



CorData White Paper

Unified Storage

August 4, 2014

SAN and NAS are not dyslexic.

Reading a book is a useful analogy for file systems. Sometimes, when you read a book yourself, life is simple. You read whatever pages you want, and if you want to jump around in the story, nobody cares. If you wish to make notations or changes, you can do so.

But what if you're reading the story to somebody else? If they want you to jump around in the story and read different sections or make changes, they have to tell you where and how. And if you have more than a few people telling you where to read and write, life becomes complicated.

Reading a book is a good example of how computers share data storage systems. In the old days, back around 1990, there was usually a one-to-one relationship between an application server and its related storage. But now, there are many servers, both physical and virtual, sharing the same storage device. How do so many servers manage the same storage system at the same time? The answer comes down to a simple question: "Who's holding the book?"

It turns out there are two industry-standard methods for sharing storage arrays: one gives everyone their own book to read at the same, shared table. The other approach is to have one book reader, and everyone gives them requests. And the reader is so fast she handles each of these requests in round robin style, in what seems like parallel fashion.

If each reader has their own book and simply shares the table, it's referred to as group reading. For servers, each with their own dedicated file system on a shared storage array it's referred to as a Storage Area Network, or "SAN". A SAN is a way to have dedicated storage resources mapped to a particular server over your storage network. Like the readers sharing a table, there's no data sharing. Everyone has their own book.

In the case when you have many servers all using a shared storage system to perform read and write operations for them, that's referred to as a 'filer'. And the technology is Network-Attached Storage, or NAS. Because SAN and NAS are such similar acronyms, this causes much confusion.

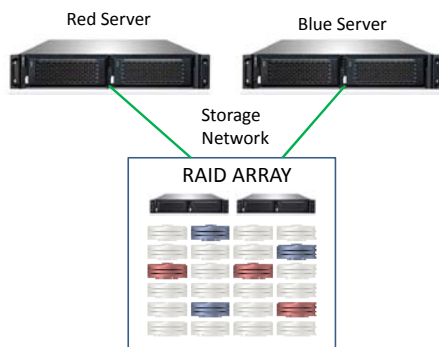
SANs are pretty easy to manage. In the old days, every server had a disk drive or a group of disk drives.

Old Days – Dedicated Disk Resources for Each Server



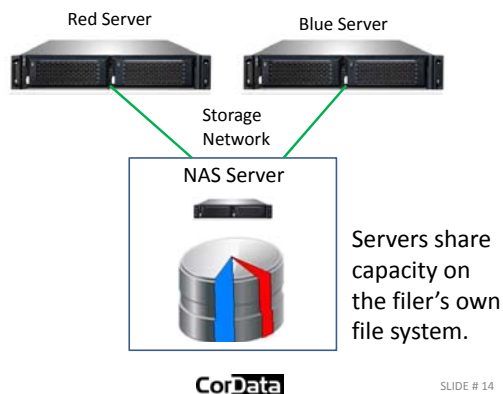
Nowadays, many data centers use RAID storage systems connected into SANs. These are nothing more than a shared storage system capable of carving out partitions on a managed group of disk drives, so each server has one or more partitions which look like local disk drives, but are actually located on the shared storage array. You hook things together via Ethernet or Fibre Channel network.

Modern Storage Area Network (SAN) Implementations



With Network Attached Storage, or NAS, you have a filer. It manages its own storage locally, and simply serves requests, one after another, from a group of servers attached to it via Ethernet. The protocol for requesting read/write services is known as NFS for UNIX-based servers, and CIFS for Windows-based servers. The difference between SAN and NAS, just like our “Who’s holding the book” analogy, is the SAN servers all own their own file systems, and a NAS Filer owns a central, shared file system and servers simply request read/write operations.

Modern Network Attached Storage (NAS) Implementations



So which approach is better, SAN or NAS?

Sometimes the answer is clear. SANs do not allow book sharing, or shared file systems. So if every server can live with its own separate data files, and performance is important, a SAN is an easy choice. And if you wish to share data, where everyone has access to the same book, then NAS, although not as fast or efficient, is the way to go.

There are ways to make SANs share file systems, using special hardware and software referred to as global file systems. But that's an expensive and complex setup. Usually, global file systems are used in extreme performance environments like supercomputing clusters.

There are also ways to make NAS systems faster and more efficient, typically by upgrading the network infrastructure or adding solid state disk to improve the performance and make all those parallel requests operate more swiftly. This is relatively expensive in most cases, since it requires more network hardware or expensive SSD disk media.



Now, there's a new capability that makes your life, and the choices between SAN and NAS, much easier.

Unified storage systems are storage systems which are intelligent enough to serve up SAN and NAS functions simultaneously. One box does it all. And better yet, all the storage resources are shared for both SAN and NAS environments. If you need more SSD or disk storage shifted from your NAS users to your SAN users, you can do it easily, from a single operator's console.

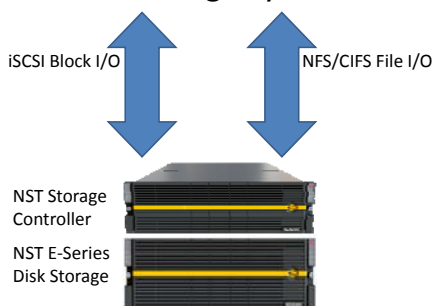
Reducing complexity is always a good thing. In the old days, people had to pay for and manage two entirely different storage systems to serve up NAS and SAN services. This required two different sets of hardware, two groups of storage administrators, and two groups of network engineers to manage network infrastructure and security issues. This complexity, and the need for different groups with different subject matter skills, is expensive.

