WHITE PAPER

InfiniSync®
Overcoming Replication Challenges with Zero Data Loss at Any Distance
Introduction

Continuous data availability is a key business continuity requirement for storage systems. It ensures protection against downtime in case of serious incidents or disasters and enables recovery to an operational state within a reasonably short period. To ensure continuous availability, storage solutions need to meet resiliency, recovery, and contingency requirements outlined by the organization.

Two key service level agreement (SLA) metrics help measure data availability:
- **Recovery point objective (RPO)** is the maximum targeted period during which data may be lost due to a major incident.
- **Recovery time objective (RTO)** is the targeted period of time within which data must be restored after a disaster or disruption in order to avoid unacceptable business impact.

In a tiered storage hierarchy, Tier 0 and Tier 1 storage is generally used for the organization's most critical data and operations, and must have continuous availability. That means that if an incident occurs, storage tiers must have an RPO of zero seconds (i.e., zero data loss) and a short RTO.

The traditional way to achieve these service levels is by using synchronous replication on storage tiers; however, many organizations operate in a two-data-center environment, where the large distance between data centers makes synchronous replication unfeasible.

Infinidat's InfiniBox® is designed for storage scenarios that require high performance, high capacity and extremely high availability. This paper outlines how organizations using InfiniBox in a two-data-center environment can meet Tier 0 and Tier 1 SLAs in a simple, consistent, and cost-efficient way. The solution is based on infinidat's InfiniSync®, a disaster-proof appliance that guarantees zero data loss at any distance and near-zero recovery time.
THE PROBLEM WITH CURRENT REPLICATION APPROACHES

All organizations want to ensure zero data loss at an affordable cost and with no impact on performance. Data loss during a disaster can result in financial losses, downtime, compliance violations and fines, recovery costs, reputation damage, and more.

Although synchronous replication and asynchronous replication are the main approaches to disaster recovery, both approaches have inherent disadvantages:

- **Synchronous replication**—Synchronous replication comes close to ensuring zero data loss, but it requires costly high-speed fiber optic lines between the primary site and the disaster recovery site, along with significant capital expenditures and high operational costs. By its nature, synchronous replication creates latency issues that can degrade storage performance, especially for hybrid or All-Flash-Arrays (ARAs) (i.e., solid-state arrays) and other high-speed, high-capacity storage devices. In addition, to minimize performance degradation, the synchronous disaster recovery site should be within 50 miles of the primary one, thereby increasing the risk of losing both sites in a regional disaster. Another issue is that synchronous replication cannot protect against rolling disasters. In a rolling disaster, data continues to be produced at the primary site even though disruptions to power or communications prevent data from being replicated to the secondary site. Data loss is guaranteed in this scenario—with all its implications to the organization.

  “The order-of-magnitude improvement provided to I&O leaders by solid state array (SSA) response times means any synchronous replication method that creates a response time delay will significantly reduce the overall performance of the storage array and the application or service. High-performance applications and services require that I&O leaders use methods other than synchronous storage array replication for high availability.” ~ Gartner Research  

- **Asynchronous replication**—Given the drawbacks of synchronous replication, many organizations choose to protect mission-critical storage via asynchronous replication in a two-data-center topology. This approach saves money, reduces complexity, and improves performance. However, asynchronous replication has a serious disadvantage for organizations that need to protect valuable data: Asynchronous recovery always entails data loss in a disaster. This is because there is an inherent lag between the data at the primary site and the data at the disaster recovery site. In the event of a disaster, data that has not yet been replicated (i.e., the lag) is lost. It is impossible to predict exactly how much data and which data will be lost.

Like synchronous replication, asynchronous solutions are also vulnerable to rolling disasters. In the case of a rolling disaster, an organization’s SLAs for RPO can quickly veer off course. Where the organization has SLAs and contingency plans for perhaps five minutes of data loss, a rolling disaster can catastrophically add an indeterminate number of minutes to RPO, and by extension, recovery time (RTO).

Only Infinidat’s InfiniSync can guarantee zero data loss in an asynchronous, two-data-center environment and in rolling disasters.

