Hitachi Data Systems Helps Protect Your Business for Less

In the big picture, keeping your company operating nonstop is more than just planning for disaster recovery: It’s about building a resilient enterprise. The range of options can be overwhelming, from local backup to replicating data over long distances and establishing a practical methodology that expedites recovery while minimizing costs.

Every data protection process, including disaster recovery, is little more than an insurance policy for your business. Like health insurance or liability insurance or fire insurance, data protection insurance provides you with an important level of peace of mind, but it does nothing for the bottom line unless something bad happens. The purpose of this paper is to discuss what a disaster recovery solution does to your bottom line and how to mitigate it. After all, paying more for insurance, or buying too much insurance, is neither smart for you personally nor smart for your organization.

Replication Technology

The most common approach to meeting the disaster recovery challenge is to use replication technology. By itself, replication does not provide complete protection. For example, it does not provide for application-consistent recovery without the addition of application-aware quiescing, and it does not, by itself, provide the ability to restore previous versions of data. If you delete a file on the source system, it is deleted from the replica. However, replication is an important and proven component in an overall data protection and disaster recovery strategy.
The two most common types of replication are synchronous and asynchronous.

**Synchronous Replication**

With synchronous replication, each block of data that is written to the production storage system is immediately copied and sent to the destination system. Only when the destination system acknowledges that it has written the data block to its disk does the source system complete the write operation. It transmits an acknowledgement back to the application or operating system that sent it the data. Synchronous replication is also known as "mirroring."

Several key attributes define synchronous replication:

- There is zero data loss since every block is immediately transferred and written. However, the data may not include every part of an application transaction at a given point in time (application consistency).
- The distance between the source and destination is limited, often to just a few miles or kilometers, as the performance of the application is impacted by the data transfer and acknowledgement latency.
- The replication software is usually embedded in the storage device, and the source and destination systems usually need to be the same make, model and revision.
- Protection is for the entire system, providing an ability to fail over when the source system becomes unavailable. But there is no protection for file level errors: If you delete or corrupt a file on the source, it is immediately deleted or corrupted on the destination.

Synchronous replication provides a high level of peace of mind, but at a very high price. Not only do you need to duplicate your purchase of application-grade storage hardware, but also the license cost for synchronous replication software is usually much higher than other data protection options. In addition, a very fast network connection, such as fiber optic cable, is required to keep the transfer latency (and therefore performance) to acceptable levels. Again, all of those costs are an investment in the worst-case scenario, and do nothing to improve your profitability, competitiveness or customer experience unless a disaster occurs.

**Asynchronous Replication**

Asynchronous replication sacrifices the zero data loss attribute, by a few seconds or minutes at most, but provides significant benefits over synchronous replication. In this model, the source system does not wait for an acknowledgement from the destination system before moving on to the next operation. The distance limitation is removed, and with it the need for the fastest possible network. The software license cost is expected to be less, and, depending on the vendor, more expensive Tier 1 storage at the destination site can be avoided. Some asynchronous replication solutions offer versioning and point-in-time recovery capabilities to protect against file-level disasters; others do not.

Asynchronous replication comes in two flavors: hardware-based and software-based. The hardware-based solution is tied to the particular storage system, and will therefore be different for each different system, maybe even with different systems from the same vendor. This can result in additional administrative costs, including personnel training and certification, and can further complicate an already too complicated IT environment.

The practice of combining storage-based synchronous and asynchronous replication is broadly adopted when a 3-data-center (3DC) model is required. The 3DC model balances both performance and resiliency against regional disasters, such as a major storm or power grid failure. In some industries, certain regulatory agencies, such as the U.S. Securities and Exchange Commission, may mandate this model.

Alternatively, software-based asynchronous replication is hardware agnostic within the matrix of the operating systems, applications and storage systems that the solution supports. Deploying this type of solution allows for much greater flexibility in purchasing new storage systems from a variety of vendors. Therefore, you can avoid vendor lock-in, which gives you the opportunity to acquire the best available storage system for your needs.

**Cost-Optimized Storage and Data Protection**

Organizations that are sensitive to the ballooning costs of data storage and data management are naturally looking for new solutions that will meet their growing needs without busting the budget (see Figure 1). Hitachi Data Systems is meeting this challenge with a selection of solutions that combine new approaches to storage hardware with advanced storage and data management software. The strategy proposed by Hitachi Data Systems is to use the technology that meets the needs of the individual workload, at the lowest possible cost, as part of a unified copy data management solution.

