

SAN-Based Data Replication



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High-end, enterprise-class storage arrays are a good choice for production applications that require the highest performance, reliability, and protection. However, these high-end arrays are costly for applications with less than high performance or availability requirements. They also limit the possibility of leveraging cost-effective mid-tier platforms for data protection and recovery. By using a data replication method that is unbiased to a particular storage platform, administrators can effectively deploy a multi-tier data life cycle strategy that can save significant costs and improve operational efficiency. Network-based replication-employing tiered storage and intelligence in the network itself-allows the availability and performance needs of an application to be accurately paired with the most appropriate storage platform.

Table of Contents

Data Replication Alternatives	2
The Advantages of Network-Based Intelligence	3
To Virtualize or Not	5
SAN-Based Data Replication Solutions from CNT	5
Switch Fabric Intelligence	7
Conclusion	7

Data Replication Alternatives

Although a heterogeneous storage infrastructure undoubtedly increases management complexity, it also provides IT managers with important benefits. Maintaining multi-vendor relationships often leads to significant cost savings, owing to the leverage gained when negotiating new storage contracts. And heterogeneous environments increase a storage manager's flexibility, allowing end-user allocation requests to be satisfied using the most appropriate technology, regardless of vendor. Achieving cost-effective business continuity/data recovery (BC/DR) configurations in a multi-vendor environment depends on interoperability support from data replication solutions.

Array-Based Replication

Utilizing the replication technology provided by a high-end array vendor delivers unparalleled failover functionality, and supports the most demanding application BC/DR needs. Array-based solutions leverage the controller of the storage array as an operating platform for replication functionality. The tight integration of hardware and software gives the storage vendor unprecedented control over the replication configuration, and allows for service level guarantees that are difficult to match with alternative replication approaches.

High quality of service comes at a cost, however. Array-based replication invariably sets a precondition of like-to-like storage device configuration. This means two similarly configured high-end storage arrays must be deployed to support replication functionality, which increases costs and ties the organization to a single vendor storage solution.

Server-Based Replication

Running replication functionality from the application server addresses some of the disadvantages of array-based solutions but introduces others. Server-based replication software functions with any storage hardware that can be mounted to the application platform, offering heterogeneous storage support. However, server-based solutions can be costly to license and manage, as software is required on each server and backup server. Operating from a general-purpose server platform and sharing resources with the business application also imposes performance penalties, making it appropriate for only low-end applications.

SAN-Based Replication - A New Alternative

Like many storage management applications, data replication functionality is finding its way into the network. SAN-based replication solutions bridge the gap between low-end server-based, and high-end array-based, approaches.

SAN-based replication solutions support heterogeneous storage devices and heterogeneous server platforms, giving the widest possible range of configurations. By enabling any-to-any connectivity, SAN-based solutions deliver the flexibility storage managers need to implement a tiered-storage model. Support for heterogeneous connectivity effectively decouples the performance and availability features of high-end storage arrays, and enables business applications to be mapped to the most cost-effective storage solution, regardless of vendor.

The Advantages of Network-Based Intelligence

Storage infrastructure total cost of ownership (TCO) is a hot topic within IT. According to a recent survey of CIOs, cost reduction was a key goal for 2004, driving initiatives for tiered storage architectures and Information Lifecycle Management (ILM). Storage-related expenses for a typical large organization account for as much as 25 percent of IT spending. And the forces driving these costs show no signs of abating.

