FileStore N8300 Clustered NAS Storage System
V100R001

Product Description

<table>
<thead>
<tr>
<th>Issue</th>
<th>01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>2009-12-15</td>
</tr>
</tbody>
</table>
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Symantec Corporation

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Website: http://www.symantec.com

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About This Document

Purpose

This document describes the appearance, software and hardware configurations, components, functions, features, technical specifications, standards, and certifications of the FileStore N8300 Clustered NAS (Network Attached Storage) Storage System (hereinafter referred to as the N8300).

Related Versions

The following table lists the product version related to this document.

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Product Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>FileStore N8300 Clustered NAS Storage System</td>
<td>V100R001</td>
</tr>
</tbody>
</table>

Intended Audience

This document is intended for:

- Technical support personnel
- Management and maintenance personnel

Organization

This document is organized as follows.

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<th>Chapter</th>
<th>Description</th>
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<tr>
<td>1 Overview</td>
<td>This chapter describes the appearance, configurations, components, and performance of the FileStore N8300.</td>
</tr>
<tr>
<td>2 Application Scenario</td>
<td>This chapter describes the application scenario of the FileStore N8300 hardware.</td>
</tr>
</tbody>
</table>
Chapter | Description
--- | ---
3 Storage System Hardware | This chapter describes the components, appearance, specifications, and other requirements of the FileStore N8300 hardware.
4 Storage System Management | This chapter describes the features and functions of the FileStore ISM and CLI of the FileStore N8300.
5 Technical Specifications | This chapter describes the entire system technical specifications, reliability specifications, and operating environmental specifications of the FileStore N8300.
6 Standards and Certifications | This chapter describes the standards and certifications of the FileStore N8300.
A Regulatory Compliance Standards | This chapter describes the certifications that the FileStore N8300 passes.
B How to Obtain Help | This chapter describes the preparations for and ways of obtaining help from Symantec.
C Glossary | This chapter describes the terms used in this document.
D Acronyms and Abbreviations | This chapter describes the acronyms and abbreviations in this document.

Conventions

Symbol Conventions

The symbols that may be found in this document are defined as follows.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>⚠️ DANGER</td>
<td>Indicates a hazard with a high level of risk, which if not avoided, will result in death or serious injury.</td>
</tr>
<tr>
<td>⚠️ WARNING</td>
<td>Indicates a hazard with a medium or low level of risk, which if not avoided, could result in minor or moderate injury.</td>
</tr>
<tr>
<td>⚠️ CAUTION</td>
<td>Indicates a potentially hazardous situation, which if not avoided, could result in equipment damage, data loss, performance degradation, or unexpected results.</td>
</tr>
<tr>
<td>⚡ TIP</td>
<td>Indicates a tip that may help you solve a problem or save time.</td>
</tr>
<tr>
<td>📌 NOTE</td>
<td>Provides additional information to emphasize or supplement important points of the main text.</td>
</tr>
</tbody>
</table>
General Conventions

<table>
<thead>
<tr>
<th>Convention</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Times New Roman</td>
<td>Normal paragraphs are in Times New Roman.</td>
</tr>
<tr>
<td><strong>Boldface</strong></td>
<td>Names of files, directories, folders, and users are in <strong>boldface</strong>. For example, log in as user <strong>root</strong>.</td>
</tr>
<tr>
<td><em>Italic</em></td>
<td>Book titles are in <em>italics</em>.</td>
</tr>
<tr>
<td><strong>Courier New</strong></td>
<td>Examples of information displayed on the screen are in <strong>Courier New</strong>.</td>
</tr>
</tbody>
</table>

Command Conventions

<table>
<thead>
<tr>
<th>Convention</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Boldface</strong></td>
<td>The keywords of a command line are in <strong>boldface</strong>.</td>
</tr>
<tr>
<td><em>Italic</em></td>
<td>Command arguments are in <em>italics</em>.</td>
</tr>
<tr>
<td>[ ]</td>
<td>Items (keywords or arguments) in <em>italics</em> are optional.</td>
</tr>
<tr>
<td>{ x</td>
<td>y</td>
</tr>
<tr>
<td>[ x</td>
<td>y</td>
</tr>
<tr>
<td>{ x</td>
<td>y</td>
</tr>
<tr>
<td>[ x</td>
<td>y</td>
</tr>
</tbody>
</table>

GUI Conventions

<table>
<thead>
<tr>
<th>Convention</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Boldface</strong></td>
<td>Buttons, menus, parameters, tabs, window, and dialog titles are in <strong>boldface</strong>. For example, click <strong>OK</strong>.</td>
</tr>
<tr>
<td>&gt;</td>
<td>Multi-level menus are in <strong>boldface</strong> and separated by the &quot;-&gt;&quot; signs. For example, choose <strong>File &gt; Create &gt; Folder</strong>.</td>
</tr>
</tbody>
</table>
# Keyboard Operations

<table>
<thead>
<tr>
<th>Format</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key</td>
<td>Press the key. For example, press Enter and press Tab.</td>
</tr>
<tr>
<td>Key 1 + Key 2</td>
<td>Press the keys concurrently. For example, pressing Ctrl + Alt + A means the three keys should be pressed concurrently.</td>
</tr>
<tr>
<td>Key 1, Key 2</td>
<td>Press the keys in turn. For example, pressing Alt, A means the two keys should be pressed in turn.</td>
</tr>
</tbody>
</table>

## Mouse Operations

<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Click</td>
<td>Select and release the primary mouse button without moving the pointer.</td>
</tr>
<tr>
<td>Double-click</td>
<td>Press the primary mouse button twice continuously and quickly without moving the pointer.</td>
</tr>
<tr>
<td>Drag</td>
<td>Press and hold the primary mouse button and move the pointer to a certain position.</td>
</tr>
</tbody>
</table>

# Update History

Updates between document issues are cumulative. Therefore, the latest document issue contains all updates made in previous issues.

**Updates in Issue 01 (2009-12-15)**

Initial commercial release.
1 Overview

About This Chapter

This section describes the appearance, configurations, components, and performance of the FileStore N8300.

1.1 Introduction to the Storage System

The FileStore N8300 is a clustered mid-range and high-end NAS storage system. The N8300 features high transverse and longitudinal scalability to meet the requirements of high-efficiency data sharing products. It applies to the industries such as finance, government, oil and gas, health and life science, manufacturing, and E-Discovery. The N8300 applies to the social networking and video/audio sharing and downloading; video monitoring and satellite images in the government industry; risk analysis, securities companies, finance derivative transactions, and file images in the finance industry; video capturing, editing, processing, and playing in the media and entertainment industries.

1.2 Typical Networking

The N8300 supports the NAS and SAN to meet different networking requirements. The ASs can connect to the N8300 through the Ethernet switch, or can connect to the N8300 storage units through the FC switch or the Ethernet switch to achieve the SAN networking.

1.3 Storage System Hardware

This section describes the hardware of the FileStore N8300.

1.4 Storage System Management

This topic introduces the management methods and the management software of the N8300.

1.1 Introduction to the Storage System

The FileStore N8300 is a clustered mid-range and high-end NAS storage system. The N8300 features high transverse and longitudinal scalability to meet the requirements of high-efficiency data sharing products. It applies to the industries such as finance, government, oil and gas, health and life science, manufacturing, and E-Discovery. The N8300 applies to the social networking and video/audio sharing and downloading; video monitoring and satellite images in the government industry; risk analysis, securities companies, finance derivative transactions, and file images in the finance industry; video capturing, editing, processing, and playing in the media and entertainment industries.
1 Overview

1.1.1 Appearance

This section describes the appearance of the FileStore N8300.

1.1.2 Product Configuration

This section describes the configurations of the FileStore N8300.

1.1.3 Product Feature

This section describes the features of the FileStore N8300.

1.1.1 Appearance

This section describes the appearance of the FileStore N8300.

The N8300 consists of the clustered NAS engine, switch module, and storage unit. The hardware can be flexibly configured through expanding different components. A clustered NAS engine can be configured with two to six nodes (two switch modules need to be configured for more than two nodes). The N8300 supports a maximum of four sets of storage units. The controller enclosure can be flexibly configured through connecting storage units of different types.

Taking a clustered NAS engine configured with two nodes and a set of storage unit (an S2300 controller enclosure connected with three D200 disk enclosures) as an example, Figure 1-1 shows the appearance of the N8300 installed in the cabinet.
1.1.2 Product Configuration

This section describes the configurations of the FileStore N8300.

The N8300 clustered NAS engine support two to six nodes. When more than two nodes are configured, the N8300 uses two switch modules.

The storage unit controller enclosure has three types: S2300, S5500, and S5600. The controller enclosure can support FC or FC+ iSCSI SAN host ports. According to different requirements on the capacity, a maximum of four sets of storage units can be connected. The capacity can be expanded through the connection of the controller enclosure to the disk enclosures.

- The S2300 controller enclosure (FC SAN host port) can be connected to a maximum of three D200 disk enclosures.
- The S5500 controller enclosure (FC or FC+ iSCSI SAN host port) can be connected to a maximum of four D200 disk enclosures.
The S5600 controller enclosure (FC or FC+iSCSI SAN host port) can be connected to a maximum of nine D200 disk enclosures.

Table 1-1 shows the configurations of the N8300.