For example, if you are using hardware-based snapshot technologies, such as Hitachi Thin Image, to provide for best-in-class operational recovery of critical applications, hardware-based replication using Hitachi TrueCopy and/or Hitachi Universal Replicator would be a natural choice for disaster recovery. However, if traditional full and incremental backup processes are good enough to meet the operational recovery service level objectives of certain applications, then the less-costly software-based replication option should be good enough for disaster recovery.

The downside of using different technologies for different workloads is that each new technology, or "point solution," adds complexity to the environment. And complexity adds costs and risks if not properly managed. Hitachi Data Systems mitigates this concern by automating and orchestrating the range of technologies needed in a single, easy-to-use platform.
**Hitachi Data Instance Director (HDID)**

Data Instance Director is a unified copy data management software solution that ties together a broad range of data protection, retention and recovery capabilities to make it easy to create and manage complex workflows. Its unique whiteboard-like interface (see Figure 2) allows you to drag-and-drop elements, such as live backup, continuous data protection (CDP), hardware-based snapshots and replication, and archiving and tiering. It also includes the ability to automatically copy its own repository between sites, offering the cost benefits of software-based replication.

**Hitachi Replication Manager (HRpM)**

Hitachi Replication Manager software configures, monitors and manages Hitachi replication products for both open systems and mainframe environments. This software product is part of the Hitachi Command Suite. Hitachi replication users can now benefit from this uniquely integrated tool that allows them to better control recovery point and time objectives (RPO and RTO).

For Hitachi Data Systems customers seeking in-system or distance replication solutions, HRpM builds on existing Hitachi technology by leveraging the powerful replication capabilities of the storage systems. It decreases management complexity while increasing staff productivity and provides greater control than previously available solutions through a single, consistent user interface.

**Hitachi TrueCopy Remote Replication**

Hitachi TrueCopy Remote Replication software is ideal for the most critical data situations when replication and backup of saved data are important. This software addresses these challenges with immediate real-time and robust synchronous replication capabilities between systems up to 330km/186mi apart.

![Figure 1. Replication Cost Versus Risk.](image1)

![Figure 2. The whiteboard-like interface of Hitachi Data Instance Director makes it easy to create and manage complex workflows.](image2)
TrueCopy software can be deployed with Hitachi Universal Replicator software’s asynchronous replication capabilities to provide advanced data replication among multiple data centers anywhere in the world. In addition, TrueCopy software can be integrated with Hitachi ShadowImage Replication software to enable robust business-continuity solutions. This pairing lets you create a remote copy of primary site or production data that is automatically updated for executing test and development tasks, or for discovery operations against production data.

Hitachi Universal Replicator
Hitachi Universal Replicator (HUR) provides storage-system-based asynchronous replication for Hitachi midrange and enterprise storage environments. Versatile Universal Replicator software also delivers low-latency performance, with key features such as disk-based journaling and multitarget or cascade configuration capabilities. As a result, it executes replication of small, extremely large or heterogeneous data volumes quickly and efficiently, as compared to server host-side replication approaches. With a pair of HUR licenses, or when paired with Hitachi TrueCopy software, you have the power and flexibility to plan two, three or potentially four remote data center configuration possibilities for data protection, disaster recovery, business continuity or data migration purposes.

Summary
There are certain applications where zero data loss and immediate failover are required to meet business objectives and regulatory requirements. These applications demand the levels of disaster protection that hardware-based synchronous replication provides, and usually justify the relatively higher costs. However, for a large percentage of data and applications, organizations can survive a few minutes’ worth of data loss and downtime. Therefore, paying for the additional insurance that synchronous replication provides is unnecessary and could have a serious impact on your bottom line. Given the rate that data is growing across all industries, it is incumbent upon IT to find and deploy the most cost-effective data storage and protection solutions available.

At the same time they must ensure that these solutions meet the performance, reliability and functionality objectives that the organization expects. Hitachi Data Systems is dedicated to designing and delivering solutions that meet and exceed today’s disaster recovery challenges. We provide cost-optimized solutions for disaster recovery protection that leverage the remote replication capabilities of HDS storage systems. And we manage and automate the solutions with next-generation software, including Hitachi Data Instance Director and Hitachi Replication Manager.

For more information regarding these solutions please visit www.HDS.com or contact your local Hitachi Data Systems representative.

KEY CONSIDERATIONS FOR A DISASTER RECOVERY SOLUTION

- What amount of data is at risk (recovery point objective of zero, seconds or minutes)?
- How much time is required to fail over or recover from a disaster?
- What are the costs of storage hardware at the disaster recovery site, software licenses and network links?
- What is the distance between the primary and disaster recovery sites: Is the disaster recovery site far enough away to be outside any disaster zone?
- Does it add to administrative complexity?