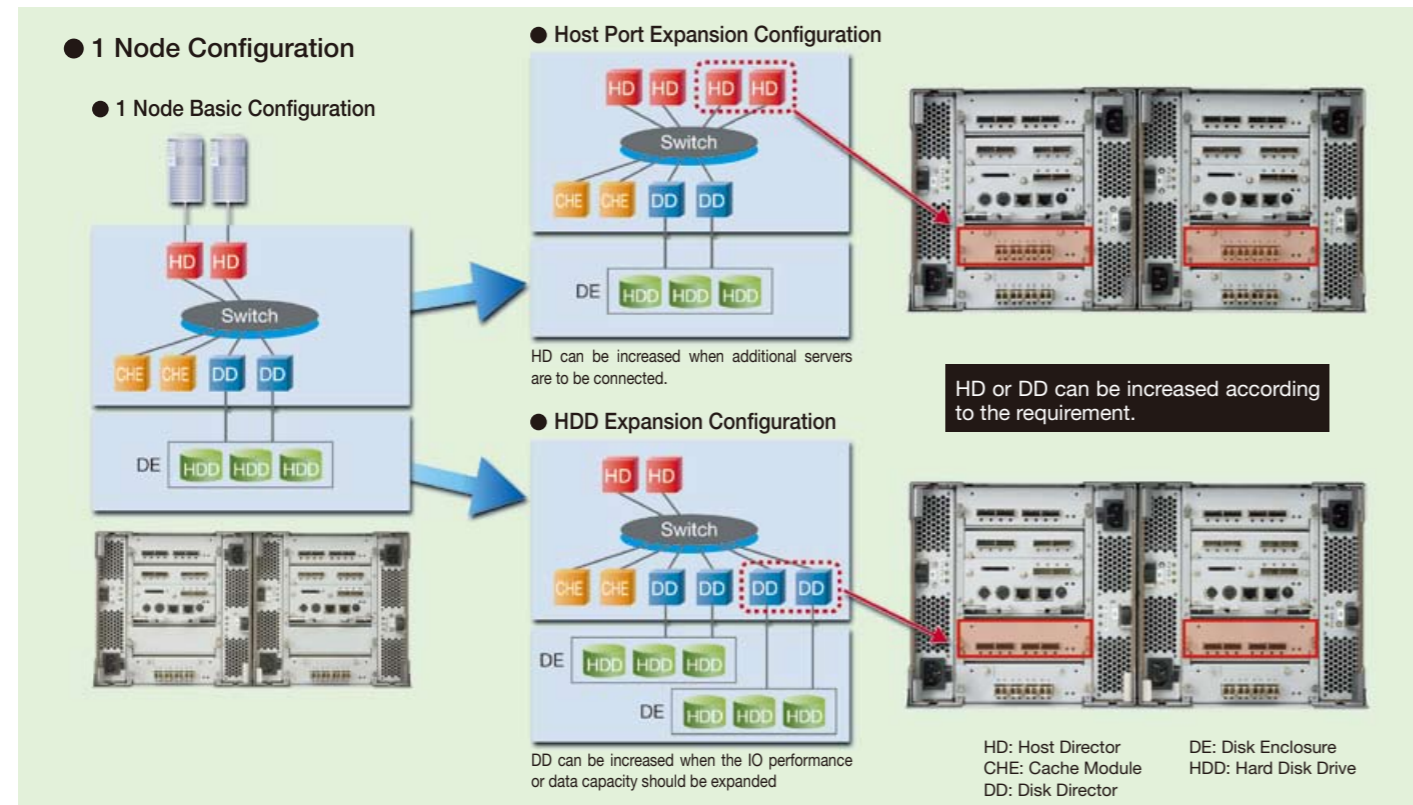
Flexibility to meet the customer's requirement is the key point for the storage system.

The D8 proposes new type of flexibility such as flexibility in resource configuration, flexibility in the logical partitioning as well as the flexibility of the building block.

Flexible expansion is available to catch up with the changing business environment.

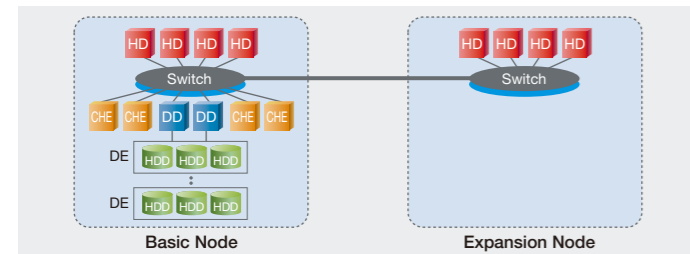
D8

The D8 Series can be flexibly upgraded to meet the customer's requirement. It is easy to increase the number of host ports when it is required to increase the number of the connected servers. It is also easy to increase the number of disk drives when it is required to expand the data capacity. In addition, when it is required to enhance the performance of the storage to startup a new business for instance, it can be seamlessly upgraded by just adding the nodes.

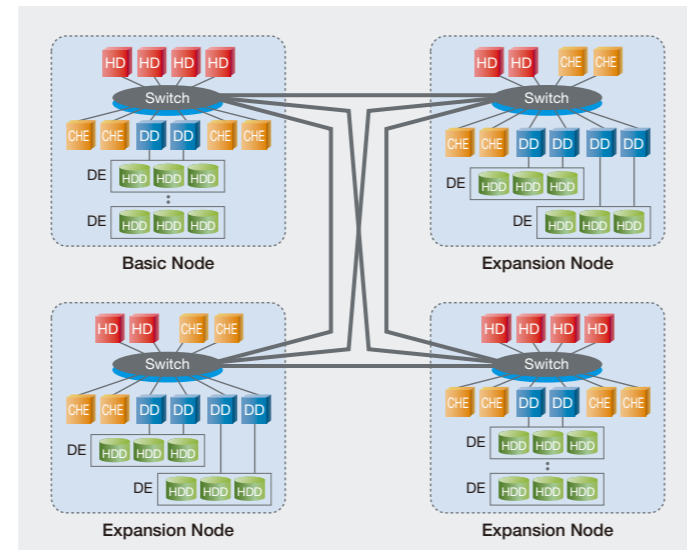


Various configurations are available for various requirements.

