

Cost-Optimize Your Disaster Recovery Plan

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, business continuity 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 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 often need to be the same make, model and revision.
- Protection is for the entire system or disk volume, 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 can be either active-passive or active-active. With the latter, data is available for read and write operations at both sites simultaneously, and can eliminate the need for failover and fail-back operations.

Synchronous replication provides a high level of peace of mind, but at a very high price. You duplicate your purchase not only of application-grade storage hardware, but also the license cost for synchronous replication software, which 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)

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 Hitachi storage systems.

to acceptable levels. Again, all 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 vendor, 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 governance 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, consider an environment that uses hardware-based snapshot technologies, such as Hitachi Thin Image, to provide for best-in-class operational recovery of critical applications. Here, hardware-based replication, using the global-active device feature of Hitachi Virtual Storage Platform (VSP) systems and/or Hitachi Universal Replicator (HUR), 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 a 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, resilience 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.

With HDID, it is easy to create automated policies and workflows that mimic business requirements. For example, let’s say you have a critical database application. The traditional once-per-day backup and replication leaves too much new data at risk of loss, both at the local and remote locations. And as the size of the databases grow, it becomes increasingly difficult to complete a backup and replication job within acceptable time limits (the backup window). You need a more modern solution.

HDID makes it easy. Make a policy to create an application-consistent snapshot once per hour. You now have 24 recovery points per day instead of one. Then once per day, create a full volume clone. This clone can be used by other departments, such as test and development, and can be mounted to be backed up to tape, if needed. Both the snapshots and clones place almost no load on the application system.

As part of the same workflow, HDID can automate off-site replication with both global-active device and Universal Replicator to provide integrated business continuity and disaster recovery. Further, it can perform snapshots and clones of the replicated systems for further data re-use requirements.

