NEC's BC Solutions: HYDRAstor - Supporting Business Continuity of Enterprises

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Abstract

What are the truly effective measures to be taken against unpredictable crises in order to ensure the business continuity of an enterprise? NEC Corporation supports the business continuity management of customer enterprises by providing a wide range of solutions, from disaster recovery planning to various products and solutions as well as building and operating DR systems based on our long past experience. As an example of a DR system, this paper introduces a remote backup function using HYDRAstor. The data deduplication and replication functions of HYDRAstor achieve smooth remote backup by transferring massive quantities of data even through thin network circuits.

Keywords

BC, business continuity, DR, disaster recovery, BCP, business continuity plan, remote backup, remote cluster, deduplication, distributed resilient data

1. Introduction

BC (Business Continuity) is a concept representing the series of processes and systems that are planned and prepared before disasters occur and which are maintained continually in order to continue business activities even in the event of any threat.

Today, the activities of enterprises and other organizations may encounter various unpredictable crises such as natural disasters, power outages, diseases, terrorism and discontinuation of supply chains. To assure the continuity of business and operations in the event of a crisis, it is necessary to establish firm countermeasures.

In general, business continuity necessitates the establishment of a BCP (Business Continuity Plan) and the study and implementation of DR (Disaster Recovery) measures.

2. NEC's BC Solutions

We at NEC offer BC support, from consulting based on our own experience in BCP planning and operations to various products, solutions and cloud services (**Fig. 1**). In addition, we also offer the expertise of SunGard Availability Services, the leading provider in the BC service industry for total support of customers from BCP planning to design, construction, operation and rehearsal.

3. Examination of DR Systems

The preservation and recovery of computer systems is not always necessary for business continuity. Speaking in extremes, there is no problem if business can be conducted with paper and manual labor even when the platform is lost. Nevertheless, most business operations today are dependent on computer systems, so it is a matter of course to achieve BC by continuing and recovering these systems.

In the following, we will discuss disaster recovery from the viewpoint of systems (DR systems).

Among the various methods for DR, representative examples are "remote cluster", aiming at system continuity, "remote replication", aiming at system recovery and "remote backup", aiming at protection of data (**Fig. 2**).

In addition to method selection, there are some further points that should be considered in an examination of DR systems, as listed in the following examples.

- **Consideration of system recovery level**

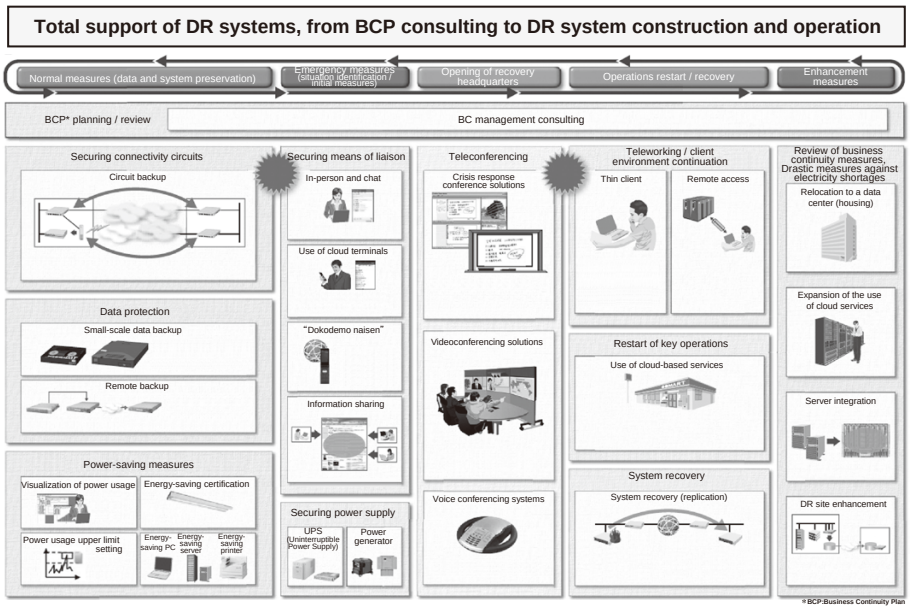

Fig. 1 NEC's BC solutions map.