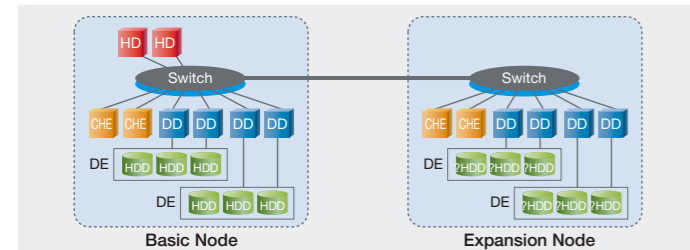
2 Node Configuration (Ex. Host Port Expansion Configuration)



4 Node Configuration



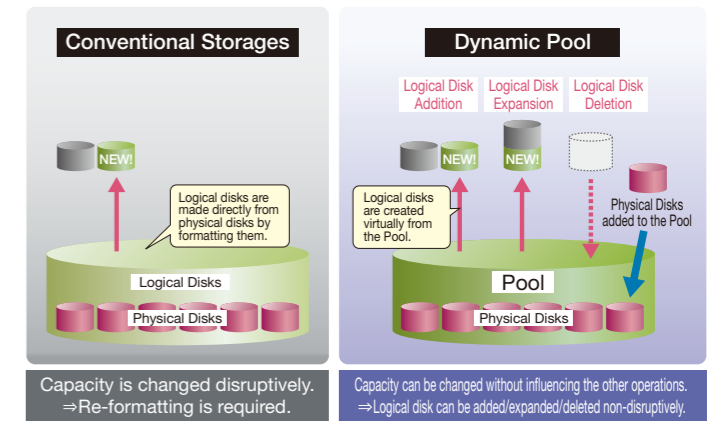
2 Node Configuration (Ex. HDD Expansion Configuration)



Dynamic Pool function allows easy change of capacity.

D1 D3 D8

When expanding the logical disk by conventional way, it is required to backup the data and create a new logical disk. This operation has become easy and simple by NEC's virtualization technology. Physical disks can be virtualized as a pool, and the logical disk can be created from the pool, and also can be expanded as required. The efficiency of the storage use can be improved, and the sudden change of data amount can be flexibly managed.

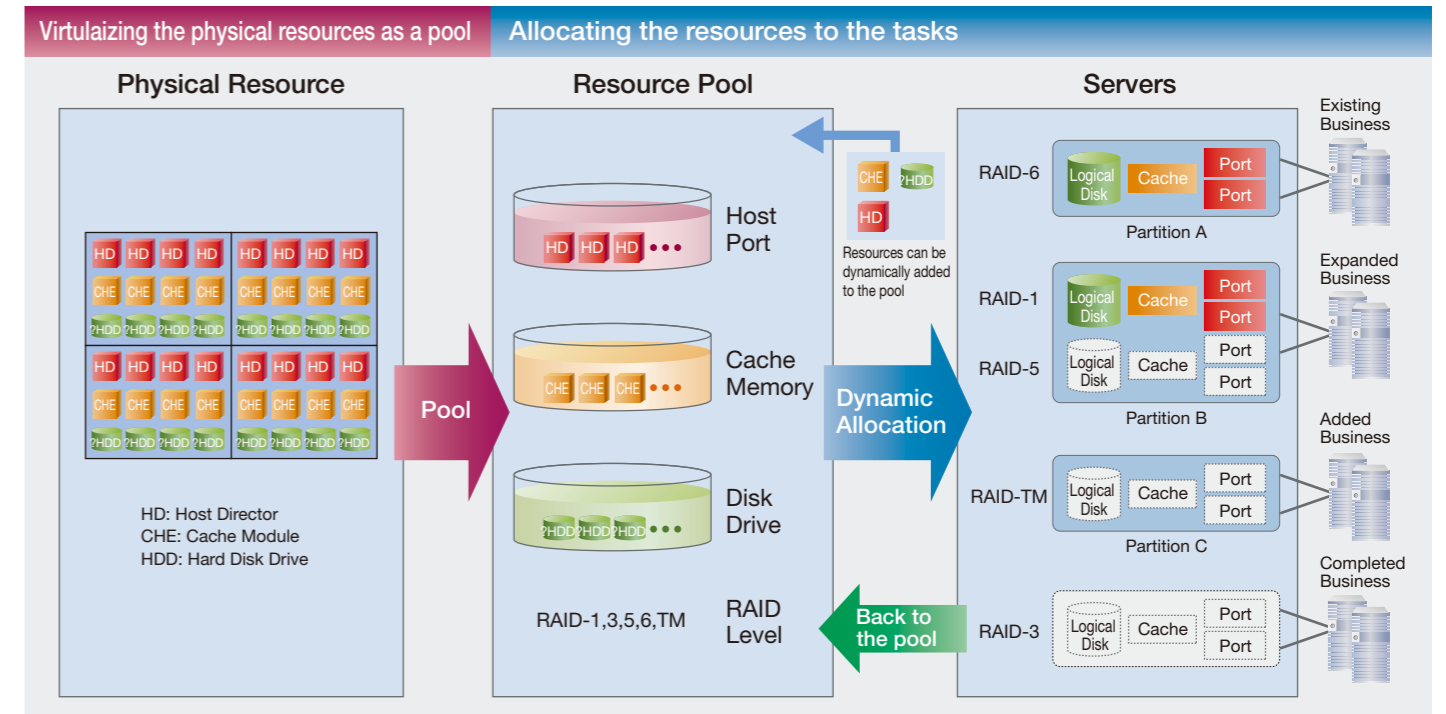


Resources can be changed non-disruptively and flexibly by advanced virtualization technology

D8

Resources within the storage such as Host Directors, Cache Modules and Disk Drives are managed by virtualized resource pool. The resources can be allocated to each task from the pool. They also can be added or reallocated to other tasks non-disruptively. Flexible accommodation to the change of business environment is available with this technology. GUI of the Web client can show the status of the resources.

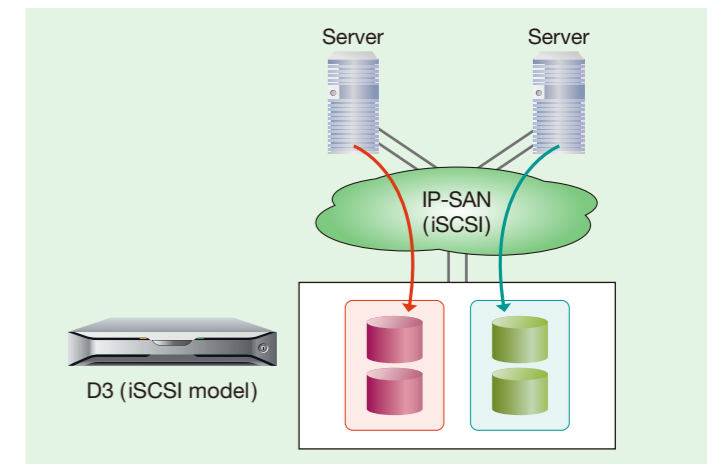
<Realized by NEC Storage VirtualStoragePartitioning>



iSCSI model and Fibre Channel model are available.

D3

iSCSI model of D3 has been released to support IP-SAN. This model supports SAN handily and at low cost. Also, back up solutions of D3 such as replication can be introduced easily.



The D Series makes change in "Operability".