Table 1-1 N8300 configuration

<table>
<thead>
<tr>
<th>Name</th>
<th>Item</th>
<th>Product Configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entire system</td>
<td>System component</td>
<td>• Clustered NAS engine</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Switch module (used for more than two nodes)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Storage unit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• An S2300 controller enclosure can be connected to 0 to 3 D200 disk enclosures.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• An S5500 controller enclosure can be connected to 0 to 4 D200 disk enclosures.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• An S5600 controller enclosure can be connected to 0 to 9 D200 disk enclosures.</td>
</tr>
<tr>
<td>Service port (for each node)</td>
<td>Four Ethernet service ports</td>
<td></td>
</tr>
<tr>
<td>Maximum capacity of a file system</td>
<td>64 TB</td>
<td></td>
</tr>
<tr>
<td>Maximum number of a file system</td>
<td>265</td>
<td></td>
</tr>
<tr>
<td>Clustered NAS engine</td>
<td>Processor (for each node)</td>
<td>Intel Xeon 5504 2.0 GHz</td>
</tr>
<tr>
<td></td>
<td>Memory (for each node)</td>
<td>8 GB</td>
</tr>
<tr>
<td></td>
<td>Local disk (for each node)</td>
<td>2 x 146 GB SAS</td>
</tr>
<tr>
<td></td>
<td>Number of ports connected to storage units (for each node)</td>
<td>Two 4 Gbit/s FC ports</td>
</tr>
<tr>
<td>Switch module</td>
<td>Choose the switch certified by Symantec, such as Brocade SW300.</td>
<td></td>
</tr>
<tr>
<td>Storage unit</td>
<td>Types of disks</td>
<td>• SAS/SATA(^a) (S2300 controller enclosure)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• FC/SATA (S5500 controller enclosure and S5600 controller enclosure)</td>
</tr>
<tr>
<td></td>
<td>Supported RAID level</td>
<td>RAID 0/1/10/5</td>
</tr>
<tr>
<td></td>
<td>Number of controllers (single controller enclosure)</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Number of connected D200 disk enclosures</td>
<td>• 3 (S2300 controller enclosure)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4 (S5500 controller enclosure)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 9 (S5600 controller enclosure)</td>
</tr>
<tr>
<td>Name</td>
<td>Item</td>
<td>Product Configuration</td>
</tr>
<tr>
<td>----------------------</td>
<td>-----------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Maximum number of disks</td>
<td></td>
<td>• 96 (An S2300 controller enclosure can be connected to three D200 disk enclosures.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 120 (An S5500 controller enclosure can be connected to four D200 disk enclosures.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 240 (An S5600 controller enclosure can be connected to nine D200 disk enclosures.)</td>
</tr>
<tr>
<td>Supported SAN protocols</td>
<td></td>
<td>• FC (S2300 controller enclosure)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• FC and iSCSI (S5500 controller enclosure and S5600 controller enclosure)</td>
</tr>
</tbody>
</table>

*a: SATA stands for Serial ATA.*

### 1.1.3 Product Feature

This section describes the features of the FileStore N8300.

The N8300 provides the following features:

- Comprehensive data protection
- High scalability
- High maintainability
- Powerful system management software
- High availability
- Supporting multiple operating systems (OSs)
- Supporting NAS and SAN.
- Supporting dynamic tiering storage
- Supporting snapshots
- Supporting incremental remote replication of file blocks
- Supporting online expansion of file systems
- Supporting dynamic addition and deletion of mirrored volumes
- Supporting AD, NIS, and LDAP
- Supporting network port binding
- Supporting user quota management
- Supporting multiple backup methods

**Comprehensive Data Protection**

The N8300 has multiple protection measures to achieve complete data protection.
Using the precopy technology to predict the disk to be faulty in advance, thus ensuring data security.

The N8300 uses the periodical scan technology, when a disk is to be faulty, it migrates the data on the disk to a hot spare disk in advance.

Using coffer disks to protect the system cache data.

When the external power supply is interrupted, this mechanism ensures that data in cache is written onto the coffer disks. Thus, data loss is prevented.

Using the cache mirroring to prevent data loss.

Mapping the caches in two controllers to each other, thus ensuring that the write cache in one controller can be synchronized to the mirroring cache in another controller to form cache mirroring. When one controller is faulty, the write cache in the controller can be recovered from another controller, thus ensuring that the write data cannot be lost.

Integrating with Symantec AntiVirus solution.

Before a file is saved, Symantec AntiVirus scans the file to ensure security. The N8300 protects the storage device against Trojan horses, worms, and infected files.

High Scalability

The N8300 supports the expansion of clustered NAS engines and storage units, thus adding clustered engine nodes and storage units to the NAS without interrupting services. This greatly improves the upgrade flexibility when an application requires an increase of the clustered NAS engine nodes, the storage capacity, or both.

Storage capacity expansion

The storage administrator can configure a new storage unit for the clustered NAS engine or map a LUN in the existing storage unit to the clustered NAS engine. The clustered NAS engine can scan the storage unit and automatically refreshes the newly-created LUN. These LUNs can be managed by the N8300 and used by the file system, so that the file system can use the resources.

Performance improvement

Through the cluster management module, nodes can be added to the cluster to balance load. The I/O throughput capability and NFS operation processing capability of the N8300 increase linearly as the number of nodes increase.

High Maintainability

The N8300 provides the following maintenance and alarm functions:

Providing graphic user interface based (GUI-based) alarms and logs to display the status of each device in real time.

Providing command line interface based (CLI-based) maintenance methods and remote maintenance access tools for remote maintenance to achieve remote online maintenance.

Providing buzzer alarms, trap IP alarms, short message alarms, and email alarms for users to know the status of the device.

Powerful System Management Software

The N8300 provides powerful system management software with GUIs. The management software ensures data integrity and service continuity. The system management software provides the following functions:
• Providing graphic installation wizard to quickly finish initial configuration and typical configuration.
• Supporting the Storage Management Initiative Specification (SMI-S) protocol that facilitates the installation and running.
• Managing the N8300 through the FileStore ISM.
• Providing the operation and maintenance in the CLI.
• Providing the function of fault alarming and monitoring.
• Supporting network management alarms and providing possible troubleshooting advice.

High Availability

The high availability of the N8300 is described as follows:
• The clustered NAS engine uses the "always on" file services and provides uninterrupted services to key data for enterprises. If one or more nodes fail in the clustered NAS engine, I/O operations at the client end will not be affected. Compared to the traditional NFS file server featuring master/slave switchover, the clustered NAS engine has obvious advantages.
• The N8300 provides the NFS global lock management mechanism, report function, log function, failover function, and failback function. Additionally, the N8300 provides installation services of high availability. When the first node fails, the installation of the clustered management software on the other nodes in the cluster can recover without interrupting services. Customers can also have the failover function automatically performed on the menu-running interface.

Supporting Multiple OSs

The N8300 supports the following OSs:
• Windows（Windows Server 2003 and Windows XP）
• Linux
• SUN Solaris
• HP Unix
• IBM AIX
• Mac OS

Supporting NAS and SAN

The N8300 integrates three types of storage architecture: NAS, FC, and IP SAN. According to features of different application systems, the user can choose the corresponding networking. In addition, the N8300 provides an excellent platform for integrating the back-end storage pool, thus facilitating the expansion of storage platforms flexibly for users in the future.
• The N8300 can work on a specified SAN, thus providing optimized performance for file transmission.
• The SAN can be extended to the network protocol that includes the IP protocol and other protocols not related to storage. The development of the storage network is the integration of best elements in NAS and SAN. The integrated solution can obviously save users’ investment and enhance the availability, storage virtualization, and replication.
Supporting Dynamic Tiering Storage

The N8300 provides the information lifecycle management (ILM), which filter files according to the specified strategy and migrate data that is not been accessed for a long time to cheap nearline storage and save hotspot data to storage with high performance. The migration process is automatic and transparent. When the data in the nearline storage becomes hotspot data, the data is migrated to the storage with high performance, thus improving the I/O performance of the service host.

- Improving the storage I/O performance of the service host.
  The hotspot data is saved in tier one storage array with high performance. The data that is not used or not used frequently is migrated to cheap storage arrays. When the data in tier two storage arrays become hotspot data, it can be automatically migrated to tier one storage. The AS can access the data in tier two at any time without migrating the data to tier two.

- Easy operation
  Based on the ILM, the dynamic automatic migration can be performed without human interruption and supports migration of thousands of files.

- Saving cost
  Tiering storage can greatly save the device cost and use a small number of storage with high performance combined with cost-effective storage, thus ensuring high storage I/O performance of the AS.

Supporting Snapshots

The N8300 supports snapshots of file systems and improves the storage performance and usage in the following aspects:

- Snapshots can be created at once without affecting host services.
- Snapshots can be data sources for backup and archiving, thus improving data security and reliability.
- Snapshots can enable storage devices to create flexible and frequent recover points, thus recovering data quickly.

