### NEC Storage HS8 Scale-out Model

#### Product Specifications

<table>
<thead>
<tr>
<th>Feature</th>
<th>1HN Configuration</th>
<th>1HN-1SN Configuration</th>
<th>2HN Configuration</th>
<th>3HN Configuration (Max. Capacity)</th>
<th>4HN Configuration (Max. Capacity)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Node Number</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Capacity (TB)</td>
<td>5.9</td>
<td>11.8</td>
<td>17.7</td>
<td>23.6</td>
<td>29.5</td>
</tr>
<tr>
<td>Performance</td>
<td>10.8 GB/s</td>
<td>11.5 GB/s</td>
<td>22.0 GB/s</td>
<td>23.6 GB/s</td>
<td>29.5 GB/s</td>
</tr>
<tr>
<td>Network Interface</td>
<td>1000BASE-T x 6 or 10GBase-T x 4</td>
<td>10GBase-T x 6 or 10GBase-T x 4</td>
<td>10GBase-T x 6 or 10GBase-T x 4</td>
<td>10GBase-T x 6 or 10GBase-T x 4</td>
<td>10GBase-T x 6 or 10GBase-T x 4</td>
</tr>
<tr>
<td>Number of Network Interface Ports</td>
<td>6</td>
<td>8</td>
<td>12</td>
<td>16</td>
<td>16</td>
</tr>
</tbody>
</table>

#### Supported Features

1. **Replication Software**: Product for replicating (copying) stored data to a remote site via a network. (Encryption scheme: AES-256 bit)
2. **Encryption Software**: Product for preventing data leakage in case of theft or disposal of the HDD and/or node. (Encryption scheme: AES-256 bit, Encryption Module: FIPS 140-2 validated)
3. **Power Supply Control Software**: Product to protect stored data using UPS in case of power outage.
4. **Concerted Access Grid Software**: Product to let hybrid grids access the same file system simultaneously.
5. **High Speed Data Transfer**: Performs backup/restore at fast speed by unique protocol.
   - Makes new full backup data from the existing full backup and incremental/differential backup, and saves in the storage unit.
   - Offers original protocol for performing high-speed backup and restore.
   - Copies backup data from a main site to a remote site at a high speed, consolidating the management of both sites.

### Environmental Compliance

- **Eco Symbol**: Product is in accordance with the European Union’s directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment (ROHS).
- **WEEE Compliance**: This product complies with the European Union’s directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS).

### Safety Precautions

Before using this product, please read carefully and comply with the cautions and warnings in manuals such as the Installation Guide and Safety Precautions. Incorrect use may cause a fire, electrical shock, or injury.
The Era of Big Data is here. New business values and services are created by huge amounts of data, and there are growing needs for storage platforms that backup/archive such important data efficiently and safely.

NEC Storage HS8 is an advanced deduplication backup/archive storage solution that satisfies both present and future requirements. It offers low-cost operation compared to tape-based storage systems, while its scale-out capability accommodates changes quickly. Additionally, its reliability surpasses that of RAID systems, and it provides next-generation disk-based backup environment.

### Efficient Storage of All Corporate Data

With an increase in the amount of data, it becomes more and more inefficient and complicated to perform backup/archive individually for each server or system. NEC Storage HS8 integrates these multiple environments and enables the optimal integration of backups and archives.

### Flexible Scale-Out to Accommodate Changes

In the age of big data, it is important to cope with unpredictable and exponential increases in the amount of data. NEC Storage HS8 is a scale-out storage system that can accommodate changes flexibly. Both capacity and performance can be enhanced by adding nodes when required without interruption to the system.

### Long-Term Data Storage Capability

NEC Storage HS8 can safely store data over extended periods of time, even decades. When replacing an old node with a new one, data is automatically migrated to the new one. By replacing old nodes in turn, data can be stored for a long time without hardware aging. This reduces costs greatly compared to creating a whole new system and migrating data. An excellent return on investment (ROI) can be achieved by this system.

### Reduced Operating Costs Through Disk-Based Backup

With NEC’s proprietary technology, backup data is compressed on a ratio of 20:1 of its original size on average and efficiently stored in the NEC storage HS8. This enables NEC Storage HS8 to achieve lower per-unit capacity costs than those of tapes. Apart from per-capacity costs, operational costs and space requirements are also reduced compared to tape-based backup solutions. By reducing the amount of data, the network infrastructure required for remote backup is also reduced. Therefore, the total cost for backups can be reduced comprehensively.

