

Hitachi Essential NAS Platform, NAS Gateway with High Cost Performance

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OVERVIEW: Over recent years, within the changing business environment, the need for file storage has grown rapidly as a consequence of the diversification of data types that has accompanied the diversification of businesses in the storage-system field. While increase in volumes of mixed data has been remarkable, the need for cost reduction in response to increases in investment costs, and complication on the operation and the maintenance has grown stronger. So efficient integration of file servers, stable performance, and backup for the sake of data protection is being demanded. Aiming to provide solutions to meet these demands, Hitachi has developed the “Hitachi Essential NAS Platform” — for improving connectivity, scalability, and availability while supporting functions such as remote backup for handling risks like system failures and disasters. Hitachi Essential NAS Platform makes it possible to establish an optimum system to satisfy requirements in regard to performance, capacity, etc. and provide flexible NAS that fully satisfies customers’ requirements.

INTRODUCTION

As the business environment changes, the data volume in storage systems continues to grow, and the volume

of externally attached RAID (redundant array of inexpensive disks) disk storage system shipped in the world market is growing by 1.6 times a year. In

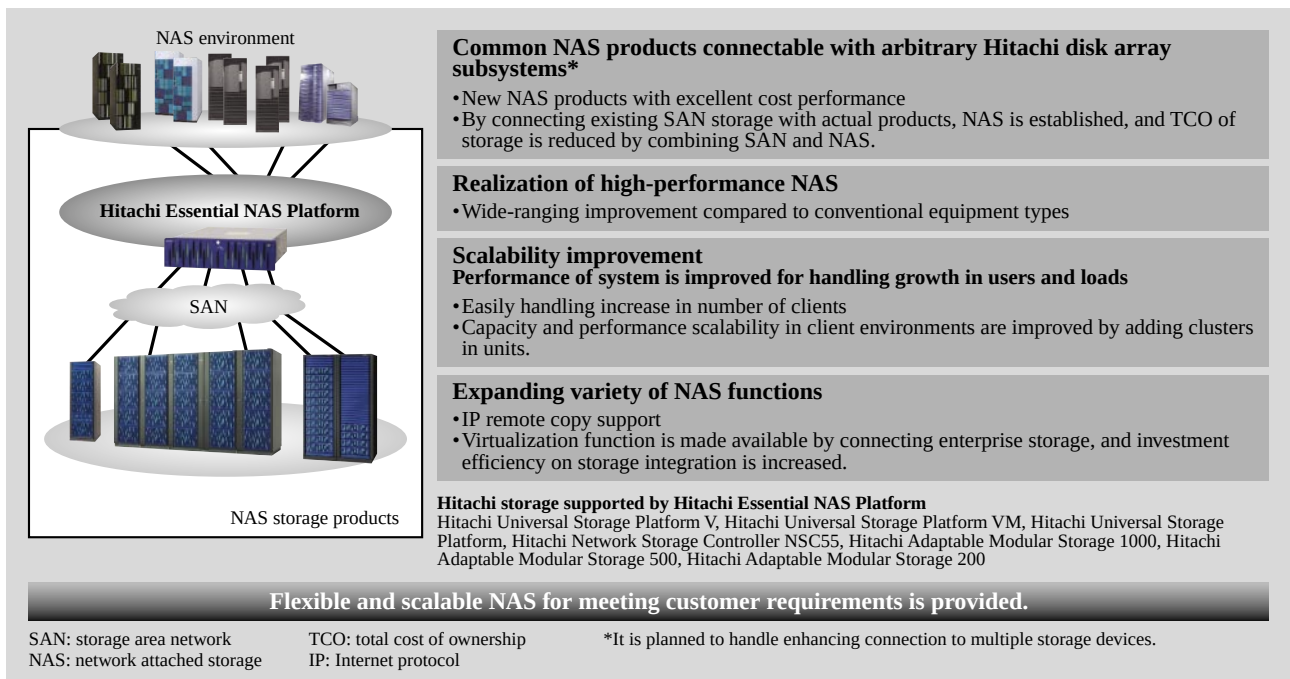


Fig. 1—Concept of Hitachi Essential NAS Platform.

With NAS products with excellent cost performance, connection with arbitrary Hitachi storage is possible. Moreover, customer needs can be flexibly satisfied by means of improving scalability and expanding NAS functions.