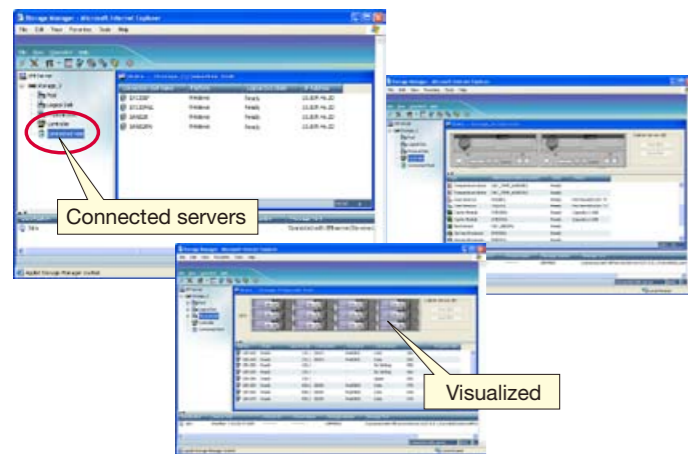
Storage systems have to deal with various requirements flexibly as the business activities of the enterprises change. How to optimize the storage system in a situation like a sudden surge of access is one of the big issues today. The D Series makes full use of NEC's advanced virtualization technology to allocate the storage resources dynamically, and support efficient operation of the system. Visualized Web client offers simple and easy operability.

Centralized management and operation by visualized Web client.

D1 D3 D8

The D Series offers GUI of Web client for every operation from installation to administration. Operational status of the system components such as storages, connected servers, logical disks can be visualized.

<Realized by NEC Storage Manager>

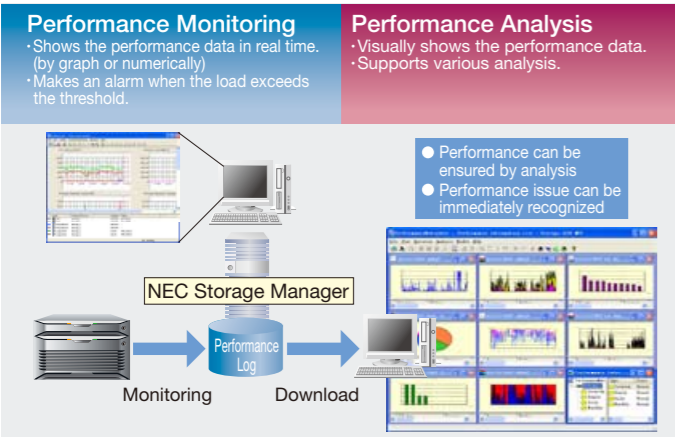


Storage's performance can be monitored and analyzed in real time.

D1 D3 D8

Monitoring and analysis of the storage performance is necessary for the mission critical businesses. Performance monitoring function can show the status by graph or numerically in real time, and makes an alarm to the administrator when it exceeds the threshold. In addition, it also can download the performance log to a PC for various analysis. This function allows prompt care for the over load, and decreases the management cost by centralized monitoring.

<Realized by NEC Storage PerformanceMonitor and NEC Storage PerformanceNavigator>

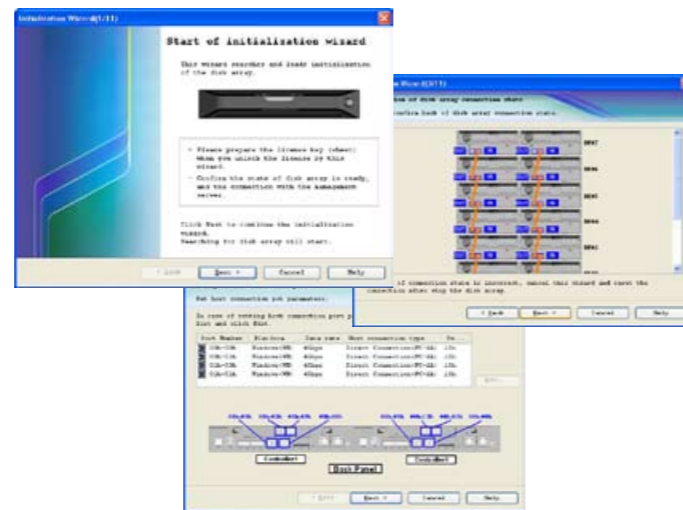


Simple and easy installation.

D1 D3

The installation process of the NEC Storage D1/D3 has been thoroughly reviewed and simplified. Maintenance PC required for the conventional models is not necessary for the new models. The installation of the D Series can be completed by just a few steps of the setup wizard of NEC Storage Manager.

<Realized by NEC Storage Manager>

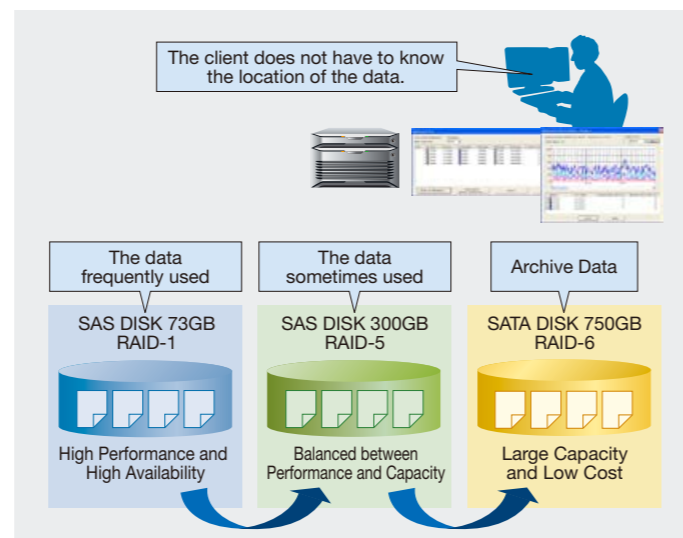


Data can be dynamically reallocated to the disks according to the importance.

D3 D8

RAID-1 of SAS disk for the data frequently accessed, RAID-5 for the data less frequently accessed, SATA disk for the data rarely accessed... The data can be reallocated flexibly within a single storage.