Supporting Incremental Remote Replication of File Blocks

The N8300 provides remote replication of file blocks. According to self-defined periodical strategy, users can copy the file systems, directories, or files in the local N8300 to the remote N8300. Remote replication applies to the following scenarios:

- Disaster recover
- Remote backup of file systems
- When the local N8300 is faulty, the read-only services on the local N8300 can be quickly taken over by the remote N8300.
- Self-defined remote replication allows multiple remote replication tasks to run at the same time.
- Replication based on changes of files
Supporting Online Expansion of File Systems

The N8300 provides extensible (shrinkable) file systems to users. The capacity of a file system is not necessarily be the capacity when a file system is created. It can be changed according to the service requirements of users.

- The N8300 meets the users' requirements on expanding capacities of file systems without interrupting services. When a file system is expanded or shrunk online, you do not need to shut the cluster; therefore, services are not interrupted.
- The N8300 supports online expanding and shrinkage of the file system capacity in multiple methods. You can choose to expand or shrink tier one storage and tier two storage to the specified capacity or by the specified incremental capacity.

Supporting dynamic addition and deletion of mirrored volumes

The N8300 provides the mirroring function of a file system. When a file system is created, you can create or delete the mirrors of the file system. When the application scenario and the requirement are changed (for example, the corresponding security level is changed), you can create or delete the mirrors of the original file system.

Supporting AD, NIS, and LDAP

The N8300 supports multiple domain management modes. As the client in the domain, the N8300 can share resources with other clients. Other clients can share resources according to the authorities, thus achieving unified management.

The domain management mode improves the enterprise-level maintainability and achieves centralized management, such as account management, application management, and network management.

Supporting Network Port Binding

The N8300 provides seven binding modes supported by Linux OS. Network port binding can bind different physical network port and provide a logical port to the outside, thus providing customers with larger service bandwidth and improving service performance.

- Network binding provides seven modes, including Round-robin, Active-backup, XOR, Broadcast, dynamic link aggregation, adaptive transmission load balance, and adaptive load balance.
- The partial binding mode provides load balance and fault tolerance. Multiple network ports balance service traffic. When a network port is faulty and cannot carry the services, other bound network ports carry the services from the faulty network port, thus achieving fault tolerance and ensuring the normal running of customers' services.

Supporting User Quota Management

The N8300 provides the CIFS sharing and supports creating home folders named with user names for different sharing users, thus specifying the using quota for different sharing users.

- The N8300 provides the same home folder for different sharing users. Users can not only access the normal sharing, but also can access their own home folders.
- The N8300 provides reliability for data in different users' home folders. Each home folder has specified users, thus avoiding illegal access.
Different user quotas can be configured to different home folders. Flexible quota management enables different quotas to be allocated to different users, thus improving the sharing maintainability.

Supporting Multiple Backup Methods

The N8300 supports the NDMP; therefore, it can use the third-party backup software that supports the NDMP. The N8300 also supports the NBU (Symantec backup software) client embedded backup mode, which is independent of service hosts and the networking is simple.

- Integrating with the NBU client, thus connecting to the NBU server simply and reliably.
- Supporting the NDMP; therefore, backup software can be flexibly chosen. When customers have non-NBU backup software, they can use the existing NBU backup software to save costs.
- Supporting NBU client embedded backup mode; therefore, the users' backup networking can be easily constructed without involving the service host.

1.2 Typical Networking

The N8300 supports the NAS and SAN to meet different networking requirements. The ASs can connect to the N8300 through the Ethernet switch, or can connect to the N8300 storage units through the FC switch or the Ethernet switch to achieve the SAN networking.

1.2.1 NAS

This section describes the NAS application scenario and networking of the N8300.

1.2.2 NAS&SAN

This section describes the networking, features, and development purpose of the NAS&SAN.

1.2.1 NAS

This section describes the NAS application scenario and networking of the N8300.

NAS results from the development of file servers. Equivalent to a dedicated file server, a NAS system provides file sharing based on the Network File System (NFS) or Common Internet File System (CIFS) protocol. Its networking is based on high-speed Local Area Networks (LANs), and its data transmission is based on the Internet Protocol (IP). The NAS has the following basic features:

- Providing an OS and an application system for special storage services.
- Providing a higher price performance ratio than existing standard systems as optimized hardware facilities.
- Easy to install and manage on the existing network as preconfigured data network components.

Figure 1-2 shows the typical NAS networking of the N8300.
1.2.2 NAS&SAN

This section describes the networking, features, and development purpose of the NAS&SAN.

Storage Area Network (SAN) is storage architecture that connects storage devices to ASs over a network. It applies to the access between the host and the storage device. Through the SAN, data can be transmitted at a high speed between servers and background storage devices.

The N8300 supports the NAS&IP SAN and the NAS&FC SAN.

In the FC SAN, ASs, AS clusters, and storage devices are connected through FC switches. ASs, AS clusters, and storage devices communicate with each other by using the FC protocol. In the IP SAN, data blocks and SCSI commands are carried over the TCP/IP protocol. ASs and SAN storage devices are connected through gigabit or 10-gigabit Ethernet switches.

All service data is stored in the N8300, as shown in Figure 1-3. Services include high bandwidth density application (using the FC SAN to guarantee the service performance) and share of non-critical services and data (using IP-SAN or NAS interfaces to reduce construction costs and deployment costs).
1.3 Storage System Hardware

This section describes the hardware of the FileStore N8300.

1.3.1 Appearance

This section describes the front and rear views of the clustered NAS engine node and the storage unit.

1.3.2 Introduction to the Clustered NAS Engine

This section describes the clustered NAS engine of the N8300.

1.3.3 Introduction to the Storage Unit

This section describes the storage unit of the N8300.

1.3.4 Reliability Design

This section describes the reliability design of the N8300.

1.3.1 Appearance

This section describes the front and rear views of the clustered NAS engine node and the storage unit.
Clustered NAS Engine Node

Figure 1-4 shows the front view of the clustered NAS engine node.

Figure 1-4 Front view of the clustered NAS engine node

1 Information label
2 Power indicator and power button
3 NMI button
4 USB connector (two)
5 Video connector
6 LCD menu button
7 LCD panel
8 System recognition button
9 CD drive (optional)
10 Disk drive

Figure 1-5 shows the rear view of the clustered NAS engine node.

Figure 1-5 Rear view of the clustered NAS engine node

1 Ethernet port
2 FC port
3 Power supply 1 (PS1)
4 Power supply 2 (PS2)
5 System recognition button
6 System status indicator
7 System status indicator connector
8 Ethernet port (four)
9 USB connector (two)
10 Video connector
11 Serial port
Storage Unit

The front view of the controller enclosure is the same as that of the disk enclosure, as shown in Figure 1-6.

**Figure 1-6 Front view of the storage unit**

![Front view of the storage unit]

1. Power indicator  
2. Startup/alarm indicator

Taking the S2300 controller enclosure configured with two controllers, two AC power modules, two fan modules, and FC host ports as an example, Figure 1-7 shows the rear view of the S2300 controller enclosure.

**Figure 1-7 Rear view of the storage unit**

![Rear view of the storage unit]

1. Power switch  
2. Power running indicator  
3. Power alarm indicator  
4. Fan alarm indicator  
5. AC power/fan module  
6. Power socket  
7. Battery module  
8. Battery running indicator  
9. Battery discharging indicator  
10. Battery alarm indicator  
11. Controller B  
12. Enclosure ID display  
13. COM 2 serial port  
14. Management network port  
15. Mini SAS expander port
1.3.2 Introduction to the Clustered NAS Engine

This section describes the clustered NAS engine of the N8300.

The clustered NAS engine of the N8300 supports two to six nodes and automatic failover and failback among nodes.

A clustered NAS engine is configured with power modules and fan modules in 1+1 redundant mode. It provides four Ethernet service ports and two 4 Gbit/s back-end FC disk interfaces. When multiple clustered NAS engines are configured, the following service ports and back-end disk interfaces are provided:

- When two nodes are configured: providing eight Ethernet service ports and four FC back-end disk interfaces.
- When three to six nodes are configured: providing 12 to 24 Ethernet service ports and 6 to 12 back-end FC disk interfaces.

When more than two nodes are configured, the clustered NAS engine must be configured with two switch modules to connect the heartbeat network.

*NOTE*
For switch modules, you must choose Ethernet switches (such as Brocade SW300) certified by Symantec.

1.3.3 Introduction to the Storage Unit

This section describes the storage unit of the N8300.

A N8300 storage unit can be configured with three models FileStore S2300, FileStore S5500, and FileStore S5600. Storage units of the three models can achieve flexible configuration of disk channels and disk types. A storage unit consists of a controller enclosure or a controller enclosure and D200 disk enclosures connected to the controller. The controller enclosure and disk enclosures use the system enclosures with the same hardware structure. Different components are inserted in system enclosures for flexible hardware configurations.

When a storage unit is configured with two controllers, the controller enclosure provides redundant expansion channels. The front-end data interfaces are configured as follows:

- When the storage unit is an S2300 controller: providing four 4 Gbit/s front-end FC data interfaces.
- When the storage unit is an S5500/S5600 controller: providing sixteen 4 Gbit/s front-end FC data interfaces or eight 4 Gbit/s front-end FC data interfaces and four 1 Gbit/s iSCSI front-end data interfaces (for the NAS&IP SAN).
1 Overview

FileStore N8300 Clustered NAS Storage System

Product Description

NOTE

1.3.4 Reliability Design

This section describes the reliability design of the N8300.