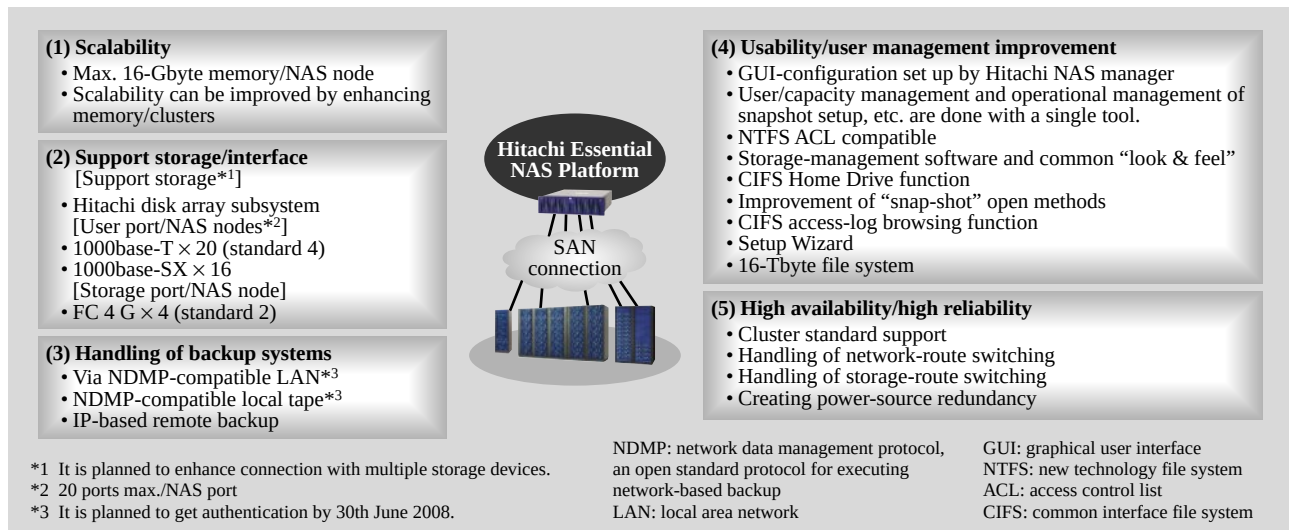


Fig. 2—Required Functions of Hitachi Essential NAS Platform.

On top of basic NAS functions, scalability, extendibility, backup functions, usability, and availability are enhanced.

In addition, data type is diversifying, non-structural types of data (such as image data and movie data) are increasing, and growth in the capacity of file storage has reached an even higher rate. In addition to file sharing, the aim of using file storage is to expand applications like file-server consolidation and backup. Under these circumstances, as issues regarding file storage, handling increases in data volume, user numbers, and load as well as recovery from system failures and user operational errors must be addressed.

Hitachi, Ltd. has commercialized the Hitachi Essential NAS Platform as a product for file storage. That is to say, we are offering it to our customers as a solution to the above-mentioned problems. In the rest of this paper, the features and performance of the Hitachi Essential NAS Platform — which is a means of solving these problems — are described in detail (see Fig. 1).

OVERVIEW OF HITACHI ESSENTIAL NAS PLATFORM

As NAS (network attached storage)-gateway-type equipment, Hitachi Essential NAS Platform can select and connect to arbitrary Hitachi disk array subsystems while also connecting to existing SAN (storage area network) environments. At the same time, it can establish a NAS environment that is optimum for meeting user requirements in terms of capacity and performance at low cost. Moreover, it provides scalability; that is, addition of network ports, memory, and NAS equipment itself as well as addition of disk

drives without having to stop the system, thereby flexibly adapting to changes in user environments. As for function, it supports NDMP (network data management protocol; a standard protocol for managing data on network connected devices) backup, and newly supports a remote backup function that uses IP (Internet protocol) circuits. So it inexpensively achieves handling of disaster and failure risks from the data protection aspect. It can also use the function of virtualization and thin provisioning of internal and external storage provided by Hitachi Universal Storage Platform V and Hitachi Universal Storage Platform VM, and it achieves investment efficiency by effectively utilizing unused disk capacity (see Fig. 2).