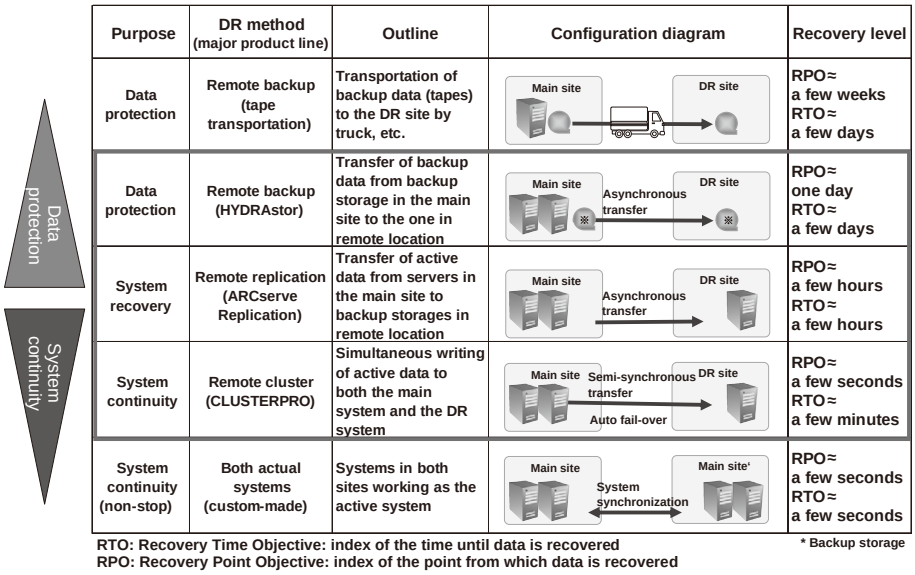

Fig. 2 Types of DR system.

- **Consideration of system recovery time**
- **Consideration of the location and configuration of the remote site**
- **Considerations related to cost**

However, if we were to stick to the points above from the initial stage of examination, the time taken would be much longer than expected due to the many considerations involved. What is important is to decide on the DR methods first, before further examination, by selecting the priority of the target, or, in other words, whether the main goal is to avoid discontinuation of operations (system continuity) or to avoid loss of data (data protection).

4. Technologies Implementing the Solutions

Our types of DR system are backed by technologies for implementing their functions. In general, a DR system is built by preparing a remote site at a long distance from the main site

and a duplication of the active system through the network. As a result, how to build a DR system without imposing a burden on the network becomes one of the key points in disaster recovery.

In this section, we will introduce the product technologies applied to the HYDRAstor series, which are the core products for remote backup, by specifically focusing on the remote backup function.

4.1 Outline of the HYDRAstor Series

The HYDRAstor series is a series of disk backup storage products to replace the traditional tape backup. It adopts a grid architecture that is scalable for extension node by node according to the required performance and capacity and also has a replication function for compatibility with remote backup. The HYDRAstor series incorporates various technologies for implementing efficient, reliable remote backup.

(1) Data deduplication technology (DataRedux)

The unique data deduplication technology (DataRedux) of the HYDRAstor series checks the duplication status of written data and prevents the writing of data that is redundant with data already written to storage to improve data storage efficiency and implement high performance and high cost efficiency.

DataRedux intelligently divides data into variable-length blocks so that duplication of existing data can be maximally detected. This enables the detection of data redundancy that had been undetectable through fixed-length data division (**Fig. 3**).

This deduplication technology reduces the amount of data transferred to the disk and the physical disk capacity required to store the data. This makes it possible to implement everyday data writing to the disk at high speed and low cost.

(2) Distributed resilient data

The data deduplication technology described above leads to the sharing of each data block by multiple items of data. Because of this, the effect of the loss of a data block may extend over a wide range because the loss affects all of the data referencing that data block.

The HYDRAstor series employs distributed resilient data placement to achieve even higher reliability than that of the previous RAID (redundant array of independent disks) technology. This method improves reliability by further dividing the stored data block, adding redundancy codes to the divided fragments and distributing them over multiple storage nodes.

Fig. 4 shows an example in which an original data block is divided into nine fragments with three redundancy codes added. In this example, the divided data, fragments 1 to 12, is distributed over four storage nodes. Even if three of the twelve fragments are simultaneously lost, it is still possible to restore the original data. The reliability of this technology is higher than that of RAID 6, which is known to be generally resilient to the simultaneous failure of up to two HDDs. Furthermore, the redundancy can be set freely according to the importance level of the stored data, etc., so the manager can obtain additional flexibility in the construction and management of the system.

In the event of an unexpected failure, the HYDRAstor series automatically detects the failed part and reconfigures it in the background. This means that troublesome management operations usually handled by a human manager are not necessary. In addition, this reconfiguration is processed on multiple storage nodes with sufficient processing capacity, without imposing overload on other processing operations being executed.