Cluster NAS Engine Reliability

The clustered NAS engine uses two or more nodes and provides the reliability design as follows:

- Adding or deleting nodes online
- Automatic failover and failback among nodes
- 1+1 redundant mode for power modules and fan modules in a node
- 8 GB cache for a node
- RAID 1 for system disks in a node
- Redundant heartbeat networks among nodes and 1+1 redundant mode for Ethernet switch modules
- Redundant configuration for service network ports and back-end disk channels

Storage Unit Reliability

The reliability design of the storage unit controller enclosure and disk enclosure is as follows:

- Power modules and fan modules are configured in 1+1 redundant mode. A power module can meet the power requirements of a controller enclosure or disk enclosure in full configuration. When one fan module is faulty, the other can meet the heat dissipation requirements for the full-load operation of the controller enclosure or disk enclosure at 5°C to 40°C.
- Supporting changing power/fan modules online.
- The controller enclosure provides 1+1 redundant mode for controllers. Two controllers communicate with each other through a high bandwidth mirroring channel. The controller enclosure also provides cache mirroring between two controllers.
- A controller is configured with 4 GB cache and can be changed online.
- Providing 1+1 redundant mode for optical modules or Ethernet switch modules.

Data Reliability

The data reliability design is as follows:

- Supporting snapshots and mirroring of file systems
- Providing remote replication to achieve remote backup of file systems

1.4 Storage System Management

This topic introduces the management methods and the management software of the N8300.
1.4.1 Introduction to Management Methods

This section describes the management methods of the N8300.

1.4.2 Introduction to Functions

The management software of the N8300 provides powerful service functions, complete system monitoring functions, and various types of alarms.

### 1.4.1 Introduction to Management Methods

This section describes the management methods of the N8300.

The N8300 provides two management methods:

- **Network client**
  - According to network configurations of clients, set the IP address of the management network port on the N8300.
  - By managing the IP address, you can log in to the network client to access storage devices and perform daily device management and maintenance. **Figure 1-8** shows the management interface based on the network client.

![Management interface based on the network client](image)

**Figure 1-8** Management interface based on the network client

- **CLI**
  - According to network configurations of clients, set the IP address of the management network port on the N8300.
  - By managing the IP address, you can log in to the CLI through the third-party software using the SSH protocol and perform local or remote management and maintenance based on the CLI. **Figure 1-9** shows the CLI management interface.

![CLI management interface](image)

**Figure 1-9** CLI management interface
1.4.2 Introduction to Functions

The management software of the N8300 provides powerful service functions, complete system monitoring functions, and various types of alarms.

**Powerful Service Functions**

Through the network client and CLI, the N8300 provides the following service functions:

- RAID group management of storage units, LUN management, host management, and mapping management.
- Cache policy management of storage unit controllers, IP address configuration of the management network port, initiator, hot spare setting, and CHAP certification.
- Clustered NAS engine node management, virtual disk management, file system management, tiering storage management, and sharing management.
- Network management, backup management, report management, and upgrade management.

**Complete System Monitoring Functions**

Through the network client and the CLI, the N8300 provides the following system monitoring functions:

- Monitoring physical modules
  Monitoring the status of each Field Replaceable Unit (FRU)
- Monitoring interfaces
Monitoring the status of each physical interface, including the link status of the FC, iSCSI, and mini SAS ports, the link status of the disk loop interface, and the connection status of the management network port.

- Monitoring the service status
  Monitoring the service status of the N8300 in real time, including the status of virtual disks, status of file systems, and usage of system resources.

Various Types of Alarms

The N8300 provides the following types of alarms:

- Alarm based on the network client or the CLI
  Through the FileStore ISM or the CLI, you can view all the history alarms and the current alarms, and set Trap IP alarms, short message alarms, and email alarms.

- Audible alarm
  When an emergency fault occurs in the N8300, the N8300 generates an alarm through the buzzer on the device.

- Indicator alarm
  When faults occur in some physical devices of the N8300, you can locate the faults through the alarm indicator on each enclosure or board.
2 Application Scenario

About This Chapter

This section describes the storage application scenario, backup application scenario, networking of the N8300.

2.1 Typical Application Scenario

This section describes the typical application scenario of the N8300.

2.2 Integrated Storage

This section describes the application scenario of integrated storage of the N8300.

2.3 NBU Client Embedded Backup

This section describes the application scenarios of NBU client embedded backup of the N8300.

2.4 Centralized Remote Backup

This section describes the application scenario of centralized remote backup of the N8300.

2.1 Typical Application Scenario

This section describes the typical application scenario of the N8300.

Figure 2-1 shows the typical application scenario.
The N8300 mainly applies to:

- **Large computing storage application**
  
  As a high-performance clustered NAS product, the N8300 provides high availability and high reliability for high performance computing services. The redundancy design of the N8300 ensures that the services will not be affected by a fault of a component.

- **Tiering storage application**
  
  The N8300 provides tiering storage application to meet the requirements of enterprises on optimizing primary storage data and improving service performance. The tiering storage migrates seldom-accessed data to cheap storage units and maintains the availability of the data, thus enabling the service host to access the migrated data at any time; frequently accessed data is stored in the primary tier with high performance. In this way, the I/O performance of the service host is enhanced.

- **Expansion application**
  
  The increasing quantities and types of services bring about the increasing amount of service access. To meet requirements of enterprises on device performance and capacity expansion, the N8300 supports performance improvement. The clustered NAS engine supports online expansion of a maximum of six nodes; therefore, the integrated performance is in linear expansion with the expansion of clustered NAS engines nodes. A storage unit can be expanded to a maximum of 7680 TB.
2.2 Integrated Storage

This section describes the application scenario of integrated storage of the N8300. Figure 1-3 shows the application networking of integrated storage of the N8300.

In the application scenario of integrated storage of the N8300, service data of all types is integrated into the N8300. Services include high bandwidth density application (using FC storage network to guarantee the service performance) and share of non-critical services and data (using IP-SAN or NAS interfaces to reduce construction costs and deployment costs).

The N8300 provides linear expansion of performance. It saves customers' investment cost and meets the requirements of all service hosts on performance at the same time.

2.3 NBU Client Embedded Backup

This section describes the application scenarios of NBU client embedded backup of the N8300.

For the current situation of low bandwidth and large amount of data, the N8300 provides NBU client embedded backup. In this backup, the backup software is not installed on the service host. Through tight coupling with the backup server, the N8300 transmits data to the disaster backup center without occupying the transmission network of the storage unit. In this way, the process of backup does not affect service host performance.

The NBU client embedded backup provides flexible backup policies:

- Daily incremental backup
- Monthly full backup

The NBU client embedded backup reduces the backup network occupation, cost, and complexity for deployment. Figure 2-2 shows the networking of the NBU client embedded backup.
2.4 Centralized Remote Backup

This section describes the application scenario of centralized remote backup of the N8300.

In the application of the centralized remote backup, the N8300 can serve as the centralized storage device of the disaster backup center to store backup data from all production centers. Figure 2-3 shows the networking of the application.
Figure 2-3 Networking of the centralized remote backup

Diagram showing the networking of the centralized remote backup system, involving FC SAN, IP SAN, NAS, and disaster recovery center. The diagram illustrates the connectivity between different units and servers.
3 Storage System Hardware

About This Chapter

This section describes specifications, features, and other requirements of the FileStore N8300.

3.1 Hardware Dimensions and Power Specifications

This section describes the dimensions, weight, and power specifications of the N8300.

3.2 Data Cables

This section describes the data cables of the N8300.

3.1 Hardware Dimensions and Power Specifications

This section describes the dimensions, weight, and power specifications of the N8300.

3.1.1 Dimensions and Weight

This section describes the dimensions and weight of the N8300.

3.1.2 Power Specifications

This section describes the power specifications and certifications that the AC power of the N8300 passes.

3.1.1 Dimensions and Weight

This section describes the dimensions and weight of the N8300.

Entire System Dimensions

The dimensions of the entire N8300 are as follows:

- Height: 2200 mm
- Width: 600 mm
- Depth: 1000 mm
Entire System Weight

The weight of each component when the N8300 is fully configured is as follows:

- Clustered NAS engine node: 26 kg/node
- Controller enclosure: 68 kg
- Disk enclosure: 61 kg

3.1.2 Power Specifications

This section describes the power specifications and certifications that the AC power of the N8300 passes.

The standard that the power complies with: The AC single power complies with CLASS A standard.

Certifications that the AC power passes:

- Certification Bodies (CB) certification
- Conformite Europeenne (CE) certification
- Restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS) certification
- Underwriter Laboratories Inc. (UL) certification

Table 3-1 lists the safety and EMC standards that AC PEMs comply with.

<table>
<thead>
<tr>
<th>Safety and EMC Standard</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IEC 60950-1</td>
<td>Information technology equipment – Safety. Part 1: General requirements, plus all existing national and group differences within the IECEE CB Scheme</td>
</tr>
<tr>
<td>EN 60950-1</td>
<td>Information technology equipment – Safety. Part 1: General requirements, plus all existing national and group differences</td>
</tr>
<tr>
<td>UL 60950-1</td>
<td>Information technology equipment – Safety. Part 1: General requirements</td>
</tr>
<tr>
<td>GB 4943-2001</td>
<td>Safety of Information Technology Equipment (including Electrical Business Equipment) (standard for China, equivalent to IEC 60950)</td>
</tr>
</tbody>
</table>

The power of the N8300 includes AC power of the clustered NAS engine and AC power of the controller enclosure and the disk enclosure.