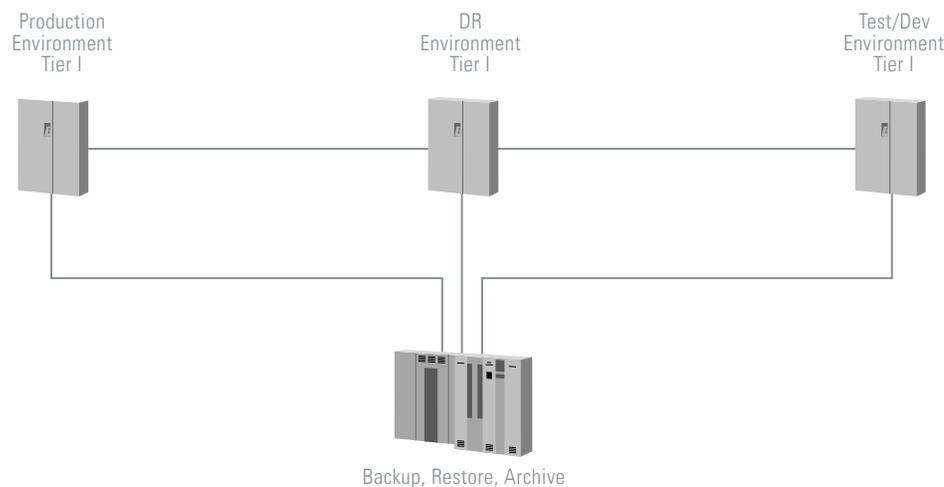
So, how does network-based intelligence help IT reduce costs? Network-based intelligence reduces capital and operating expenses on a number of fronts:

- Enables a tiered storage approach rather than a one-size-fits-all approach, mapping application needs to the most cost-effective storage.
- Enables Information Lifecycle Management, moving data to less expensive media as it ages.
- Enables consolidation, potentially reducing the amount of storage resources required.
- Provides a single point of management for replication services, reducing or negating the need for multiple backup/restore tools and licenses.
- Moves backup off the host and storage, making them more available for production, and effectively reducing your backup window to zero.
- Restores are faster and 100 percent successful.

Tiered Storage/Information Lifecycle Management

Tiered-storage takes the presence of heterogeneous storage resources as a given. It provides storage managers with the means to categorize and prioritize business applications by the level of service they demand, including Recovery Time Objectives and Recovery Point Objectives for BC/DR planning, and then map those requirements to the appropriate class of storage, using a tiered architecture. The result is efficient allocation of all resources, and cost-effective BC/DR.

For instance, many data centers today deploy a two-tier data protection practice: Tier I storage is used for production, backup copies, disaster recovery/fail-over copies as well as any copies required for development and test environments. Tape is used for archive copies.

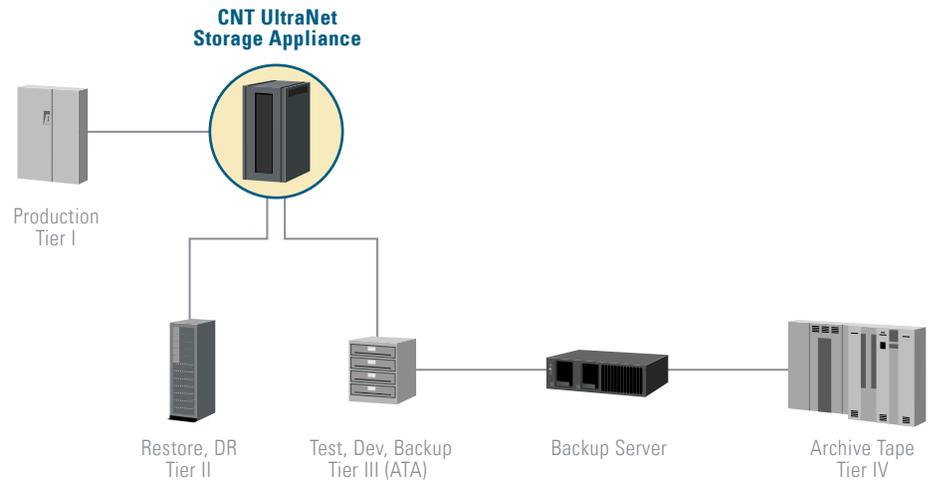


A two-tier storage infrastructure

Using a Tier I enterprise disk storage for all production, backup, test/development, and DR requirements can be an expensive approach.