CHARACTERISTICS OF HITACHI ESSENTIAL NAS PLATFORM

The main characteristics of the Hitachi Essential NAS Platform are described in the following sub-sections.

(1)Connectibility

The Hitachi Essential NAS Platform has a gateway configuration independent of storage and can be connected to arbitrary Hitachi disk array subsystems. As a result, storage optimized for user requirements in terms of performance and capacity can be chosen and connected. Moreover, by connecting Hitachi disk array subsystems already being used as SAN by customers and by allocating unused volume for NAS, it is possible to construct an environment in which both SAN and NAS coexist. As a result of this

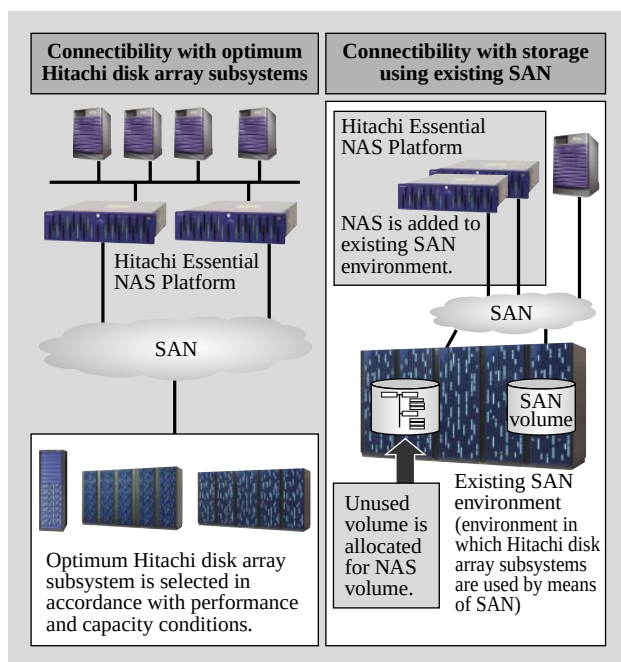


Fig. 3—Storage Connection with Hitachi Essential NAS Platform.

Connectivity with arbitrary Hitachi disk array subsystems is possible, and Hitachi Essential NAS Platform can even be applied in case that existing Hitachi disk array subsystems are being used.

connectability, a system can be constructed at the minimum necessary installation cost (see Fig. 3).

(2) Scalability

As network ports (addition of up to 40 ports per cluster is possible) and on-board memory (addition of up to 32 Gbyte per cluster is possible) mounted on the Hitachi Essential NAS Platform can be extended, and increase in client number and load can be handled. What's more, scalability in terms of increasing the number of devices themselves in cluster regions is possible, and a suitable cluster configuration that satisfies system-performance requirements can be established. And by adding disk drives while devices are operating, file-system capacity can be dynamically expanded without having to stop the system. As a consequence of this scalability, flexible handling of a NAS system with changing performance and capacity requirements is achieved.

(3) Availability

As a cluster configuration and failover function is supported as standard, file service operation can be continuously operated in the event of enhancing network ports, and memory or equipment failure. Moreover, as a node has redundancy of power supplies, operation can be continued uninterruptedly in the event

of failure of a power supply within a node. Moreover, in the event of a failure of network path of LAN (local area network) or SAN, a function that switches respective paths activates. Consequently, the resulting availability creates a platform with high reliability and fault tolerance.

FUNCTIONS OF HITACHI ESSENTIAL NAS PLATFORM

Overview

In addition to having a function as file storage for supporting the basic protocols NFS (Network File System) and CIFS (Common Interface File System), the Hitachi Essential NAS Platform supports a multitude of other functions. That is to say, the snapshot function takes snapshot image of a file system at certain points in time and, can restore files by a simple “drag and drop” operation in case of incorrect operation of files by a user. Moreover, the “quota function” — for setting maximum licensing capacity in each user/group or directory — puts a check on the influence on the system in the event of unexpected capacity consumption. What's more, by cooperating with an external virus-scan server and executing real-time scanning, it is possible to prevent infection of the system by viruses.

As for the network aspect, network bandwidth is increased by a link-aggregation function, and by means of a VLAN (virtual local area network) function, one port can be shared and utilized by multiple segments. These link-aggregation and VLAN functions can be used simultaneously; thus, a network with much flexibility can be built.