### Highly Reliable Data Protection

Distributed Resilient Data Protection ensures NEC Storage HS8’s high level of robustness that can tolerate simultaneous faults in three disk drives, while the automatic recovery function quickly completes the rebuilding process.

With these advanced technologies, NEC Storage HS8 minimizes the risk of data loss, achieving high reliability surpassing that of RAID. NEC Storage HS8 also offers an encryption function for preventing data leakage, a write protection function for protecting data from malicious falsification and erroneous operations, and a physical data erasing function to completely erase unnecessary data.
Providing backup/archive solutions according to customers’ needs.

Solutions

**Disk-Based Backup Solution that Replaces Tape-Based Backup**
In conventional tape-based backup environments, a large number of staff and considerable amounts of labor are required because there are many operations that can only be completed manually such as handling and replacing the tape cartridges, transportation, physical storage, and so on. Furthermore, as the volume of data increases, tape-based operations will become more and more cumbersome. NEC Storage HS8 offers a disk-based backup solution that is simple to operate and has low operational costs. With the deduplication function, NEC Storage HS8 can store large amounts of data efficiently. Due to the automation of operations, the manual work required is reduced. The cost and time needed for backup/archive can also be lowered significantly.

**Reduced File Server Backup Time**
NEC Storage HS8 eliminates the need for regular full backups. By performing only daily incremental backups, a full backup is automatically synthesized at high speed within the NEC Storage HS8. This reduces the load of the business servers and networks, as well as significantly reducing the backup time.

**Efficient Management of Long-Term Data Storage**
Recently, data that needs to be stored for extended periods of time has been increasing rapidly, including backups of accounting data and archives of e-mails. The capacity of NEC Storage HS8 can be expanded easily as the amount of data grows, with its automatic optimal configuration. NEC Storage HS8 stores long-term archive data safely with a "Distributed Resilient Data" feature. Data is automatically migrated to an existing node to a new one at the time of replacement. Node replacement can also vastly reduce costs by extending the life of an existing system compared to creating a completely new system.

**Consolidated Backup**
With the deduplication function of NEC Storage HS8, backups in various regional offices can be consolidated into a single safe and secure backup site at a low cost. As large amounts of data will be deduplicated and compressed by backup servers at each site, backup data can be transferred fast through an inexpensive WAN. The transferred data is encrypted to ensure safety on the way.

**Streamlined File Server Environment**
Data migration software migrates less frequently used files to NEC Storage HS8 in order to increase usable capacity on the file servers and reduce the costs for primary storage. The migrated data is deduplicated and stored in NEC Storage HS8 efficiently. Furthermore, as the amount of file servers’ data to be backed up is reduced, the backup window can be shortened.

**Falsification Prevention for Data Protection**
NEC Storage HS8 provides a Write Once Read Many (WORM) feature, which protects data from illegal falsification and erroneous operations. A protection period can be specified on each file, and once the protection is enabled, even the administrator cannot update the file until the set period has expired. As the WORM protection is also supported on data replicated, the data at backup sites is protected during same period as the original data. Additionally, NEC Storage HS8 has a function to erase unnecessary data completely to prevent it from being restored and used improperly.

**Direct Backup/Restore by Collaborating with NEC Storage M Series**
NEC Storage HS8 provides functionally to collaborate with the NEC Storage M Series unified storage, which enables backup and restoration to be performed directly between the NEC Storage HS8 and the NEC Storage M Series. As a full backup is required only at the first time and incremental backups are performed from second or later backup time is reduced drastically. This solution eliminates the need for a dedicated backup server and software, and reduces the cost of implementing and operating a backup/restore system.
Three core technologies to support backup/archiving.

To store day-to-day backup/archive data efficiently and safely, NEC Storage HS8 incorporates three core technologies.

### Easy, Non-Disruptive Expansion of Capacity and Performance
If it is necessary to add more capacity and improve the level of performance, Hybrid Nodes and Storage Nodes can be added easily without stopping the system. Added nodes are autonomously incorporated into the storage pool, so that load balancing and data relocation can be performed automatically and thus make the nodes usable instantaneously. No node addition does not require the storage administrator to consider where the data is located or perform any kind of configuration. This enables the increasing of capacity and performance without the concern of bottlenecks, thereby contributing to improved operational efficiency and simplified system administration.