<Realized by NEC Storage PerformanceOptimizer>

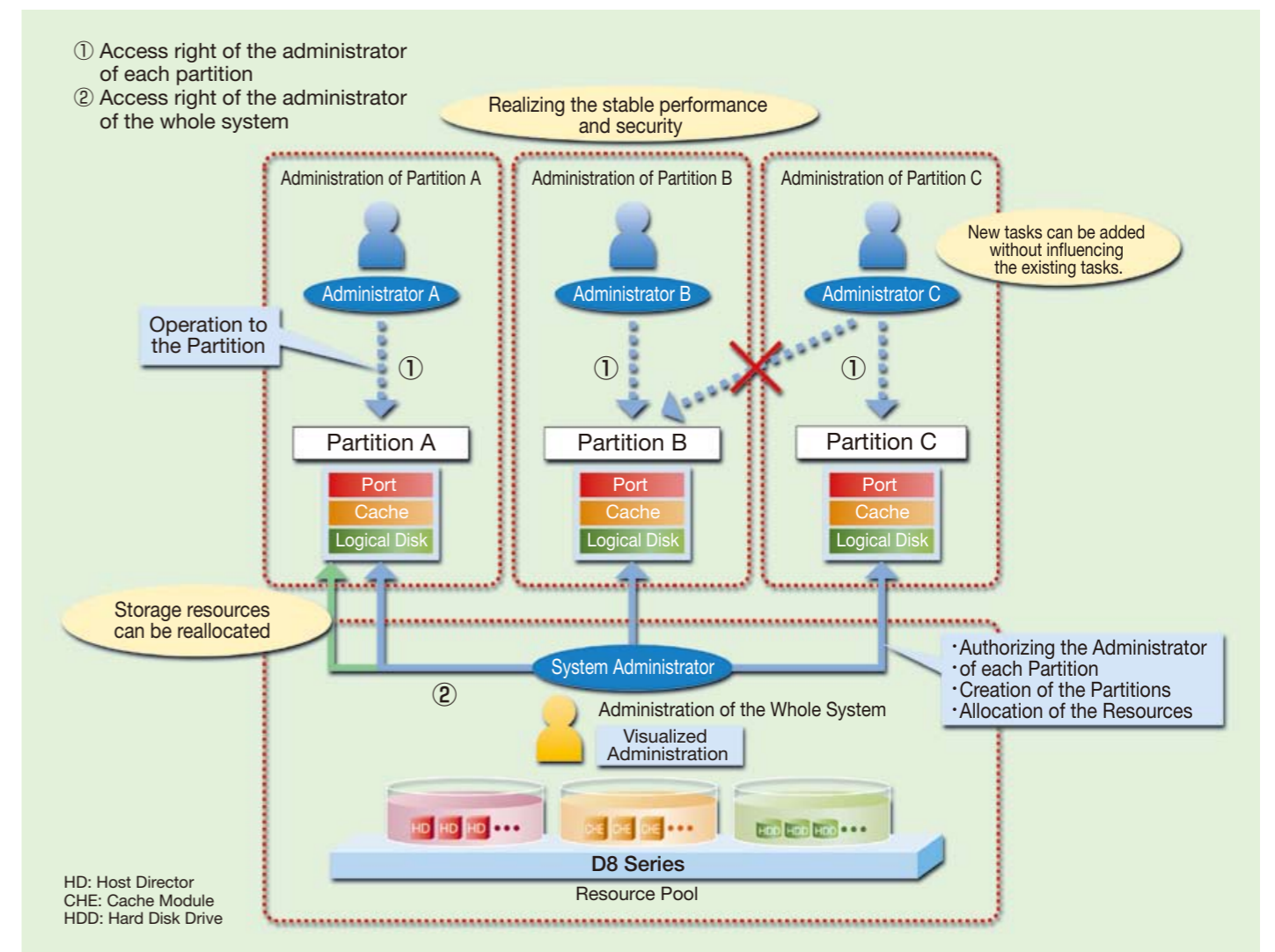


Allocating tasks to different partitions prevents influence of the task on each other.

D8

The D8 Series can divide the storage into some logical partitions. When some storages are consolidated and many different tasks are operated with one storage, each task has its own partition and can be isolated from each other. By this technology, the influence of the task on each other can be prevented. The resources can be added to or taken away from the partition flexibly. The administrator of each partition cannot access the other partitions, so it is safe and secured.

<Realized by NEC Storage VirtualStoragePartitioning>



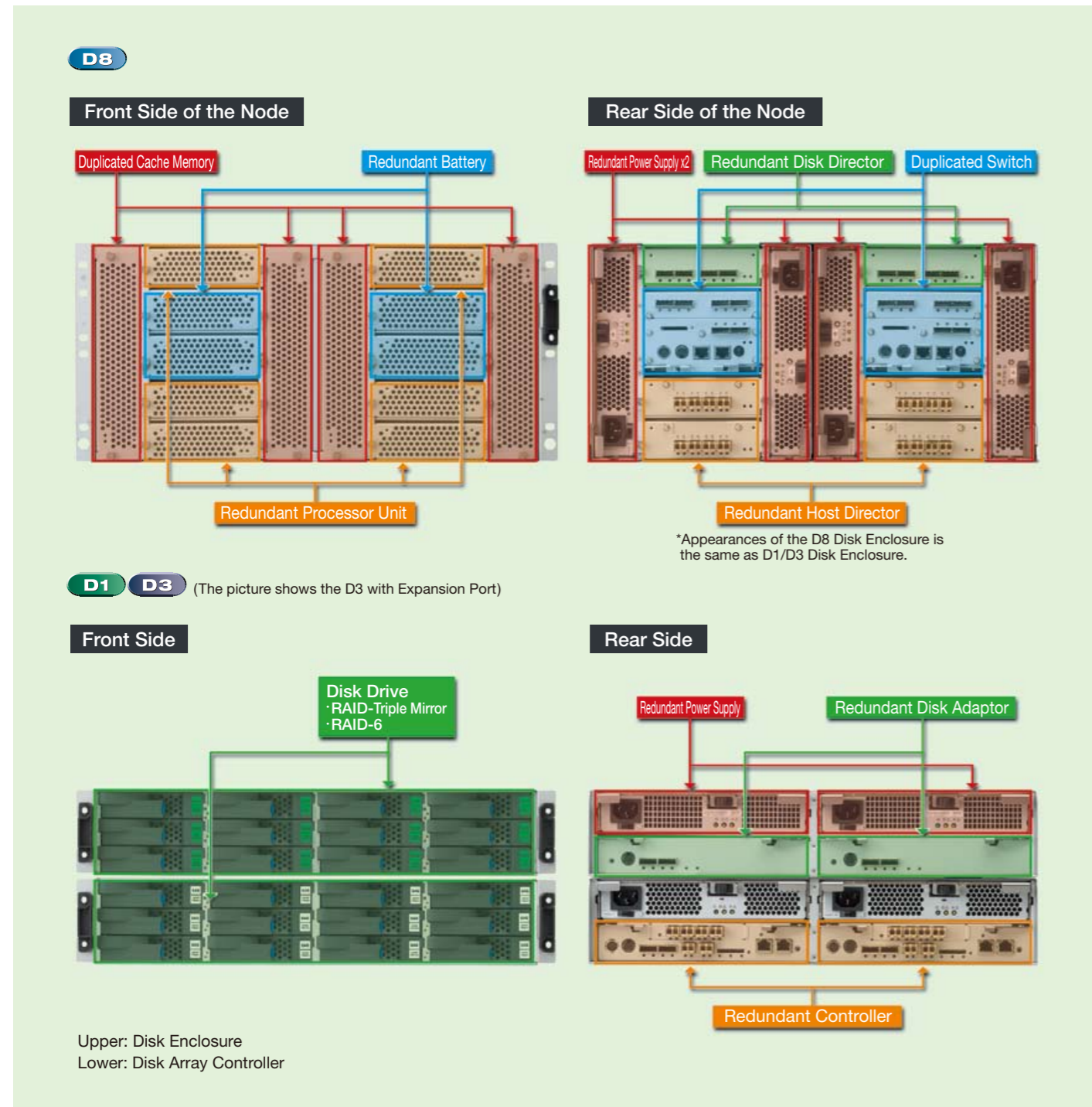
The D Series makes change in "Availability".

Even suspension for just a few seconds may have enormous impact on the business... "Availability" is a never ending challenge for the storage for enterprise's invaluable data. The D Series makes all the main components redundant/duplicated. Even higher order of availability is realized by advanced technologies such as RAID-Triple Mirror and duplication of redundant power supply.