As for the management aspect, it is possible to manage Hitachi disk array subsystems and the Hitachi Essential NAS Platform in an integrated manner by using Hitachi's storage-management software. On top of that, as well as having various functions, such as improving compatibility with Windows* [for NTFS (new technology file system) ACL (access control list) support, a function for controlling file access], Hitachi Essential NAS Platform supports multiple backup functions and can cooperate with functions of Hitachi disk array subsystems.

Various Backup Functions

Data-protection functions are strengthened by the backup functions described below.

* Windows is a registered trademark of Microsoft Corporation in the U.S. and/or other countries.

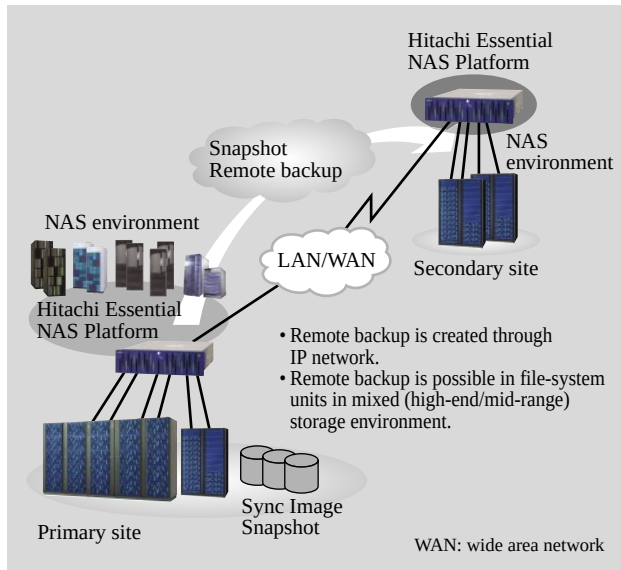


Fig. 4—File-system-unit Remote Backup.
IP circuit is used, and asynchronous remote backup is created.

(1) Long-distance remote backup

As a long-distance remote-backup function, Hitachi's "Replication Utility for Sync Image" (which is a new software product) is supported. This function provides remote backup by generating a "differential snapshot" on the primary-site side, and by transferring the differential data to a second site using the IP circuit. In the event of a failure of the primary site, after the failure is recovered, backup data from the secondary site is returned to the primary side, and service is restored (see Fig. 4).

(2) Tape backup

NDMP (a standard protocol for managing data on network-connected devices) is supported, and by cooperating with NDMP-compatible backup software (backup server and media server), functions for remote NDMP backup and local NDMP backup are provided. By combining a backup function and the NAS Sync Image (snapshot function), on-line backup is possible. Furthermore, reduction of the time required for backup by differential-backup and incremental-backup functions as well as backup and restoration of quota function and ACL (access control list, an access-control function) information are possible (see Fig. 5).

Connection with Hitachi Disk Array Subsystems

By means of link up with the TrueCopy feature of Hitachi's disk array subsystems, a remote backup system and a disaster-recovery system can be set up.

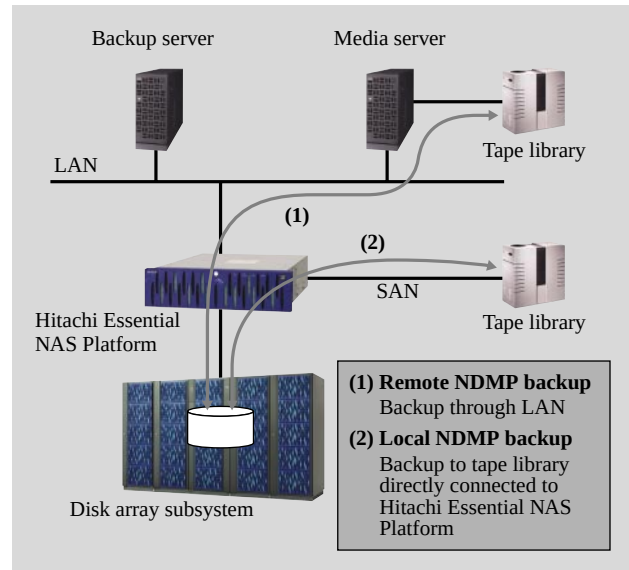


Fig. 5—Tape Backup.