### Vastly Improved Capacity Efficiency for Reduced Cost
The data compression technology (DataRedux) checks the data blocks to be newly written against data that is already in storage, and then eliminates any duplicate data, thereby improving the data storage efficiency and writing performance. To maximize the detection of duplication relative to the existing data, DataRedux applies intelligent variable-length division to the data. This achieves further improvement in storage efficiency and performance, especially for multi-generation backups.

### Fault Tolerance that Surpasses RAID
NEC Storage HS8 offers a high level of redundancy surpassing that of conventional storage. By dividing the backup data into multiple blocks, adding special parities to those blocks, and then distributing them to disks on multiple nodes, NEC Storage HS8 enables data restoration even if faults occur in multiple storage locations. It can accommodate up to 3 simultaneous faults not only with disk drives but also with nodes*, preventing data loss if a fault should occur. 

*Depends on the node configuration and the setting of the number of parities.

Line-Up
With the latest enhancements in hardware and software technology, NEC Storage HS8 achieves even higher levels of performance and capacity. NEC Storage HS8 is a scale-out type system that can scale out to a total of 165 nodes to expand both capacity and performance. This makes it possible to start out with a small and economically sized initial system, and then gradually extend the system as backup needs increase.

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Raw Capacity</th>
<th>Effective Capacity</th>
<th>Max. Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Node Configuration</td>
<td>12/24/36/48 TB</td>
<td>156/312/468/624 TB</td>
<td>10.8 TB/h</td>
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<tr>
<td>2-Node Configuration</td>
<td>24/48/96 TB</td>
<td>312 TB (207 TB*)/624 TB (414 TB*)</td>
<td>23.0 TB/h</td>
</tr>
<tr>
<td>4-Node Configuration</td>
<td>192 TB</td>
<td>2.50 PB</td>
<td>23.0 TB/h</td>
</tr>
<tr>
<td>8-Node Configuration</td>
<td>7.9 PB</td>
<td>103 PB</td>
<td>1,900 TB/h</td>
</tr>
</tbody>
</table>

Capacity Focus

- **Performance Focused**: Raw Capacity: 7.9 PB, Effective Capacity: 103 PB, Max. Performance: 1,900 TB/h
- **Capacity Focused**: Raw Capacity: 7.9 PB, Effective Capacity: 103 PB, Max. Performance: 23.0 TB/h
- **4-Node Configuration**: Raw Capacity: 192 TB, Effective Capacity: 2.50 PB, Max. Performance: 23.0 TB/h

DataRedux

- **DataRedux Technology**:
  1. Detects duplicate data at the block level
  2. Compresses and stores only non-duplicated data
- **Advantages of DataRedux**:
  - Data Compression Costs
  - Storage Installation Costs
  - Storage Operation Costs
  - Storage Maintenance Costs

Efficient Storage of Backup/Archive Data

<table>
<thead>
<tr>
<th>Day</th>
<th>Full Backup</th>
<th>Partial Backup</th>
<th>Partial Backup</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>2</td>
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</tr>
<tr>
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</tr>
<tr>
<td>7</td>
<td>7</td>
<td>7</td>
<td>6</td>
</tr>
</tbody>
</table>

Day 1: Full Backup
Day 2: Differential
Day 3: Differential
Day 7: Full Backup

DataRedux Technology:
1. Detects duplicate data at the block level
2. Compresses and stores only non-duplicated data
3. Stores the non-duplicated data

- **DataRedux** Technology: Detects duplicate data at the block level
- **Advantages of DataRedux**:
  - Efficient storage capacity
  - Reduced storage costs
  - Improved performance

Cost Advantages of DataRedux:
- Reduced storage installation costs
- Reduced storage operation costs
- Reduced storage maintenance costs

To store day-to-day backup/archive data efficiently and safely, NEC Storage HS8 incorporates three core technologies.

- **Easy, Non-Disruptive Expansion of Capacity and Performance**
- **Vastly Improved Capacity Efficiency for Reduced Cost**
- **Fault Tolerance that Surpasses RAID**

Line-Up

- **Performance Focused**: Raw Capacity: 7.9 PB, Effective Capacity: 103 PB, Max. Performance: 1,900 TB/h
- **Capacity Focused**: Raw Capacity: 7.9 PB, Effective Capacity: 103 PB, Max. Performance: 23.0 TB/h

- **4-Node Configuration**: Raw Capacity: 192 TB, Effective Capacity: 2.50 PB, Max. Performance: 23.0 TB/h

*Capacity for a 2 HN configuration when using clustering (6 parities).