AC Power Specifications of a Clustered NAS Engine Node

Table 3-2 lists the AC Power specifications of a clustered NAS engine node.
Table 3-2 AC Power specifications of a clustered NAS engine node

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>Minimum Value</th>
<th>Typical Value</th>
<th>Maximum Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input AC power</td>
<td>W</td>
<td>570</td>
<td>-</td>
<td>870</td>
</tr>
<tr>
<td>Input AC voltage range</td>
<td>V</td>
<td>90</td>
<td>-</td>
<td>264</td>
</tr>
<tr>
<td>Input AC voltage frequency</td>
<td>Hz</td>
<td>47</td>
<td>50</td>
<td>63</td>
</tr>
<tr>
<td>Input circuit</td>
<td>A</td>
<td>-</td>
<td>-</td>
<td>55</td>
</tr>
</tbody>
</table>

AC Power Specifications of a Controller Enclosure

Table 3-3 lists the AC Power specifications.

Table 3-3 AC power specifications of a controller enclosure

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>Minimum Value</th>
<th>Typical Value</th>
<th>Maximum Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input AC power</td>
<td>W</td>
<td>-</td>
<td>-</td>
<td>• S2300: 835</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• S5500: 820</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• S5600: 840</td>
</tr>
<tr>
<td>Input AC voltage range</td>
<td>V</td>
<td>200</td>
<td>220</td>
<td>240</td>
</tr>
<tr>
<td>Input AC voltage frequency</td>
<td>Hz</td>
<td>47</td>
<td>50</td>
<td>63</td>
</tr>
<tr>
<td>Power factor</td>
<td>-</td>
<td>0.95</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Input circuit</td>
<td>A</td>
<td>-</td>
<td>-</td>
<td>8</td>
</tr>
<tr>
<td>Input impulse circuit</td>
<td>A</td>
<td>-</td>
<td>-</td>
<td>27</td>
</tr>
</tbody>
</table>

AC Power Specifications of a Disk Enclosure

Table 3-4 lists the AC Power specifications.

Table 3-4 AC power specifications of a disk enclosure

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>Minimum Value</th>
<th>Typical Value</th>
<th>Maximum Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input AC power</td>
<td>W</td>
<td>-</td>
<td>-</td>
<td>670/680</td>
</tr>
<tr>
<td>Input AC voltage range</td>
<td>V</td>
<td>200</td>
<td>220</td>
<td>240</td>
</tr>
</tbody>
</table>
3.2 Data Cables

This section describes the data cables of the N8300.

Table 3-5 lists the data cables used by the N8300.

Table 3-5 Data cables used by the N8300

<table>
<thead>
<tr>
<th>Type</th>
<th>Condition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network cable</td>
<td>CAT5E</td>
<td>• Connecting the service network port to an external network.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Connecting the heartbeat network between clustered NAS engine nodes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Applying to the IP SAN to connect the host port on the a storage unit to an external network.</td>
</tr>
<tr>
<td>Serial port</td>
<td>RJ-45 to DB-9</td>
<td>• Connecting the CLI serial port on the controller enclosure or the disk enclosure to the serial port on the maintenance terminal.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Connecting the CLI serial port on the clustered NAS engine node to the serial port on the maintenance terminal.</td>
</tr>
<tr>
<td>Optical fiber</td>
<td>Multi-mode</td>
<td>• Connecting the clustered NAS engine nodes to storage unit FC network.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Applying to the FC SAN to connect the host port on the a storage unit to an external network.</td>
</tr>
<tr>
<td>SAS cable a</td>
<td>-</td>
<td>Connecting D200 disk enclosures.</td>
</tr>
</tbody>
</table>

a: SAS cables are classified into mini SAS cables and mini SAS to SAS cables.
4 Storage System Management

About This Chapter

This section describes the features and functions of the FileStore ISM and CLI of the FileStore N8300.

4.1 Overview

This section describes the methods for managing the N8300.

4.2 FileStore ISM

This section describes the management interface and functions of operation and maintenance of the FileStore ISM.

4.3 CLI

This section describes the management modes, levels, and classification of function commands of the storage system based on CLI.

4.1 Overview

This section describes the methods for managing the N8300.

The N8300 uses the modular structure. The N8300 also provides GUI-based network clients and CLI-based standard management interfaces, thus facilitating users to operate and maintain the N8300.

4.2 FileStore ISM

This section describes the management interface and functions of operation and maintenance of the FileStore ISM.

4.2.1 Overview

The FileStore ISM is a platform software developed by Symantec. The FileStore ISM supports the SMI-S protocol and provides the storage device management platform. By using the Java Web Start (JWS) technology, the FileStore ISM enables users to easily and conveniently configure, manage, and maintain storage arrays.
4.2.2 Main Interface

This section describes the main interface of the FileStore ISM.

4.2.3 Modes and Features of Operation and Maintenance

This section describes the modes and features of operation and maintenance of the FileStore ISM.

4.2.4 Main Functions of Operation and Maintenance

This section describes the management interface and functions of operation and maintenance of the FileStore ISM.

4.2.1 Overview

The FileStore ISM is a platform software developed by Symantec. The FileStore ISM supports the SMI-S protocol and provides the storage device management platform. By using the Java Web Start (JWS) technology, the FileStore ISM enables users to easily and conveniently configure, manage, and maintain storage arrays.

4.2.2 Main Interface

This section describes the main interface of the FileStore ISM.

The FileStore ISM provides a friendly interface and detailed system prompts, thus avoiding misoperation of users and reducing maintenance costs to the largest extent.

The main interface includes the menu bar, tool bar, navigation tree, status bar, operation area, and alarm statistics. You can enter each functional module through the menu bar, toolbar, or shortcut menu. Users can choose a proper method according to personal habits.

Figure 4-1 shows the main interface of the FileStore ISM.

**Figure 4-1 Main interface of the FileStore ISM**

1. Menu bar
2. Toolbar
3. Navigation tree
Menu Bar

The menu bar includes System, Configuration, Performance, Alarm, User, Security, and Help. Different nodes in the navigation tree correspond to different menus and different submenus.

Toolbar

The icons on the toolbar correspond to functions. When you choose different objects in the navigation tree, the icons on the toolbar change. The icons from the commonly-used icons to the changed icons are sequenced from left right.

Navigation Tree

Navigation trees are classified into two types: Physical View and Logical View. In the navigation tree, you can use the shortcut menu to operate. The shown icons indicate the running status of corresponding components.

Status Bar

On the status bar, the location of the currently selected node and the information about the current user are displayed.

Operation Area

In the operation area, the physical diagram and related device information are displayed. On the physical diagram, you can click an object to view its properties. The displayed device information consists of the details of the selected node on the left and the key information about its sub-nodes.

Alarm Statistics

Displaying statistics of alarms in the current system.

4.2.3 Modes and Features of Operation and Maintenance

This section describes the modes and features of operation and maintenance of operation and maintenance of the FileStore ISM.

The GUI operation and maintenance mode of the N8300 is simple, easy to use, reliable, and vivid. FileStore ISM provides a friendly management interface. Through the initial configuration wizard, typical application configuration wizard, and the help system, users can operate and maintain the N8300 easily and quickly.

The N8300 provides the confirmation in case of dangerous operations. All potential hazardous operations to the system or data should be confirmed. This prevents wrong operations from causing damage to the system or data.
4.2.4 Main Functions of Operation and Maintenance

This section describes the management interface and functions of operation and maintenance of the FileStore ISM.

The FileStore ISM provides the following functions:

- System management
- Device management
- Service management
- Mapping management
- Performance management
- Alarm management
- User management
- CHAP management
- Storage pool management
- File system management
- Sharing management
- Cluster management
- Backup management
- Network management
- Help

**System Management**

Providing functions such as array discovery, time synchronization, upgrade, license management, screen locking, and exiting from the FileStore ISM.

**Device Management**

Providing management of information query, information modifying, and device connecting. Providing the functions of importing or exporting configuration data, exporting running data, and switchover.

In addition, device management includes management of storage units:

- Controller enclosure management
- Disk enclosure management

**Service Management**

Providing RAID group management, LUN management, resource pool management, HyperImage management, and session management.

**Mapping Management**

Providing host group management, host management, and initiator management.
Performance Management

Performance management can perform statistics according to the array and the front-end host ports. Performance management can also export the performance statistics data.

Alarm Management

The N8300 provides the following types of alarms:

- Alarms based on the GUI and CLI
  Through the GUI or the CLI, you can view all the history alarms and the current alarms, and set Trap IP alarms, short message alarms, and email alarms.
- Audible alarm
  When an emergency fault occurs in a device, the N8300 generates an audible alarm through the buzzer on the controller enclosure.
- Indicator alarm
  When faults occur on certain physical devices of the N8300, you can locate the faults through the alarm indicator.

User Management

Providing various functions such as creating, modifying, deleting, or browsing user information. User levels are classified into the following types:

- Administrator level
  Only the administrator can use the commands of this level.
- System user level
  Only the system user and the administrator can use commands of this level.
- Storage user level
  Only the storage user and the administrator can use commands of this level.