With NDMP-compatible backup tape, backup optimized to user environment can be provided.

Moreover, by coordination with the ShadowImage feature, backup of user data can be obtained from duplicated volume without imparting any effect on services. By applying the virtualization and thin provisioning of internal and external storage provided by Hitachi Universal Storage Platform V and Hitachi Universal Storage Platform VM to the user volume of NAS, it becomes possible to improve efficiency of investment in storage by more effectively utilizing unused disk capacity.

OVERVIEW OF BEHAVIOR OF REPLICATION UTILITY FOR SYNC IMAGE

Replication Utility for Sync Image is an IP remote-backup function that backs up a "differential snapshot" from the primary site to the secondary site coordinating with NAS Sync Image software. Since the IP circuit is used, it makes it possible to construct an environment in which the installation cost is suppressed. A mutual pair of file systems (set up on primary and secondary sites) is created, and "snapshot" information between the primary file system and secondary file system of that pair is remotely copied. After the file system is completely copied to the secondary site on creation of the pair, differential snapshots subsequently obtained on the primary site are copied to the secondary site, and a differential snapshot having the same name and creation time in the secondary site as in the primary site is prepared. This procedure is repeated periodically, and the primary and secondary

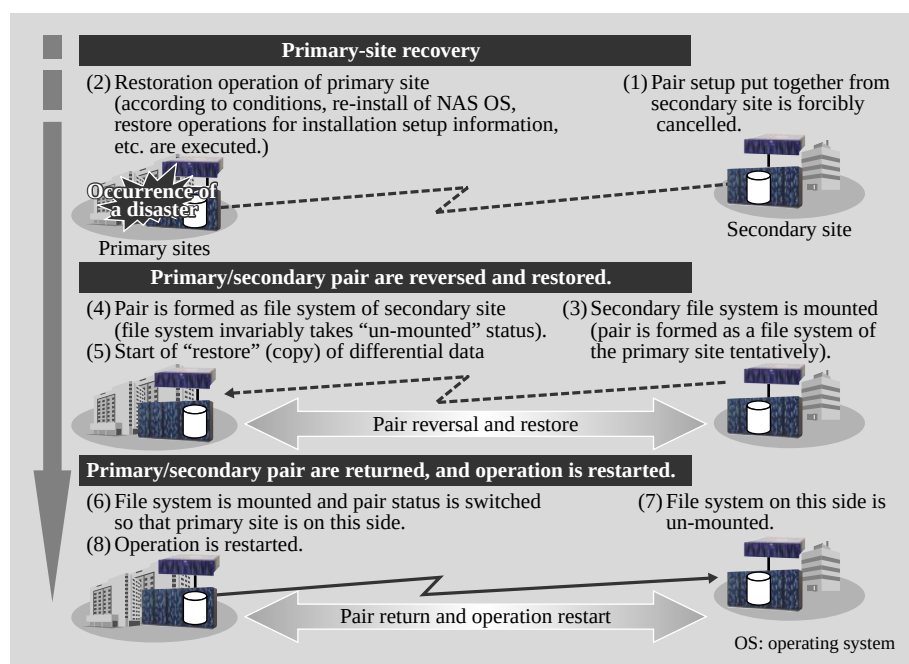


Fig. 6—Restoration Procedure of Remote Backup.
Installation cost of environment construction is suppressed by using IP circuits.

sites are synchronized in each snapshot. In the event of a failure, after recovery of the primary site, the primary and secondary sites are switched, and a pair is created. Then, snapshot data already backing up on the primary site (formerly the secondary site) is restored to the secondary site (formerly the primary site), and once restoration is completed, a pair composed of primary and secondary sites is once again formed and operation is restarted (see Fig. 6).

systems for meeting the needs of file storage — were described in this paper. In response to the rapidly growing needs for file storage, Hitachi, Ltd. will continue to assess necessary functions, develop functions in view of customers' needs, and expand our range of "file-storage solutions."

CONCLUSIONS

The features and performance of the Hitachi Essential NAS Platform — one of Hitachi's storage

REFERENCE

- (1) "News Release on Hitachi Essential NAS Platform," <http://www.hitachi.co.jp/New/cnews/month/2007/11/1113a.html> in Japanese.

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