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SOLUTION BRIEF
KEY CONSIDERATIONS FOR BACKUP AND RECOVERY

Among the priorities for efficient storage management is an appropriate protection architecture. This paper will examine how to architect storage subsystems to provide efficient protection as part of the backup and recovery process.

PROTECTION ARCHITECTURE

RESTART—Protection Tier: 1
(Physical Protection)

- RAID 1
- Primary Copy Recovery
- "Instantaneous"

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RESTART—Protection Tier: 2
(Physical Protection)

- Point in Time Copies
- Protection from Corruption, Data Loss
- Journals & Logs
- Local and Remote

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RECOVERY—Protection Tier: 3
(Physical Protection)

- Disk Library Primary Backup Target
- Tape is now used for Portability, Geo-Seperation

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LONG TERM SECURITY—Protection Tier: 4
(Logical Protection)

- Archive
- Compliance
- Regulatory
- Authenticate
- Authorize
- Administration
- Audit
- Single Instance Storage
- Automated Replication
- Scalable
- Green

ASSUREON

[1] Source: The modernization of backup: More disk, less tape by searchstorage.com

We all know how important it is to protect the crown jewels of any business—the data. Chief among IT challenges for data protection are the ever-growing rates of data and associated volumes.

The question is, given changes in both business objectives and technology options, are IT departments protecting both in ways that make sense today? While data growth rates are a primary concern to business and technology leaders, business leaders are also very concerned with the cost of protection in a challenging economy. These challenges are driving business and IT leadership to look for ways of achieving the best possible cost, performance, availability and reliability for protecting their data and their business.

THE PROTECTION ARCHITECTURE

To build an appropriate protection architecture, the business value of the applications protected must align with technology that results in a cost justified level of protection. Not every application deserves the highest level of protection money can buy. That seems reasonable and most would agree. To that end, the classification figure on page 3 is an example of how a classification schema can be organized. There are four major parts to a protection architecture. Each area has value differentiation. Protection Tiers 1 and 2 are focused on being able to failover or restart after a hardware failure, data corruption, or data loss and are accomplished using mirrored or point-in-time copies of volumes. This solution brief is focused on Protection Tier-3, which concerns itself with considerations for backup and recovery.

The overall objective of backup and recovery is to offer the ability to recovery from any failure or data loss within a specified period of time. The process of backing up, especially to disk, is generally highly automated after initial setup across applications, platforms and virtual environments. Historically, backing data up was largely the exclusive domain of tape rather than disk. Breakthroughs in disk technologies and pricing have led to very dense arrays that are power, cost and performance efficient. This has caused a shift in the primary target of a backup or recovery from a tape library to a disk library. In fact, according to a 2010 survey by the Enterprise Strategy Group, 62 percent of organizations currently back up to disk-based storage and then to tape; 18 percent back up to disk only; 20 percent continue to back up directly to tape[1].

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TOP FIVE BACKUP AND RECOVERY CONSIDERATIONS TO DISK

1. **BACKUP FAST**—Backing up to Nexsan storage systems allows fast, efficient and automated protection. Not only is disk hardware fast, but software that allows for Synthetic Full backups greatly enhance performance.
2. **RECOVERY FASTER**—Recovery from Nexsan allows for aggressive RTOs, partially because all RAID protected disk arrays can read faster than they can write. In addition, being able to only read the blocks required greatly reduces recovery time over tape.
3. **RELIABILITY**—Nexsan builds ultra reliable arrays with many layers of protection and no single point-of-failure architecture.
4. **SIMPLICITY**—Nexsan storage systems are purpose-built to be easily managed to reduce or eliminate the administrative burden of managing backup applications and tape devices.
5. **COST EFFICIENCY**—By using Nexsan's dense storage packaging and AutoMAID® for power savings, along with deduplication, organizations can reduce expenses significantly.