Redundancy/duplication of main components

D1 D3 D8

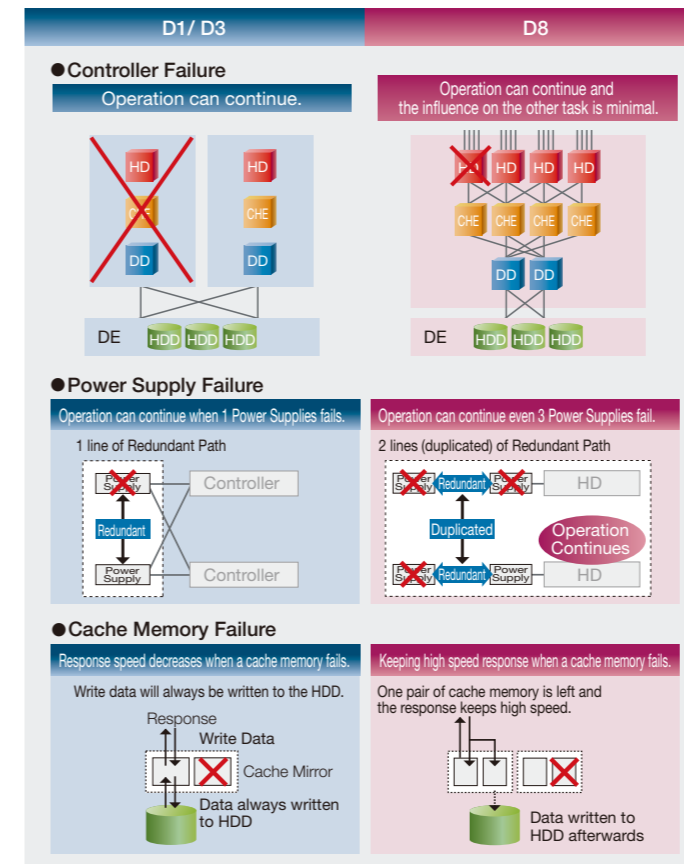
Do not suspend the operation ever... The D Series inherits the high availability technology of high-end SAN storage S Series. Completely avoid Single Point of Failure by redundancy/duplication of all the main components such as disk drives, host directors and power supply. Even when a failure occurs, it can be maintained without suspension of the system.



Better business continuity by keeping the performance in the event of failure.

D8

The D8 Series has the high availability design of the high-end class even from the 1 node model. When one of the host directors fails, the influence on the other controllers is minimal. Mirrored cache memory keeps high-speed response when one of the cache memories fails. Power supply of each line is duplicated, so the operation can continue even when three power supplies fail if the server path is duplicated.

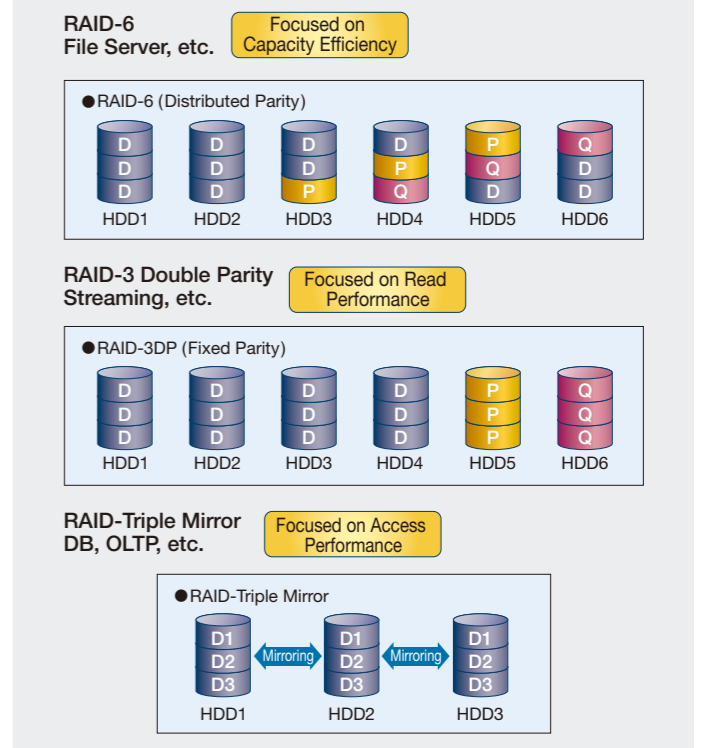


RAID with advanced redundancy for today's large-capacity systems.

D1 D3 D8

As the information of the enterprises is rapidly increasing, the disk drives of the systems have the trend toward large-capacity. The longer the restoration time, the more the risk of another disk drive's failure during the restoration, which might cause data loss. The D Series supports a newly developed RAID-Triple Mirror^{*1}, which has the speed of RAID-1 and the reliability of RAID-6 together, and RAID-3 Double Parity^{*2} in addition to RAID-6 which was developed for S Series. NEC's RAID technology meets the requirement of both large-capacity and high-reliability at the same time.

^{*1} Planned to be supported in 1Q of CY2008.
^{*2} Planned to be supported in 3Q of CY2007.

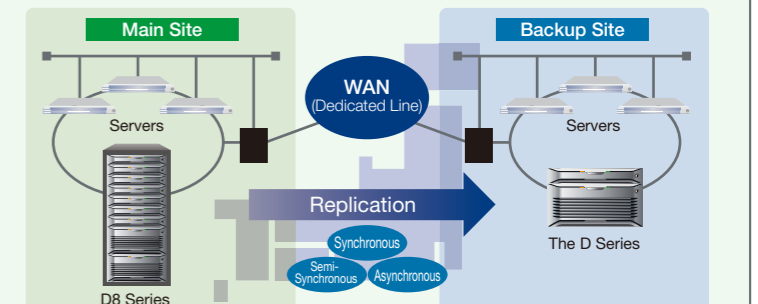


<Realized by NEC Storage RemoteDataReplication/DisasterRecovery>

Remote replication for disaster recovery.

D8

Transporting the backup tapes between remote sites is one of the major measures against the disasters such as earthquake and fire. But how the cost of transportation can be reduced... The D8 Series backs up the data to remote sites in real time via WAN, using its replication function. Even in the event of disaster, it can minimize the data loss.

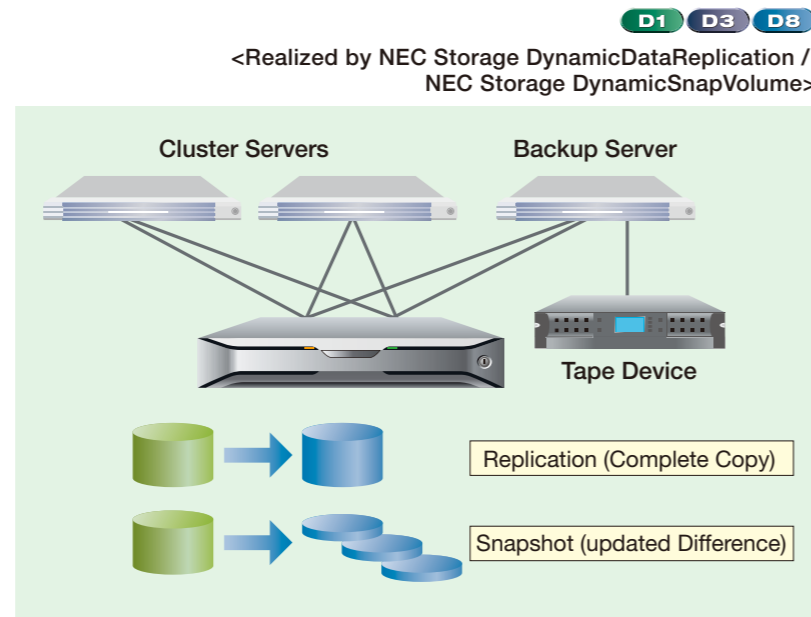


The D Series makes change in "Backup".