CHAP Management

Providing creating or deleting a CHAP, enabling an initiator, modifying a password, and querying information. When a controller is configured with an iSCSI host port, the validity of the starter's identity can be certified when the storage unit connects to the clustered NAS engine or external network after CHAP certification is enabled. In this way, access security is improved.

Storage Pool Management

Providing disk management and creating, deleting, and renaming of the storage pool.

File System Management

Providing expansion, shrinkage, snapshots, mirroring, and tiering storage of a file system.

Sharing Management

Providing the NFS and CIFS.
Cluster Management
Providing adding, deleting, restarting, and powering off nodes.

Backup Management
Providing setting the client, NDMP, and server.

Network Management
Providing link management, DNS management, routing management, NIS management, binding management, and LDAP management.

Help
For details on the FileStore ISM help, see the FileStore ISM Online Help.

4.3 CLI
This section describes the management modes, levels, and classification of function commands of the storage system based on CLI.

The N8300 can manage the storage system in the CLI. Through the CLI, users can query, set, manage, and maintain the services provided by devices and the system. The CLI supports operations in batch. In this way, users can maintain devices efficiently and quickly.

4.3.1 Modes and Levels of CLI Commands
This section describes the modes and levels of CLI commands.

4.3.2 Classification of CLI Commands
This section describes the classification of CLI commands.

4.3.1 Modes and Levels of CLI Commands
This section describes the modes and levels of CLI commands.

Modes
The modes of CLI commands are as follows:
- User management
- Cluster management
- Storage management
- Network management
- System management
- CIFS management
- NFS management
- Backup management
- Remote replication
• Report management
• Technical support
• Upgrade management

Levels

The levels of CLI commands are as follows:
• Administrator level
  Only the administrator can use the commands of this level.
• System user level
  Only the system user and the administrator can use the commands of this level.
• Storage user level
  Only the storage user and the administrator can use commands of this level.

4.3.2 Classification of CLI Commands

This section describes the classification of CLI commands.

According to functions, CLI commands are classified into the following types:
• User management
• Cluster management
• Storage management
• Network management
• System Management
• CIFS management
• NFS management
• Backup management
• Remote replication
• Report management
• Technical support management
• Upgrade management
5 Technical Specifications

About This Chapter

This chapter describes the technical specifications, reliability specifications, and operating environmental specifications of the FileStore N8300.

5.1 Technical Specifications of the Entire System

This section describes the technical specifications of the N8300 clustered NAS engine and storage units.

5.2 Reliability Specifications

This section describes the reliability specifications of the N8300.

5.3 Operating Environmental Specifications

This section describes the operating environmental specifications of the N8300.

5.1 Technical Specifications of the Entire System

This section describes the technical specifications of the N8300 clustered NAS engine and storage units.

Clustered NAS Engine

Table 5-1 lists the technical specifications of the clustered NAS engine.

<table>
<thead>
<tr>
<th>Type</th>
<th>Sub Type</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC power supply</td>
<td>Power</td>
<td>870 W (high input)</td>
</tr>
<tr>
<td>(each power supply)</td>
<td></td>
<td>570 W/200840 KB (Energy Smart)</td>
</tr>
<tr>
<td>Voltage</td>
<td></td>
<td>90 V AC to 264 V AC, auto-adjusting, and 47 Hz to 63 Hz</td>
</tr>
<tr>
<td>Heat dissipation</td>
<td>Maximum of</td>
<td>Maximum of 2968.6 BTU/h (high input)</td>
</tr>
<tr>
<td></td>
<td>1944.9 BTU/h (Energy Smart)</td>
<td></td>
</tr>
</tbody>
</table>
## Physical specifications

<table>
<thead>
<tr>
<th>Type</th>
<th>Sub Type</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum input current</td>
<td></td>
<td>In the situation of a typical circuit and within the entire system running environment, each power supply may allow a maximum input current of 55 A in ten milliseconds or a shorter time.</td>
</tr>
<tr>
<td>Height</td>
<td></td>
<td>8.64 cm (3.4 inches)</td>
</tr>
<tr>
<td>Width</td>
<td></td>
<td>48.24 cm (18.99 inches) with the rack latch 44.31 cm (17.4 inches) without the rack latch</td>
</tr>
<tr>
<td>Thickness</td>
<td></td>
<td>72.06 cm (28.4 inches) with the power supply and baffle 68.07 cm (26.8 inches) without the power supply and baffle</td>
</tr>
<tr>
<td>Weight</td>
<td></td>
<td>(Full configuration) 26.1 kg (57.54 pounds) (Empty) 17.7 kg (39 pounds)</td>
</tr>
</tbody>
</table>

## Storage Unit

Table 5-2 lists the technical specifications of a storage unit.

### Table 5-2 Technical specifications of a storage unit

<table>
<thead>
<tr>
<th>Type</th>
<th>Sub Type</th>
<th>Specification</th>
</tr>
</thead>
</table>
| Enclosure power consumption | AC input power of the controller enclosure | • S5600: 840 W  
• S5500: 820 W  
• S2300: 835 W |
| Power supply specifications | AC power voltage range                       | 200 V to 240 V                                     |
|                           | AC power frequency range                      | 47 Hz to 63 Hz                                     |
|                           | AC power conversion rate                      | >75%                                               |
|                           | Power redundant mode                          | 1+1 load balance                                   |
| Weight (without disks)    | -                                             | 45 kg                                              |
| Dimensions               | -                                             | 446 mm×175 mm×600 mm                               |

Table 5-3 lists the technical specifications of a storage unit disk enclosure.

### Table 5-3 Technical specifications of a storage unit disk enclosure

<table>
<thead>
<tr>
<th>Type</th>
<th>Sub Type</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enclosure power consumption</td>
<td>AC input power of a disk enclosure</td>
<td>670 W/680 W</td>
</tr>
</tbody>
</table>
### 5.2 Reliability Specifications

This section describes the reliability specifications of the N8300.

**Table 5-4** lists the reliability specifications.

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intrinsic reliability of the N8300</td>
<td>≥ 99.999%</td>
</tr>
<tr>
<td>MTTR (^a) (regardless of travel time)</td>
<td>&lt; 1 hour</td>
</tr>
</tbody>
</table>

\(^a\): MTTR stands for mean time to repair.

### 5.3 Operating Environmental Specifications

This section describes the operating environmental specifications of the N8300.

**Table 5-5** lists the operating environmental specifications.

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temperature</td>
<td>10°C to 35°C</td>
</tr>
<tr>
<td>Maximum temperature variation rate</td>
<td>10°C/h</td>
</tr>
<tr>
<td>Operating humidity</td>
<td>20% RH to 80% RH</td>
</tr>
<tr>
<td>Maximum humidity variation rate</td>
<td>10% /h</td>
</tr>
</tbody>
</table>
6 Standards and Certifications

About This Chapter

This chapter describes the standards that the FileStore N8300 complies with and the certifications that the FileStore N8300 passes.

6.1 Regulatory Standards

This section describes the standards that the N8300 complies with.

6.2 Certifications

This section describes the certifications that the N8300 passes.

6.1 Regulatory Standards

This section describes the standards that the N8300 complies with.

Table 6-1 lists the standards that the N8300 complies with.