CLASSIFICATION

THE PROTECTION ARCHITECTURE

Protection Tier	Classification	Availability	RTO	RPO
1	Mission Critical Data (RAID 5, RAID 10) • Critical to an enterprise, continuous access • Highest performance, near zero downtime	99.999%	1 min	0
1-2	Business Critical Data (RAID 5) • Very important to the enterprise, frequently accessed • High performance, high availability, less than four-hour recovery	99.99%	1 hr	15 min
2-3	Accessible Online Data (RAID 5, RAID 6) • Necessary to the enterprise, infrequently accessed, cost sensitive • Online performance, high availability, less than eight hours of recovery	99%	3 hrs	1 hr
2-3	Nearline Data (RAID 6) • Non-Changing Data, Backup/Recovery—un-managed archive, cost sensitive • Disk performance, automated retrieval	96%	24 hrs	8 hrs
3-4	Compliance Data (RAID 6) • Managed Archive • Enforced record retention and verifiable data integrity discovery • GAS classification, index and search capabilities • Audit	100%	48 hrs	0

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TAPE VS. DISK
ANALYSIS:

Item	Disk	Tape
Compression 2:1 (typically less)	•	•
Deduplication	•	
5 Year Replacement	•	•
Removable and Portable		•
Performance Advantage	•	
Reliability/Availability Advantage	•	
Cost Advantage	•	
Management Complexity Advantage	•	
Encryption	•	•
WORM (Write Once Read Multiple)	•	•

IMPORTANT BACKUP AND RECOVERY CONSIDERATIONS

There continues to be industry noise that has positioned tape as an enduring, if not advantageous, technology for backup and recovery. The facts simply do not support such claims as all benefit categories favor Disk, except data portability. (See analysis in sidebar). For a detailed breakdown of the tape versus disk debate, read Nexsan's white paper, **"Making Cents of Tape vs Disk."**

The first major consideration for architecting an appropriate backup and recovery approach is in setting objectives. The two objectives that matter are the Recovery Time Objectives and the Recovery Point Objectives. The Recovery Time Objective (RTO) is the duration of time within which a business process must be restored after a disaster (or disruption) to avoid unacceptable consequences associated with a break in business continuity. The second important measurement is the Recover Point Objective. In a disaster, there will generally be lost data. The Recovery Point Objective (RPO) is the time (relative to the disaster) to which you plan to recover your data. Once defined, it specifies the minimum frequency in which backup copies must be made.

Once the RPO and RTO objectives are set, a storage administrator can employ the appropriate technology to meet the objective.

BEST PRACTICES

A well-founded protection architecture starts as a classification process to determine the value of an application when it is running and the impact of an application when it stops, which is used to set the RTO and RPO objectives. Protection tier-1 would typically represent the smallest amount of overall data and justifies a solution using a hardware RAID mirror or a software mirrored copy for failover.

A tier-2 protection scheme is used to protect from corruption or data loss and is part of a rapid recovery, thought of as a restart.

A tier-3 protection scheme uses backup data located on a disk library with advantages for reliable, high performance recoveries or offsite copies on tape result in days or weeks of time for a recovery.

What is important about this architecture and strategy is the idea that the value of data must be assigned to determine a recover point and time objective. That can be mapped into a solution capability which can then be used to choose the right technology to provide an effective protection architecture and an effective business rationalization plan.