Online operation for 24 hours...
 Non-disruptive backup is required in today's business environment.
 The D Series provides various backup function for this requirement.

Backup system, which does not affect online operation

The D Series provides various backup functions such as replication, which is full copy of business volume without stopping operation, and snapshot, which retains only the updated data. They also have the function to back up the data from the replicated volume to the tape device, and to restore the data to the business volume in the event of volume failure.



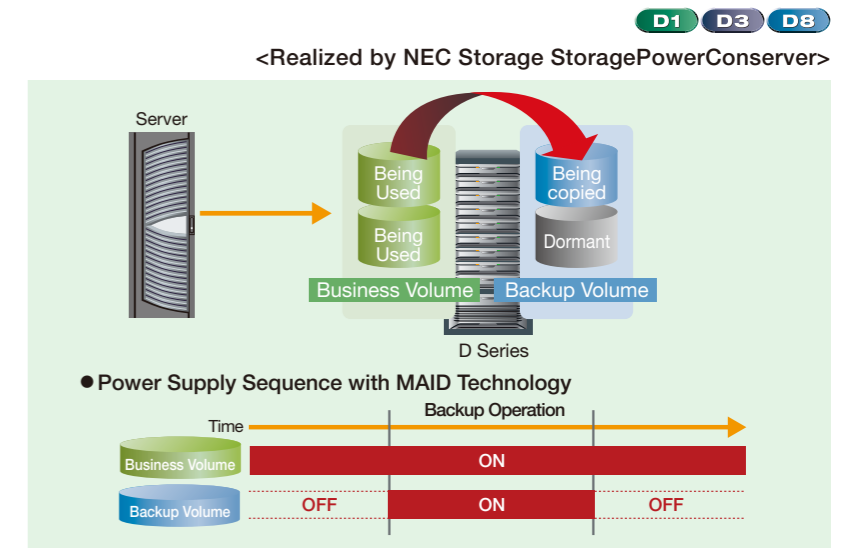
The D Series makes change in "Environment".

As the amount of data is getting larger unprecedentedly,
 the storage systems are getting bigger accordingly.
 The D Series employs the eco-friendly and energy-saving technology,
 and reduces the cost of power consumption.

MAID Technology to reduce the power consumption of disk drives

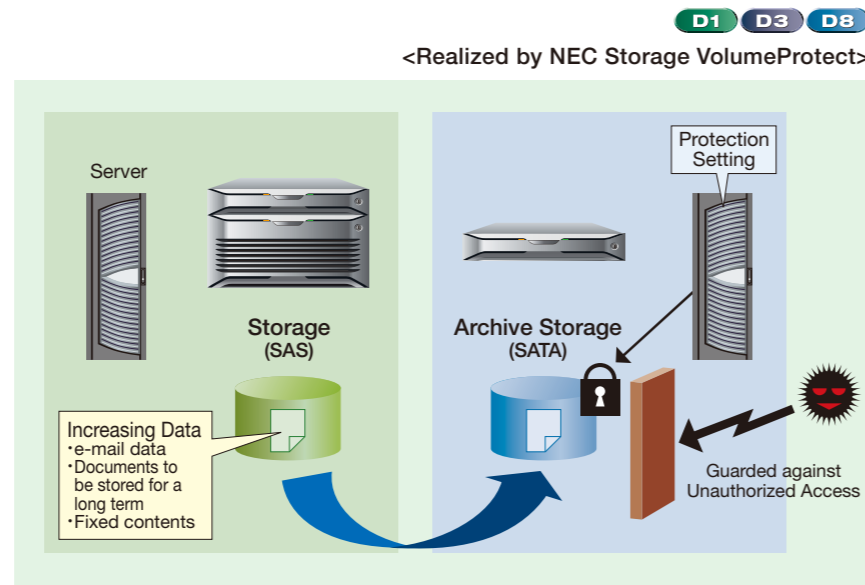
The larger the scale of system becomes, the more power is consumed and it has an impact on running cost. The D Series adopts MAID(*) technology aiming at saving energy. By dedicated software control, this system turns off the motor power of unused disk drives. This lead to reduce max.30% of the power consumption, compared with the conventional models.

*MAID: Massive Array of Inactive Disks



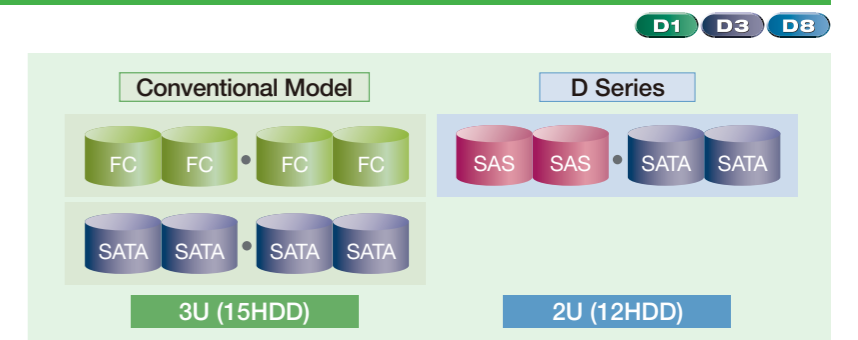
Tamper proof function to prevent unauthorized access and keep the data secure.

It is required today to enhance the security of information. By the D Series, e-mail data and the documents which are required to be kept for a long period of time can be relocated from SAS disk drive to SATA disk drive as an archive, and securely maintained by tamper proof function. Access right and the retention period can be set by the storage function to prevent the data corruption due to unauthorized or improper operations. As it stores the data in a format not to be tampered with, the data can be safely stored for a long time.