<table>
<thead>
<tr>
<th>Item</th>
<th>Standard</th>
</tr>
</thead>
</table>
| FC   | • FC-PH: ANSI X3.230  
      | • FC-PH2: ANSI X3.297  
      | • SCSI-FCP: ANSI X.269  
      | • FC-AL: ANSI X.272  
      | • FC-AL2: ANSI NCITS332-1999  
      | • FC-SW: ANSI NCITS321  
      | • FC-SW-2: ANSI NCITS 355-2001  
      | • FC-GS: ANSI X.288 (for FC switch)  
<pre><code>  | • FC-GS2: ANSI NCITS 288 (for FC switch) |
</code></pre>
<table>
<thead>
<tr>
<th>Item</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAS</td>
<td>• Serial Attached SCSI-1.1(SAS-1.1)</td>
</tr>
<tr>
<td></td>
<td>• T10/1562D Rev. 05 Serial Attached SCSI (SAS)</td>
</tr>
<tr>
<td></td>
<td>• T10/1601D Rev. 07 Serial Attached SCSI Model-1.1 (SAS 1.1)</td>
</tr>
<tr>
<td></td>
<td>• SFF 8301 Form Factor of 3.5” Disk Drives</td>
</tr>
<tr>
<td></td>
<td>• SFF 8323 3.5” drive form factor with serial connector</td>
</tr>
<tr>
<td></td>
<td>• SFF 8482 SAS plug connector</td>
</tr>
<tr>
<td>SCSI 3</td>
<td>• SAM-2: ANSI INCITS 366-2003</td>
</tr>
<tr>
<td></td>
<td>• SPC-2: ANSI INCITS 351-2001</td>
</tr>
<tr>
<td></td>
<td>• SBC: ANSI INCITS 306-1998</td>
</tr>
<tr>
<td>SNMP Trap</td>
<td>RFC2578 (SNMP v2)</td>
</tr>
<tr>
<td>Ethernet</td>
<td>IEEE 802.3</td>
</tr>
<tr>
<td>Fast Ethernet</td>
<td>IEEE 802.3u</td>
</tr>
<tr>
<td>Gigabit Ethernet</td>
<td>IEEE 802.3z</td>
</tr>
<tr>
<td>IEEE test interface</td>
<td>IEEE 1149.1-2001</td>
</tr>
<tr>
<td>and boundary scan</td>
<td></td>
</tr>
<tr>
<td>structures</td>
<td></td>
</tr>
<tr>
<td>Failure mode</td>
<td>IEC 812</td>
</tr>
<tr>
<td>effective analysis</td>
<td></td>
</tr>
<tr>
<td>(FMEA) process</td>
<td></td>
</tr>
<tr>
<td>Reliability,</td>
<td>IEC 863</td>
</tr>
<tr>
<td>maintainability,</td>
<td></td>
</tr>
<tr>
<td>and availability</td>
<td></td>
</tr>
<tr>
<td>predication standard</td>
<td></td>
</tr>
<tr>
<td>Safety and EMC</td>
<td>UL 1950</td>
</tr>
<tr>
<td>standard in North</td>
<td></td>
</tr>
<tr>
<td>America</td>
<td></td>
</tr>
<tr>
<td>Safety and EMC</td>
<td>UL 60950</td>
</tr>
<tr>
<td>standard in North</td>
<td></td>
</tr>
<tr>
<td>America</td>
<td></td>
</tr>
<tr>
<td>Safety and EMC</td>
<td>LVD 73/23/EEC</td>
</tr>
<tr>
<td>standard in Europe</td>
<td></td>
</tr>
<tr>
<td>Safety and EMC</td>
<td>EN 60950</td>
</tr>
<tr>
<td>standard in Europe</td>
<td></td>
</tr>
<tr>
<td>EMC standard in</td>
<td>47 CFR Part 15, Subpart B</td>
</tr>
<tr>
<td>America</td>
<td></td>
</tr>
<tr>
<td>EMC standard in</td>
<td>EMC Directive 89/336/EEC</td>
</tr>
<tr>
<td>Europe</td>
<td></td>
</tr>
<tr>
<td>EMC standard in</td>
<td>EN 55022</td>
</tr>
<tr>
<td>Europe</td>
<td></td>
</tr>
<tr>
<td>EMC standard in</td>
<td>EN 55024</td>
</tr>
<tr>
<td>Europe</td>
<td></td>
</tr>
<tr>
<td>ETSI standard</td>
<td>ETS 300 019</td>
</tr>
<tr>
<td>(environment)</td>
<td></td>
</tr>
<tr>
<td>ETSI standard</td>
<td>ETS 300 132</td>
</tr>
<tr>
<td>(power supply)</td>
<td></td>
</tr>
<tr>
<td>ETSI standard</td>
<td>ETS 300 753</td>
</tr>
<tr>
<td>(noise)</td>
<td></td>
</tr>
<tr>
<td>Item</td>
<td>Standard</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>ETSI standard (environment)</td>
<td>ETS 300 119</td>
</tr>
<tr>
<td>ETSI standard (grounding)</td>
<td>ETS 300 253</td>
</tr>
<tr>
<td>ITUT standard (grounding)</td>
<td>ITUT K.27</td>
</tr>
<tr>
<td>Environmental protection</td>
<td>ECMA TR/70</td>
</tr>
<tr>
<td>Reliability</td>
<td>GR-929, Telcordia SR-33</td>
</tr>
</tbody>
</table>

### 6.2 Certifications

This section describes the certifications that the N8300 passes.

Table 6-2 lists the certifications that the N8300 passes.

#### Table 6-2 Certifications that the N8300 passes

<table>
<thead>
<tr>
<th>Certification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CB</td>
<td>The CB system (the IEC system for testing and certificating electrical products) is part of the IEC System for Conformity Testing to Standards for Safety of Electrical Equipment (referred to as the IECEE). Members of the IECEE test product performance based on the use of specific IEC standards for electrical equipment. The test result, that is, the CB test report and the CB certification are recognized by members of the IECEE. The purpose is to reduce international trade barriers caused by the requirement to meet different certifications and approval standards in different countries.</td>
</tr>
<tr>
<td>CE</td>
<td>European Union Notice: Products that bear the Conformity with European (CE) marking comply with the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Union.</td>
</tr>
<tr>
<td>RoHS</td>
<td>RoHS is a European Union (EU) compulsory standard that is designed to regulate the materials and the technical standard of the electrical and electronic products. In this way, it does good to human health and environment protection.</td>
</tr>
<tr>
<td>UL</td>
<td>Underwriters Laboratories Inc (UL) is a nonprofitable product safety test and certification institute.</td>
</tr>
</tbody>
</table>
A Regulatory Compliance Standards

This section describes the CB, CE, RoHs, and UL certifications that the N8300 passes.

CB Certification Description

The CB system (the IEC system for testing and certificating electrical products) is part of the IEC System for Conformity Testing to Standards for Safety of Electrical Equipment (referred to as the IECEE). Members of the IECEE test product performance based on the use of specific IEC standards for electrical equipment. The test result, that is, the CB test report and the CB certification are recognized by members of the IECEE.

The CB system is based on the international IEC standard. Member countries are allowed to have standards that are different from the IEC standard, but they are required to notify other member countries. The CB test certification indicates that the sample has successfully passed the test and complies with requirements of the IEC and member countries.

CE Certification Description

European Union Notice: Products that bear the Conformity with European (CE) marking comply with the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Union.

If this product has telecommunication functionality, the R_TTE Directive (1999/5/EC) that complies with the directives mentioned previously implies conformity to the following European norms (in parentheses are the equivalent international standards and regulations):

- EN 55022 (CISPR 22)-Electro Magnetic Interference
- EN 55024 (IEC61000-4-2, 3, 4, 5, 6, 8, 11)-Electro Magnetic Immunity
- EN 60950 (IEC 60950)-Product Safety

RoHS Certification Description

The Restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS) is the directive that restricts the use of certain hazardous substances in the electrical, electronic equipment.

RoHS is a European Union (EU) compulsory standard that is designed to regulate the materials and the technical standard of the electrical and electronic products. In this way, it does good to human health and environment protection. That is, the six hazardous substances of lead (Pb), mercury (Hg), cadmium (Cd), hexavalent chromium (Cr6 +), polybrominated biphenyl (PBB), polybrominated diphenyl ethers (PBDE) can not exceed the specified limits.
UL Certification Description

Underwriters Laboratories Inc. (UL) is a non-profitable product safety test and certification institute.

UL has its own certification system for the entire system, components, and materials. All electric products that are exported to the USA must pass the UL certification.

The UL safety certification is classified into the following three methods:

- **Labeling**
  The UL labeling service is the best known service of the UL safety certification. The UL label on the product indicates that UL has tested the sample of the product according to the safety standards approved by the USA. The sample does not cause fire, creepage, or other dangers if predictable.

- **Classification**
  specific cases. In general, the classified products are mostly construction materials or industrial instruments. The classified products include industrial or commercial products. Some specified features must be tested, such as inflammability, hazardous performance, or specifications specified by the government.

- **Approval**
  UL tests parts of the product or unfinished product. These parts will be used in the ULabeled product list. This service covers millions of plastics, wires, circuit boards, various finished products, and even some large components, such as motorcycles or power supplies.
B How to Obtain Help

If a problem persists in routine maintenance or troubleshooting, contact Symantec for technical support.

B.1 Preparations For Contacting Symantec

To better solve the problem, you need to collect troubleshooting information and make debugging preparations before contacting Symantec.

B.2 How to Use the Document

Symantec provides guide documents shipped with the device. Through these documents, you can solve problems that occur during routine maintenance or troubleshooting.

B.3 Technical Support

Symantec Technical Support maintains support centers globally. Technical Support’s primary role is to respond to specific queries about product features and functionality. The Technical Support group also creates content for our online Knowledge Base. The Technical Support group works collaboratively with the other functional areas within Symantec to answer your questions in a timely fashion. For example, the Technical Support group works with Product Engineering and Symantec Security Response to provide alerting services and virus definition updates.

B.1 Preparations For Contacting Symantec

To better solve the problem, you need to collect troubleshooting information and make debugging preparations before contacting Symantec.

B.1.1 Collecting Troubleshooting Information

You need to collect necessary information for the troubleshooting.

B.1.2 Making Debugging Preparations

When you seek for technical support, Symantec technical engineers may help you to perform some operations to further collect fault information or remove the fault.

B.1.1 Collecting Troubleshooting Information

You need to collect necessary information for the troubleshooting.
You need to collect the following information:

- Detailed name and address of the customer
- Contact person and telephone number
- Time when the fault occurs
- Detailed description of the fault phenomena
- Device type, serial number, and software version
- Measures taken after the fault occurs and related results
- Problem level and required solution deadline

B.1.2 Making Debugging Preparations

When you seek for technical support, Symantec technical engineers may help you to perform some operations to further collect fault information or remove the fault.

Therefore, you need to prepare some tools or components for engineers, such as spare parts of the blade and interface card, screwdriver, screw, serial cable and network cable.

B.2 How to Use the Document

Symantec provides guide documents shipped with the device. Through these documents, you can solve problems that occur during routine maintenance or troubleshooting.

To solve the problems better, use the documents before you contact Symantec for technical support.