But now, life is much simpler. Unified storage solutions, such as the ones CorData offers from companies like Nexsan, combine all these disparate technologies into one, unified system which easily scales to Petabytes in size. It hooks easily to all your NAS and SAN networks, and all your storage is managed consistently, on the same screen, with a completely consistent management environment. Your team works with storage resources effectively and easily. And with CorData and Nexsan, it's all highly affordable.

There's another way to benefit with unified storage systems. You backup and protect all your data in the same, easy way. The Nexsan NST storage solution allows you to snapshot any storage resources, whether SAN or NAS, to create a completely consistent image of your data which may be used for backups without affecting the performance of your applications. And NST systems replicate from one to another, even replicating many-to-one, which makes disaster recovery solutions easier, whether the distances between systems are across the hallway or across the country.

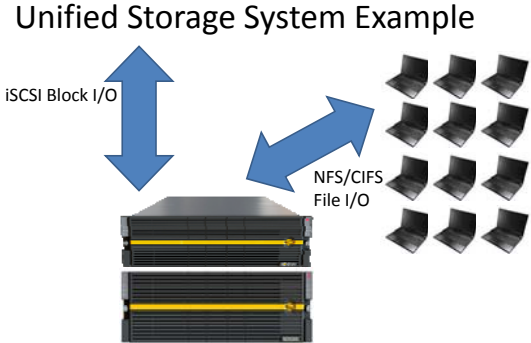
Here's an example of a unified storage system connected to the existing SAN and NAS networks.

Unified Storage System Example

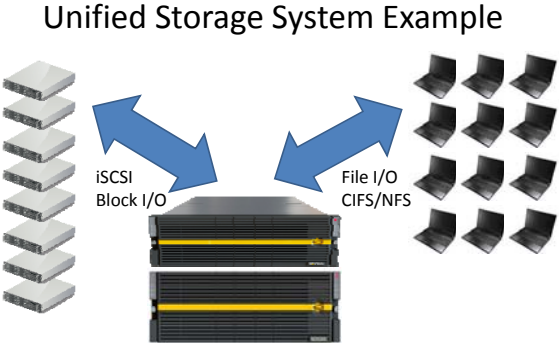


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Here's the system providing NFS and CIFS file services to a population of desktop and laptop PC users. Each user has a "D" drive on the system, with fully protected files.

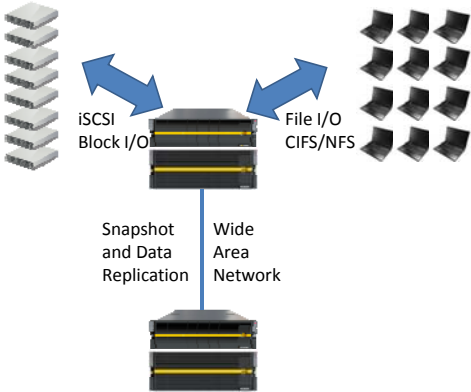


Here's the same system providing SAN services to VMWare database, web, email, and backup servers. Applications run quickly, since SAN provides the best performance for server-based transactionally intensive applications.



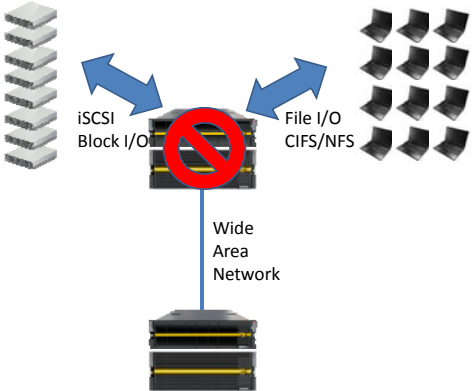
Here's a second NST storage array at a second building on the same campus. Every fifteen minutes, the systems automatically syncs all updated data to the second system.

Unified Storage System Example



Here's the disaster scenario. The NST system is taken off line by a freak accident in the data center. The data center forklift operator accidentally runs a forklift blade right through the center of the NST storage

Unified Storage System Example

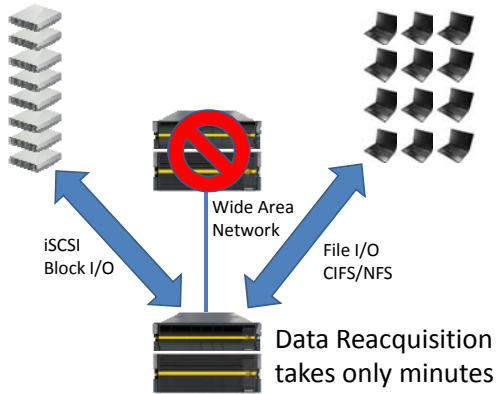


controller unit.

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Here's the recovery scenario. All the users reacquire the data through the wide area network connection, and are back up and running in minutes, with data that is at the worst case, only fifteen minutes out of date. Even with Petabytes of data at both ends of the connection, it all works flawlessly.

Unified Storage System Example



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It seems that storage systems have gotten a lot easier to manage since unified storage came along. They're less complex, require less specialized knowledge to administer, simplify your backup and disaster recovery planning, and decrease the complexity of your network and security infrastructures.

You'll find that integrating a unified storage system with your existing backup software and scripts is easy, using snapshots. And security integration with existing security platforms such as Active Directory or LDAP is also easy. The security configuration is menu-driven. And implementing a disaster recovery system with multiple NST systems, whether they are around the hallway, around the block, or around the country, is also pretty easy. In fact, they're all about easy; less complexity, less work, less cost.

About CorData

CorData is a storage systems integrator based in the Washington, DC area. We work with US intelligence, military, and civilian agencies, commercial clients, and research and development organizations world-wide.

For more than thirteen years, CorData has provided data storage insights to help our clients achieve their key business objectives.

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