A multi-tier storage infrastructure

Using a multi-tier storage approach enables the matching of application requirements to the most appropriate, cost-effective storage.



A network-based replication strategy allows the implementation of a multi-tier strategy. Production data is written to and read from Tier I storage. A replica or mirror is sent to Tier II storage, which is roughly half the cost of Tier I. The Tier II storage, which does not have the same performance demands of the production copy, is used for both near-line restore and archive to tape. A Tier III storage like ATA, which is a fraction of the cost of Tier I storage, can be used for development and test environments. The result is a significantly reduced total cost of ownership for the storage infrastructure, while improving recoverability.

This tiered storage architecture also enables data lifecycle management, migrating data to a media that matches its requirements for accessibility, recoverability, and cost as it ages. In addition to lower acquisition costs, these solutions can yield improved management and reduced operational costs.

Consolidation

Network-based intelligence also enables consolidation and improved operational efficiencies. Rather than having a variety of backup environments—each with their own backup and restore tools and processes—you can consolidate the backup environment to the network, dramatically reducing the number of licenses required to be maintained. It also allows you to consolidate storage and use a shared tape library and media server across all environments rather than having dedicated storage for each environment.

Improved backup and recovery

By moving the backup process to the network, server and storage resources are always available for production-and not required to be offline for extended periods for backup purposes. SAN-based data replication provides an instant backup copy for DR, and effectively reduces your backup window to zero. Because they can now be completed over the full 24-hour period, backups may also require fewer tape resources, reducing costs even further.

SAN-based data replication also ensures a successful backup, improving the success rate over typical backups to tape. Even more importantly, the SAN-based replication to disk dramatically improves recovery time and ensures 100 percent restore success.

Network-based intelligence allows you to dedicate host and storage resources to what they do best, while improving data backup and recovery processes.

To Virtualize or Not

Some SAN-based replication solutions require that you virtualize the storage in order to replicate data. The configuration and implementation of a virtualization-based solution is typically an intrusive and disruptive process. Generally, a virtualizing replication solution requires that all copies of the data, both source and destination, to be virtualized with a proprietary header. Switching between one vendor's virtualization solution and another, or removing a product that uses virtualizing technology, is similarly disruptive. It typically involves the tedious, and error prone, manual remapping of all LUNs defined to the virtualizing platform.

However, not all SAN-based solutions use virtualization technology. In particular; the solutions that replicate to physical LUNs offer storage managers a simple installation process, plus the ability to rapidly redeploy the solution with minimal environmental impact, while providing the benefits of tiered storage architectures.

SAN-Based Data Replication Solutions from CNT

CNT offers both technology and services for SAN-based data replication solutions. From a technology perspective, CNT offers the UltraNet® Storage Appliance.

The UltraNet® Storage Appliance is an integrated system offering a range of network-based, local and remote data replication storage services. Specifically, the UltraNet appliance offers synchronous mirroring for heterogeneous storage environments, asynchronous mirroring for long distance BC/DR, and snapshot replication with roll-back capabilities for scheduled backups and data migration services. Because the UltraNet appliance replicates to physical LUNs, it can be easily and transparently implemented into a storage network environment.

The appliance also includes robust data management capabilities across metro and wide area networks to ensure maximum bandwidth use, including compression, fail-over and load balancing, bandwidth sharing for multiple applications, and application priority. In addition, the UltraNet appliance includes inVSN™ Storage Network Manager, providing pro-active, multi-domain storage network management of the end-to-end BC/DR solution.

The any-to-any connectivity offered by the CNT UltraNet Storage Appliance overcomes the limitations of single-vendor replication solutions, allows an organization to leverage existing storage assets for BC/DR and purchase new assets based on best price/performance, delivering significant vendor leverage and infrastructure flexibility. Using the UltraNet appliance to manage data replication, each application can be matched with the most cost-effective BC/DR features as determined by the RPO and RTO. By leveraging the right resources for the job, UltraNet reduces the capital and operational costs of the storage infrastructure.