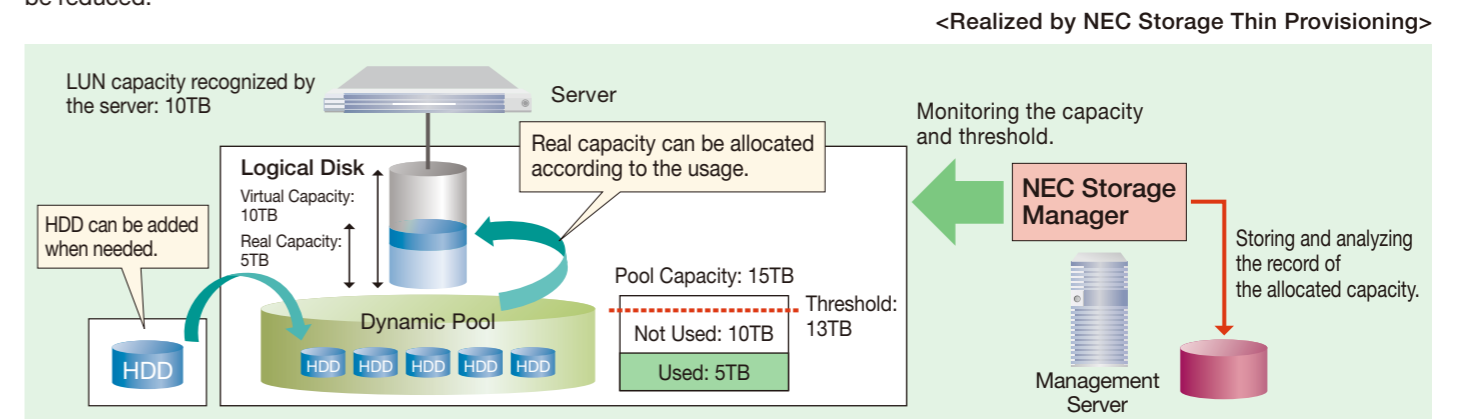
Saving-space design mountable 12 units of disk drive in 2U enclosure

The D Series can mount 12 units of disk drive into 2U enclosure and enhances efficiency of implementation than before. Besides, you can mount SAS/SATA disk drives together in a same enclosure. By this feature, you can economically realize the Disk to Disk backup with large-scale and low-cost SATA disk drive replication volume.



Capacity can be increased on-demand and non-disruptively with Thin Provisioning.

Logical volume with virtual capacity can be allocated to servers, and the real capacity can be allocated to the logical volume from the pool. If the remaining capacity in the pool is insufficient, physical disks can be added to increase the capacity of the pool non-disruptively. By this function, the storage capacity can be used more efficiently, and the initial cost and power consumption can be reduced.



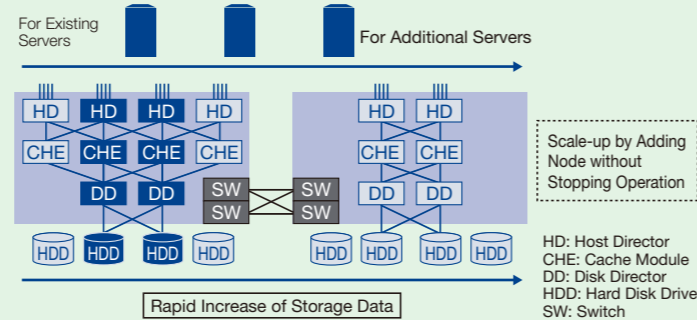
Case Study

The D Series meets various needs for storage

The D Series adopts the innovative and the latest technologies such as SAS technology and building block architecture. It responds to the storage issues which today's enterprise faces.

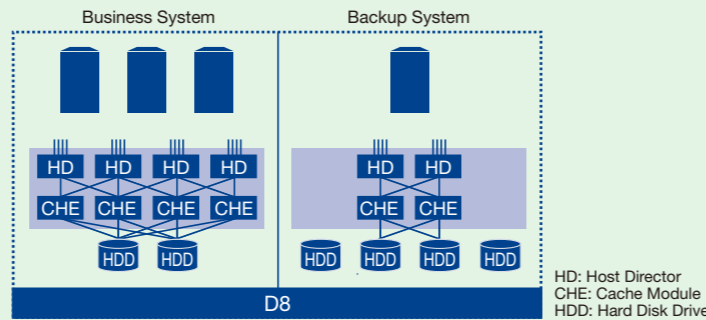
For IDC and xSP, which expect the increase of data in the future

As the moving image contents will explosively increase, the capacity of the storage must be expanded accordingly... The D8 Series can expand storage resources by building block without stopping the operation. Linear scale-up is available by just adding nodes. Besides, by virtual technology, the resources can be dynamically reallocated as the access load fluctuates. The degradation of response is the thing of the past.



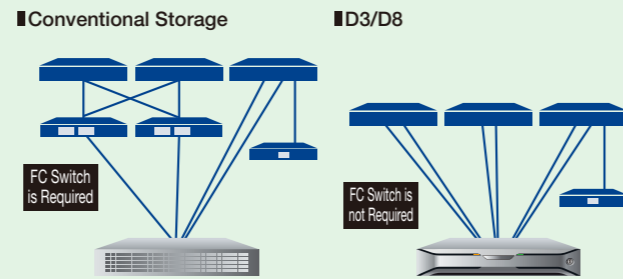
Divide the storage into business system and backup system by partitioning

The resources of the D8 Series can be divided into some partitions of logical storage. For business system, more host port and cache memory for better performance. For backup system, more disk capacity. They can be configured as you like, and they do not have influence on each other's performance.



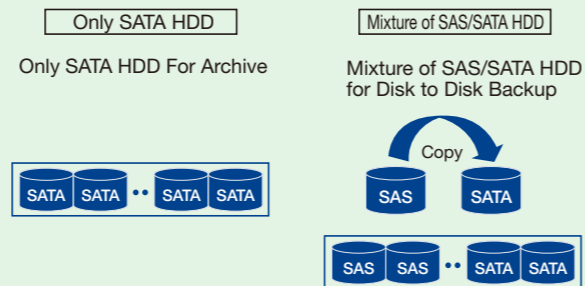
Switch less, simple and economical SAN

Storage is needed but it should be simple and economical... D3 can have up to 12 host ports, and the minimum number of D8's host port is 8. The system can be configured without FC switch even if you connect the server of 2 path cluster system and backup server.



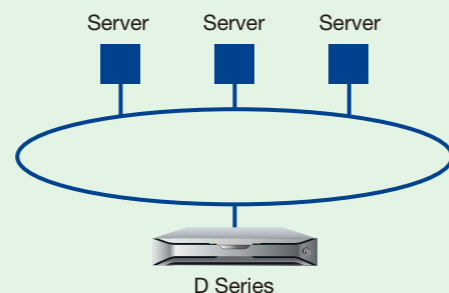
For inexpensive archive of a large amount of corporate information

It is required to store and manage the materials necessary for long-term storage at low cost... The D Series can be utilized as an economical backup system, configuring only low-cost and large-scale SATA disk drive in the disk enclosure. Besides, it can also be used as a low-cost disk backup system, mounting SAS/SATA together.



As a simple, convenient and low-cost SAN

SAN system should be introduced for storage consolidation with initial investment as small as possible, reducing an initial investment as much as possible... The D Series has excellent cost performance along with the function of professional SAN storage. This Series consists of the D1 (up to 72 disk drives), D3 (up to 144 disk drives) and D8 (up to 384 disk drives per node).