B.3 Technical Support

Symantec Technical Support maintains support centers globally. Technical Support’s primary role is to respond to specific queries about product features and functionality. The Technical Support group also creates content for our online Knowledge Base. The Technical Support group works collaboratively with the other functional areas within Symantec to answer your questions in a timely fashion. For example, the Technical Support group works with Product Engineering and Symantec Security Response to provide alerting services and virus definition updates.

Symantec’s maintenance offerings include the following:

- A range of support options that give you the flexibility to select the right amount of service for any size organization.
- Telephone and Web-based support that provides rapid response and up-to-the-minute information.
- Upgrade assurance that delivers automatic software upgrade protection.
- Global support that is available 24 hours a day, 7 days a week.
- Advanced features, including Account Management Services.

For information about Symantec’s Maintenance Programs, you can visit our Website at the following URL: http://www.symantec.com/techsupp/
B.3.1 Contacting Technical Support

Customers with a current maintenance agreement may access Technical Support information at the following URL: http://www.symantec.com/techsupp/

Before contacting Technical Support, make sure you have satisfied the system requirements that are listed in your product documentation. Also, you should be at the computer on which the problem occurred, in case it is necessary to replicate the problem.

When you contact Technical Support, please have the following information available:

- Product release level
- Hardware information
- Available memory, disk space, and NIC information
- Operating system
- Version and patch level
- Network topology
- Router, gateway, and IP address information
- Problem description:
  - Error messages and log files
  - Troubleshooting that was performed before contacting Symantec
  - Recent software configuration changes and network changes

B.3.2 Licensing and registration

If your Symantec product requires registration or a license key, access our technical support Web page at the following URL: http://www.symantec.com/techsupp/

B.3.3 Customer service

Customer service information is available at the following URL:
http://www.symantec.com/techsupp/

Customer Service is available to assist with the following types of issues:

- Questions regarding product licensing or serialization
- Product registration updates, such as address or name changes
- General product information (features, language availability, local dealers)
- Latest information about product updates and upgrades
- Information about upgrade assurance and maintenance contracts
- Information about the Symantec Buying Programs
- Advice about Symantec's technical support options
- Nontechnical presales questions
- Issues that are related to CD-ROMs or manuals

B.3.4 Maintenance agreement resources

If you want to contact Symantec regarding an existing maintenance agreement, please contact the maintenance agreement administration team for your region as follows:

- Asia-Pacific and Japan: customercare_apac@symantec.com
B.3.5 Additional enterprise services

Symantec offers a comprehensive set of services that allow you to maximize your investment in Symantec products and to develop your knowledge, expertise, and global insight, which enable you to manage your business risks proactively.

Enterprise services that are available include the following:

- Symantec Early Warning Solutions
  These solutions provide early warning of cyber attacks, comprehensive threat analysis, and countermeasures to prevent attacks before they occur.

- Managed Security Services
  These services remove the burden of managing and monitoring security devices and events, ensuring rapid response to real threats.

- Consulting Services
  Symantec Consulting Services provide on-site technical expertise from Symantec and its trusted partners. Symantec Consulting Services offer a variety of prepackaged and customizable options that include assessment, design, implementation, monitoring, and management capabilities. Each is focused on establishing and maintaining the integrity and availability of your IT resources.

- Educational Services
  Educational Services provide a full array of technical training, security education, security certification, and awareness communication programs.

To access more information about Enterprise services, please visit our Web site at the following URL: www.symantec.com.

Select your country or language from the site index.

- Europe, Middle-East, and Africa: semea@symantec.com
- North America and Latin America: supportsolutions@symantec.com
C Glossary

A

Administrator level

A user that has the total rights of the system.

Alarm

A function that can soon notify users of system faults. Alarm severity is classified based on the fault impact and user participation.

C

CIFS

A network file system access protocol primarily used by Windows clients to communicate file access requests to Windows servers. Abbreviated CIFS. Originally called Server Message Block (SMB). Today, other implementations of the CIFS protocol allow other clients and servers to use it for intercommunication and interoperation with Microsoft operating systems. Common Management Information Protocol.

CLI

A mechanism that provides a text-only interface for humancomputer interaction.

Cluster

A collection of computers that are interconnected (typically at highspeeds) for the purpose of improving reliability, availability, serviceability and/or performance (via load balancing). Often, clustered computers have access to a common pool of storage, and run special software to coordinate the component computers' activities.

Controller

Basic hardware that is installed with storage management software.

G

GUI

A visual computer environment that represents programs, files, and options with graphical images, such as icons, menus, and dialog boxes, on the screen.
<table>
<thead>
<tr>
<th><strong>LUN</strong></th>
<th>The SCSI identifier that specifies an internal logical unit of a target.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>M</strong></td>
<td>Mirroring A form of storage array in which two or more identical copies of data are maintained on separate media, thus avoiding data loss caused by damaged disks.</td>
</tr>
<tr>
<td><strong>N</strong></td>
<td>NAS A term used to refer to storage elements that connect to a network and provide file access services to computer systems. Abbreviated NAS. A NAS Storage Element consists of an engine, which implements the file services, and one or more devices, on which data is stored. NAS elements may be attached to any type of network. When attached to SANs, NAS elements may be considered to be members of the SAS class of storage elements.</td>
</tr>
<tr>
<td><strong>Network port binding</strong></td>
<td>Ensure high availability of network connections of servers and improve network performance.</td>
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<tr>
<td><strong>NFS</strong></td>
<td>A distributed file system and its associated network protocol originally developed by Sun Microsystems Computer Corporation and commonly implemented in UNIX systems, although most other computer systems have implemented NFS clients and/or servers. Abbreviated NFS. The IETF is responsible for the NFS standard.</td>
</tr>
<tr>
<td><strong>Node</strong></td>
<td>One of hosts in a cluster.</td>
</tr>
<tr>
<td><strong>R</strong></td>
<td>Redundancy The inclusion of extra components of a given type in a system (beyond those required by the system to carry out its function) for the purpose of enabling continued operation in the event of a computer failure.</td>
</tr>
<tr>
<td><strong>S</strong></td>
<td>Serial port The serial port is a type of connection on PCs that is used for peripherals such as mice, gaming controllers, modems, and older printers.</td>
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<tr>
<td><strong>Snapshot</strong></td>
<td>A fully usable copy of a defined collection of data that contains an image of the data as it appears at the point in time at which the copy is initiated. A snapshot may be either a duplicate or a replicate of the data it represents.</td>
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<tr>
<td><strong>SNMP</strong></td>
<td>An IETF protocol for monitoring and managing systems and devices on a network. The data monitored and managed is defined by an MIB. The protocol supports the functions of requesting and retrieving data, setting or writing data, and sending traps that signal the occurrence of events.</td>
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<tr>
<td>SSH</td>
<td>A network protocol designed by the IETF to provide secure file transfer and manipulation facilities over the secure shell (SSH) protocol.</td>
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<tr>
<td>Storage user level</td>
<td>A user that has the rights of maintaining storage devices and etc.</td>
</tr>
<tr>
<td>System user level</td>
<td>A user that has the rights of creating and maintaining file systems and etc.</td>
</tr>
<tr>
<td>Synchronous replication</td>
<td>A solution that synchronously copies the local production data to a remote server by using the disaster recovery software or hardware system. Each local I/O operation is released only by the remote replication party. In this mode, the remote data and the local data are completely synchronized in case of a disaster.</td>
</tr>
<tr>
<td>Tiering storage</td>
<td>Store data in different storage media according to classification of data.</td>
</tr>
<tr>
<td>Tier two storage</td>
<td>Storage media with lowe performance in tiering storage.</td>
</tr>
<tr>
<td>Tier one storage</td>
<td>Storage media with high performance in tiering storage.</td>
</tr>
</tbody>
</table>
## D Acronyms and Abbreviations

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>CIFS</td>
<td>Common Internet File System</td>
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<tr>
<td>CLI</td>
<td>Command Line Interface</td>
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<tr>
<td>CPU</td>
<td>Central Processing Unit</td>
</tr>
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<td>F</td>
<td>Fiber Channel</td>
</tr>
<tr>
<td>FC</td>
<td>Fiber Channel</td>
</tr>
<tr>
<td>GUI</td>
<td>Graphical User Interface</td>
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<tr>
<td>IP</td>
<td>Internet Protocol</td>
</tr>
<tr>
<td>ISM</td>
<td>Integrated Storage Management</td>
</tr>
<tr>
<td>LAN</td>
<td>Local Area Network</td>
</tr>
<tr>
<td>LDAP</td>
<td>Lightweight Directory Access Protocol</td>
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<tr>
<td>LUN</td>
<td>Logical Unit Number</td>
</tr>
<tr>
<td>MTTR</td>
<td>Mean Time To Repair</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
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<tr>
<td>NAS</td>
<td>Network Attached Storage</td>
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<tr>
<td>NDMP</td>
<td>Network Data Management Protocol</td>
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<tr>
<td>NFS</td>
<td>Network File System</td>
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<tr>
<td>NIS</td>
<td>Network Information Service</td>
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<tr>
<td>SAN</td>
<td>Storage Area Network</td>
</tr>
<tr>
<td>SNMP</td>
<td>Simple Network Management Protocol</td>
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<tr>
<td>USB</td>
<td>Universal Serial Bus</td>
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