INFINIDAT’S INFINISYNC: RPO = 0 WITH ONLY TWO DATA CENTERS

Infinidat’s InfiniSync is a highly resilient and easily implemented zero-data-loss solution for two-data-center topologies. It helps address an array of disaster recovery use cases while giving organizations the best of all worlds: zero data loss at any distance; minimal performance impact; and rapid, easy recovery of storage systems after a disaster—all at a fraction of the cost of traditional disaster recovery solutions.
HOW INFINISYNC WORKS
Infinidat's InfiniSync allows organizations to replicate asynchronously to any distance, while still protecting data that has not yet been written to the remote disaster recovery site. InfiniSync protects a synchronous copy of this data “lag” in a disaster-proof “Black Box” at the primary (production) site. In the event of a disaster, the data in the Black Box can be recovered via a cellular, Wi-Fi, wide area network (WAN), or laptop connection and transmitted to the remote location.

The disaster-proof Black Box is like a mini data center in a bunker. It includes power, communications, compute, and storage technology that is designed to accommodate extremely high input/output rates (up to 1.6 GB/sec) and up to 3.2TB of yet-to-be-replicated data.

InfiniSync is supported by Infinidat's native technology, minimizing technology variance in the organization, and reducing operational risk. InfiniSync integrates transparently with Infinidat. It stores synchronously all updates from InfiniBox, and then deletes the updates once they reach the remote site. When a disaster occurs, organizations can recover yet-to-be replicated data via a cellular, WiFi, WAN, or laptop connection.

RPO = 0 AND MORE
Using Infinidat's InfiniSync, organizations can ensure zero data loss for all their business-critical storage. That is, they can achieve recovery point objective (RPO) = 0, while meeting the following storage replication goals:

- **Any distance**—Organizations can replicate to any remote site, regardless of its distance. Doing so reduces exposure to regional disasters, supports consolidation efforts, and allows organizations to take advantage of personnel skills and lower costs in other regions or countries.

- **Better performance**—By avoiding synchronous replication—and the associated propagation delays—to the remote site, organizations can significantly reduce the latency overhead on write operations. Although synchronous writes occur to the InfiniSync system, overall latency is minimal because the system is in the same data center as the primary storage.

- **Reduced data transmission costs**—Organizations can maintain unreplicated data (i.e., lag) at the primary site. This lag is protected inside the InfiniSync disaster-proof Black Box. Because there is no synchronous replication to the remote site, there is no need for costly high-speed fiberoptic replication lines. Organizations can use low-cost IP lines across the large distance between the primary and remote DR data center.

- **Immunity to rolling disasters**—The InfiniSync Black Box is housed at the production site and replicates to a remote, asynchronous site. It fulfills the functions of a synchronous data center, right at the primary site, making the solution immune to regional disasters and rolling disasters that could bring down a remote data center.
**Easier decision-making/Faster return to productivity**—InfiniSync simplifies and expedites the decision to fail over, meaning that organizations can return to productivity sooner. One of the hardest decisions to make in a partial failure (e.g., a communication outage or an upgrade failure) is whether to declare a failover or wait out the service interruption. If failover is declared, the organization loses data and must go through a lengthy failback process. With InfiniSync, data loss does not occur, so the decision to fail over versus delay productivity is obvious. The organization can fail over immediately.

**Significantly lower overall costs**—Because InfiniSync architecture does not require a third, nearby data center, it costs a lot less to implement. Savings span across multiple cost centers, including head count, real estate, utilities, equipment, and communications.
In Conclusion

Organizations operating Tier 0 and Tier 1 storage tiers need to ensure zero RPO and near-zero RTO. Until now, the only way to achieve zero data loss was with synchronous replication; however, many organizations operate in a two-data-center topology that is not feasible for synchronous replication and is vulnerable to rolling disasters.

Infinidat’s InfiniSync changes the disaster recovery game. It is a cost-effective, zero-data-loss solution for two-data-center environments. It is also a superior alternative to costly and complex three-data-center configurations. Using InfiniSync to guarantee zero RPO and near-zero RTO, organizations can ensure extremely high availability for mission-critical storage systems and meet stringent SLAs—all while reducing costs and simplifying operations. It’s the industry’s only disaster recovery solution that guarantees zero data loss over unlimited distances and in rolling disasters.