In addition, CNT offers a complete suite of services for SAN-based data replication, including consulting, design, implementation, support, and managed services, all of which help companies ensure project success in the fastest time possible.

"Integrating intelligence into the storage fabric has generated endless debate around how, when, and why. ESG no longer believes IF is a relevant question, only WHEN. Storage services are executed at either end of the storage spectrum today—the box, or the host. Both are great for individual tasks, neither is good for generic or heterogeneous function.

The network sees all. It's there whether we like it or not, so since it has to be in the way carrying traffic regardless, why not let it make some decisions of its own? Heterogeneous replication, snapshot, etc. are all great functions to consolidate down into the smart network. Why? Because management is the issue and it's much easier to manage less than it is more.

This movement is going to be one of the most significant infrastructural paradigm shifts since the advent of the fibre channel block storage network. We see an inevitable boom for users with lower software, management and administrative costs driving more value throughout the entire enterprise storage network."

—Steve Duplessie, ESG, February 2004

"The applications that are to be hosted on the new generation of switches currently run on storage arrays, or on host servers, or purpose-built appliances. The first and simplest benefit of moving storage applications from these locations onto a switch is that it can reduce the number of boxes within a storage network by cutting out the need for management appliances, or it can reduce the amount of agent software that must be loaded on host servers. Fewer boxes and few items of software, or "touch points", means less maintenance work.

Moving applications into the network and increasing the IQ of the average storage switch will elevate the level of the conversation between storage management tools and the devices that make up a SAN, changing them into something more sophisticated than their current base nature.

Smart switches will appeal to customers that want to perform tasks such as replication between heterogeneous disk arrays, or pool the capacities of mid-range storage arrays, or perhaps back up data to disk, but to do all of these tasks without the increased management overheads or performance constraints associated with appliance-based services."

-Computerwire, March 2004

Switch Fabric Intelligence

The movement of storage intelligence like data replication and storage virtualization off traditional server- and controller-based platforms and into the fabric of the storage network is a trend that's here to stay. And one that promises to bring enormous productivity, cost, performance, and configuration flexibility benefits to enterprise IT storage infrastructures.

As SAN-based solutions mature and this technology evolves, network intelligence will be embedded into highly distributed, next generation intelligent switch architectures that offer a variety of enterprise services, including higher scalability, more robust reliability and availability, support for multiple protocols, integrated MAN and WAN services, a variety of services for network security and quality of service, data replication and virtualization storage services, and standards-based management services, including pro-active monitoring, fault isolation, and policy-based automation. This next generation of intelligent switches will provide the fault-tolerance, dependability, performance, and flexibility required to form the foundation for storage utilities and real-time infrastructures.

Conclusion

SAN-based data replication offers the key to cost-effective storage infrastructures and BC/DR configurations. With support for multi-vendor storage environments, SAN-based replication solutions deliver the flexibility needed to maximize the utilization of all enterprise storage assets. When combined with a tiered-storage architecture to guide storage allocation and distribution, SAN-based replication demonstrably lowers storage infrastructure TCO.

CNT's full suite of consulting, implementation, and managed services, combined with its industry-leading technology, helps companies plan, deploy, and manage cost-effective, SAN-based data replication solutions leveraging tiered storage infrastructures.

"Matching graduated application requirements to different tiers of storage is a strategy that works. Suppliers like CNT are well-positioned to provide tiered infrastructure via their products, services, and solutions. Their network-based storage devices allow needed flexibility in storage deployments (and) provide a foundation for an ILM strategy."

— Robert Gray / VP Research, IDC

CNT is one of the world's largest providers of comprehensive storage networking solutions. For over 20 years, our experts have analyzed, designed, and built enterprise storage networks.

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