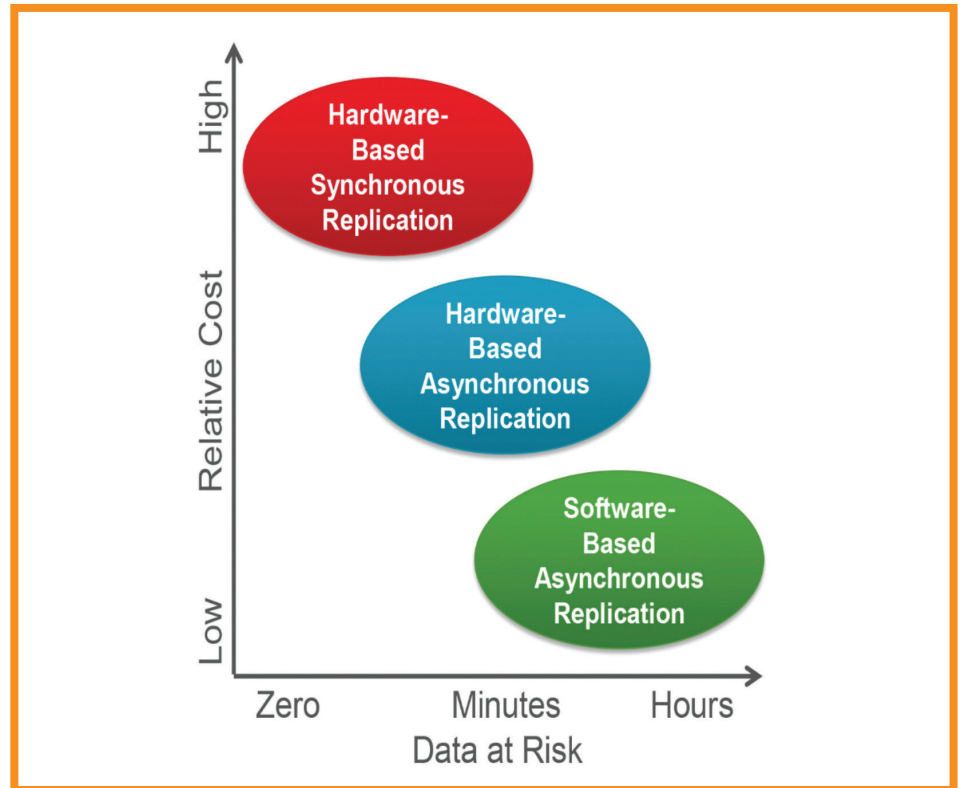


Figure 1. Replication Cost Versus Risk

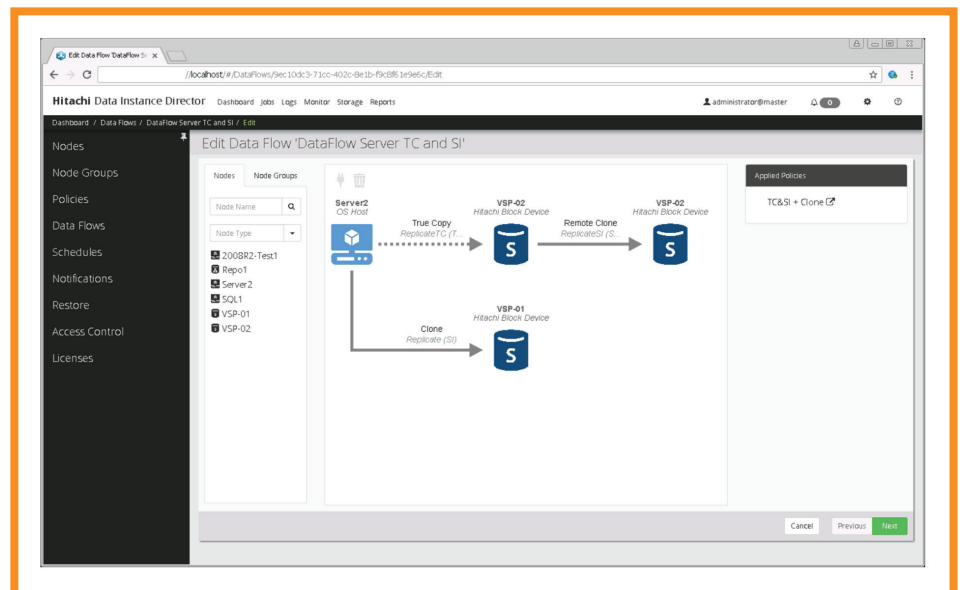


Figure 2. The whiteboard-like interface of Hitachi Data Instance Director makes it easy to create and manage complex workflows.

Global-active device provides active-active storage clustering between systems. When an active-passive approach is needed, Hitachi TrueCopy synchronous replication is also available and can be fully automated by HDID.

Global-Active Device

As part of Hitachi Storage Virtualization Operating System, the global-active device feature provides continuous operations and availability for key applications. It simplifies business resilience for both SAN and NAS workloads, and allows organizations to achieve zero recovery point and recovery time objectives (RPO and RTO).

The feature supports read and write copies of the same data in two places at the same time. Its active-active design implements cross-mirrored storage volumes between two matched Hitachi Virtual Storage Platform systems that accept read and write I/Os on both sides, which are continuously updated. The systems may be separated by up to 500km.

If a failure occurs at either system, the system at the other site takes over automatically and accepts read and write operations. There is no need for manual failover, and when the failed system becomes available, it is automatically resynchronized without manual intervention.

Hitachi Universal Replicator

Universal Replicator provides storage system-based asynchronous replication for Hitachi midrange and enterprise storage environments. Versatile HUR software also delivers low-latency performance, with key features such as disk-based journaling and

KEY CONSIDERATIONS FOR A DISASTER RECOVERY SOLUTION

- What amount of data is at risk (recovery point objective of zero, seconds, minutes or days)?
- 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?

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-based replication approaches. With a pair of HUR licenses, or when paired with global-active device 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 clustering and synchronous replication provide, 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 business continuity and 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.

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

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