(3) Replication (RepliGrid)

Backup data is transferred to a remote location using a replication function (RepliGrid). RepliGrid can additionally compress the transferred data by transferring only the data that does not exist at the remote site among the

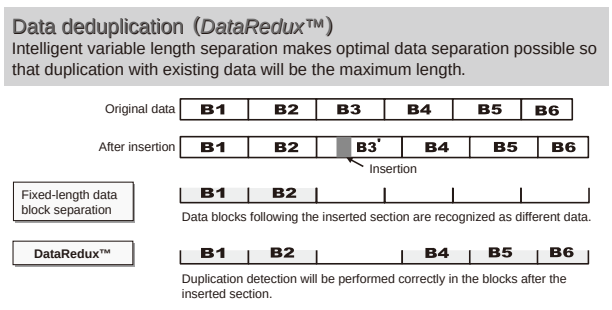

Fig. 3 Deduplication technology (DataRedux).

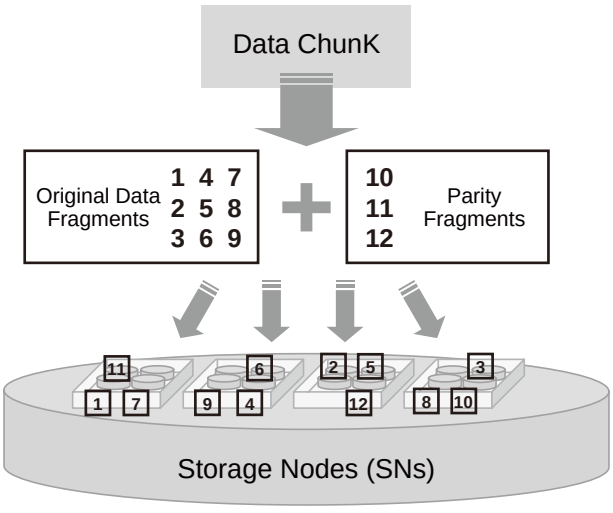

Fig. 4 Distributed resilient data.

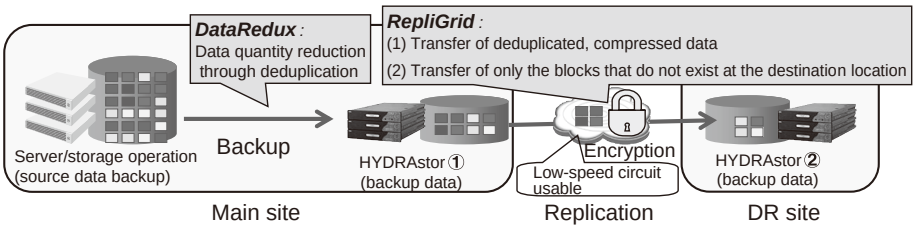

Fig. 5 HYDRAstor replication operation.

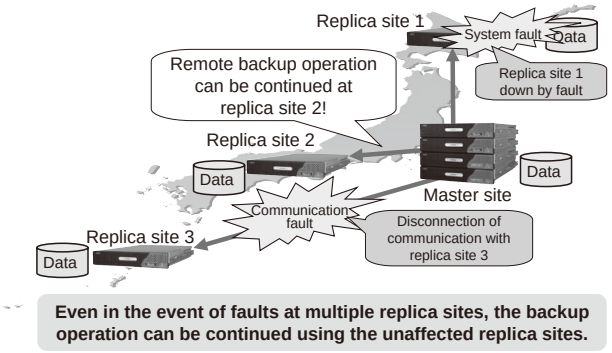

Fig. 6 Multi-target replication.

data deduplicated and compressed by DataRedux (**Fig. 5**). This drastically reduces the amount of data transferred to the remote site. The use of low-speed circuits with narrow bandwidth makes possible the construction of a disaster recovery site at reduced cost.

The communication path is encrypted to enable secure data transfer.

In addition, RepliGlid has the multi-target replication function that enables sharing of a single master file system among multiple replica file systems (**Fig. 6**). This function makes it possible to keep multiple copies of important data in multiple replica sites, thereby implementing a more rigid disaster recovery system can be achieved.

5. Conclusion

In the above, we introduced NEC's BC solutions by focusing on HYDRAstor (remote backup), but we are also preparing other products, such as CLUSTER PRO (remote cluster) and ARCserve Replication (remote replication). In the future, we will further enhance our BC solutions, for example by linking them with vertical integration platforms such as NEC Solution Platforms.

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