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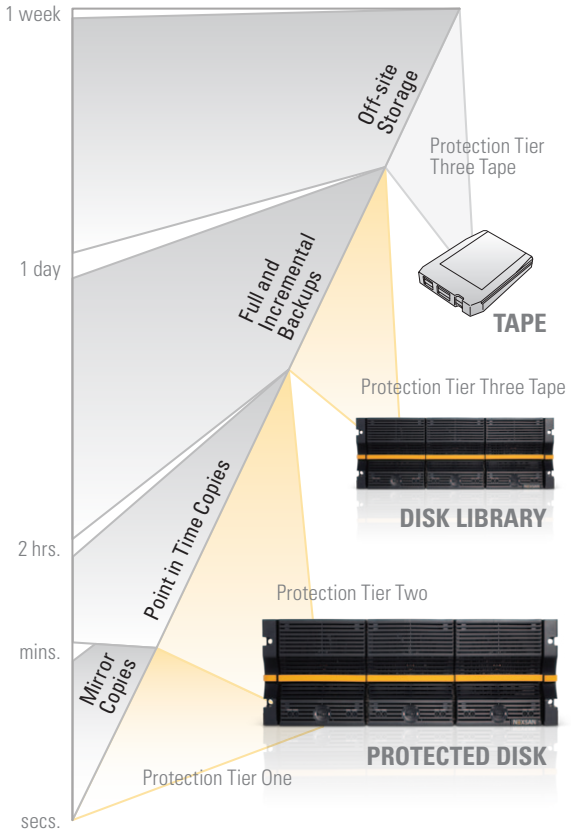
RECOVERY TIME OBJECTIVE

Mapping Protection Class to Technology



DISK BEST PRACTICES

Nexsan's approach to the protection architecture is grounded in proven principles of matching the right technology to deliver the right data at the right time for the right cost. Because Nexsan designs and builds ultra reliable - Easy, Efficient, Enterprise-class storage, organizations can depend on their data meeting Service Levels for Protection and Recovery objectives at a price point that will please the business. Nexsan has solutions for Tier 1, 2 and 3. Using Nexsan storage in tier-3 allows for ultra reliable, high performance backup and recovery. With Nexsan's integration into the Microsoft Management Console, it is very easy to manage configurations used for backups. Nexsan's integrated hardware capabilities take advantage of features within VMware to optimize performance and rapid recovery.

EASY, EFFICIENT, AND ENTERPRISE CLASS

Nexsan arrays have been purpose-built to make it easy to select, configure, purchase, deploy, manage and support storage arrays easily and efficiently. All Nexsan arrays have management features built-in to make them easy to deploy and manage so IT professionals can concentrate on the big picture.

Nexsan storage arrays are power efficient, space efficient and cost efficient.

With as much as 15 drives per rack unit into a chassis, and the most energy efficient storage available on the market, Nexsan drives down costs significantly. AutoMAID, which is built into every Nexsan array, saves up to 87% on power and cooling compared to other arrays.

Nexsan has achieved an unparalleled level of reliability with their industry leading reliability rate, hot-swappable devices, multi-path IO and no single point-of-failure architecture. The risk to business continuity is an important consideration when choosing a data protection solution.

It is important to use efficient applications as a part of the backup process. Most of the major backup and recovery applications are now designed to write directly to disk and offer added value through deduplication. Deduplication reduces the overall amount of storage required frequently by 20:1, which is about ten times better than compression on tape. Many backup and recovery applications also offer the ability to encrypt the data that is going into the backup repository for security of data at rest.

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CONCLUSIONS

Nexsan storage arrays make backup and recovery fast, reliable and cost efficient by eliminating performance and management bottlenecks and reducing the overall amount of space, power and cooling otherwise required. Nexsan storage arrays offer the perfect balance of easy, efficient, enterprise-class storage purpose-built for the mid-market and are ideal as in integral part of the protection architecture.

ABOUT NEXSAN

Nexsan® is a leading provider of innovative data storage systems with over 10,000 customers worldwide. Nexsan's pioneering hybrid storage systems combine solid-state technologies, spinning disk storage and advanced software to deliver radical new levels of performance and capacity at lower cost. The company's advanced technologies enable organizations to optimize traditional, virtual and cloud computing environments for increased productivity and business agility. With more than 28,000 systems deployed since 1999, the company delivers its data storage systems through a worldwide network of solution providers, VARs and system integrators. Nexsan is based in Thousand Oaks, Calif. For more information, visit **www.nexsan.com.**

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