Specifications



Model	D1 ^{*1}	D3(SCSI) ^{*1}	D3(FC) ^{*2}	D8 Series
Cabinet Configuration	Up to 5 disk enclosures can be connected to the disk array controller. One disk array controller or disk enclosure can house up to 12 disk drives.	Up to 11 disk enclosures can be connected to the disk array controller. One disk array controller or disk enclosure can house up to 12 disk drives.	Up to 11 disk enclosures can be connected to the disk array controller. One disk array controller or disk enclosure can house up to 12 disk drives.	Scalable from 1 node to 4 nodes Upt to 32 disk enclosures can be connected to 1 node. One disk enclosure can house up to 12 disk drives.
Host Interface	Fibre Channel (up to 4Gbps)	iSCSI (up to 1Gbps)	Fibre Channel (up to 4Gbps)	Fibre Channel (up to 8Gbps) ^{*8}
Host Port	4 ports ^{*3}	4 ports ^{*4}	4 ports (standard), 8 ports, 12 ports (with optional port)	8 ports-64 ports (with optional HD) ^{*9}
Cache Memory	Capacity 2GB (1GB per controller) ^{*3} Battery Backup Time Up to 120 hours (with optional battery (1U))	Capacity 4GB (2GB per controller) ^{*4} Battery Backup Time Up to 72 hours (with optional battery (1U))	Capacity 4GB (2GB per controller) Battery Backup Time Up to 72 hours (with optional battery (1U))	Capacity 4GB-128GB Battery Backup Time - (saved to flash memory)
RAID Level	SAS: RAID-0, 1, 10, 3, 3DP, 5, 50, 6, TM SATA: RAID-5, 6, TM			
Disk Drive	SAS/SATA (up to 300MB/s)			
Capacity	SAS 73GB, 147GB, 300GB, 450GB (15,000rpm) SATA 500GB, 750GB, 1TB (7,200rpm)	SAS 147GB, 300GB, 450GB (15,000rpm) SATA 750GB, 1TB (7,200rpm)	SAS 73GB, 147GB, 300GB, 450GB (15,000rpm) SATA 500GB, 750GB, 1TB (7,200rpm)	SAS 147GB, 300GB, 450GB (15,000rpm) SATA 750GB, 1TB (7,200rpm)
Rotation Speed	15,000rpm	15,000rpm	15,000rpm	15,000rpm
Storage Capacity ^{*5}	SAS 73GB Disk Drive: 71GB-4.5TB 147GB Disk Drive: 142GB-9.1TB 300GB Disk Drive: 287GB-18.4TB 450GB Disk Drive: 440GB-28.1TB SATA 500GB Disk Drive: 491GB-28.3TB 750GB Disk Drive: 737GB-42.5TB 1TB Disk Drive: 984GB-56.6TB	SAS 147GB, 300GB, 450GB (15,000rpm): 142GB-18.2TB SATA 750GB, 1TB (7,200rpm): 750GB-56.3TB	SAS 73GB, 147GB, 300GB, 450GB (15,000rpm): 71GB-9.1TB SATA 500GB, 750GB, 1TB (7,200rpm): 491GB-56.6TB	SAS 147GB, 300GB, 450GB (15,000rpm): 142GB-195.1TB SATA 750GB, 1TB (7,200rpm): 440GB-601.1TB
Number of Disk Drives	3-72	3-144	3-144	3-1,536 (with optional DD) ^{*9}
Supported OS ^{*6}	Microsoft® Windows Server® 2003 (IA-32, x64) Microsoft® Windows Server® 2008 (IA-32, x64) Red Hat Enterprise Linux, Asianux, MIRACLE LINUX, VMware, Citrix XenServer	Microsoft® Windows Server® 2003 (IA-32, x64) Microsoft® Windows Server® 2008 (IA-32, x64) Red Hat Enterprise Linux, VMware	HP-UX, SUPER-UX, Solaris, AIX Microsoft® Windows Server® 2003 Microsoft® Windows Server® 2008 Red Hat Enterprise Linux, Asianux, MIRACLE LINUX, VMware, Citrix XenServer	HP-UX, Solaris, AIX Microsoft® Windows Server® 2003 Microsoft® Windows Server® 2008 Red Hat Enterprise Linux, Asianux, MIRACLE LINUX, VMware, Citrix XenServer ^{*7}
Cabinet Dimensions (W x D x H)	Disk Array Controller / Node: 480 x 540 x 86.5 mm (2U) Disk Enclosure: 480 x 540 x 86.5 mm (2U)			482 x 600 x 218 mm (5U) 482 x 540 x 86.5 mm (2U)
Weight	Disk Array Controller / Node: 31kg or less Disk Enclosure: 29kg or less			60kg or less 29kg or less
Power Requirements	AC100-240V single phase 50/60Hz			
Power Consumption	SAS: 590-2,740W SATA: 530-2,380W	610-5,340W 540-4,610W	620-5,350W 550-4,620W	1,850-60,720W 1,790-53,040W

^{*1}: Dual Controller Model and Single Controller Model are available.
^{*2}: Upgradable to D8 (Offline Upgrade).
^{*3}: 2ports/1GB for Single Controller Model
^{*4}: 2ports/2GB for Single Controller Model
^{*5}: Calculated on "1GB=1,000,000,000B" basis.
^{*6}: There might be some restrictions on the OS when disk array unit is connected through fibre channel interface. Supported OS/version will be gradually added to the list. For more informatin, please feel free to contact NEC.
^{*7}: Planned to be supported.
^{*8}: 8Gbps is planned to be supported.
^{*9}: HD or DD can be selected for each node.

Main Software

Type	Product Name	D1	D3(SCSI)	D3(FC)	D8	Feature
Storage Management	Device Management	●	●	●	●	Basic storage management functions
	Performance Management	●	●	●	●	Function to liaise with SigmaSystemCenter for integrated storage operation
	Performance Management	●	●	●	●	Performance monitoring function
Storage Control	Storage Control	●	●	●	●	Basic function to control the storage
	Replication	● ^{*11}	● ^{*11}	●	●	Function for replicating volumes within the same storage system
	Replication	-	-	●	●	Function for replicating volumes across different storage systems
	Replication	-	-	●	●	Function for replicating volumes across different storage systems over a low speed network
	Replication	● ^{*11}	● ^{*11}	●	●	Function for creating snapshots using the disk capacity efficiently
	Replication	●	●	●	●	Option to enable non-disruptive backup of Microsoft® SQL Server™
	Replication	●	●	●	●	Option to synchronize with file system for disk separation
Disaster Recovery	Disaster Recovery	●	●	●	●	Function to easily construct a non-disruptive backup system with storage replication
	Disaster Recovery	-	-	-	●	Basic function to enable the recovery of business operations in a disaster
Resource Control	Resource Control	-	-	-	●	Function to separate storage resources to make and manage virtual storages
	Resource Control	-	-	-	●	Function to enhance storage usage efficiency by virtual capacity
	Resource Control	●	●	●	●	Function to save storage power consumption by control of HDD power
	Resource Control	-	●	●	●	Function to optimize disk performance
High Availability	High Availability	●	●	●	●	Function for tamper proof and ensure the integrity of volume data
	High Availability	●	●	●	●	Path redundancy function

^{*10}: included in NEC Storage BaseProduct
^{*11}: Not supported in Single Controller model