



# **Smarter Storage: Managing Data Efficiently and Reducing Costs with an Archive Tier**

White Paper | [Spectra Logic](#)

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## Introduction: The Growing Data Challenge

Every organization is dealing with an explosion of data. Some are mission-critical, some are rarely accessed, and some sit there, racking up unnecessary costs. Yet many companies still store everything—active and inactive data alike—on expensive, high-performance storage. The result? A skyrocketing storage bill and a never-ending cycle of purchasing more primary storage.

The truth is up to 80% of data is inactive<sup>1</sup>. So why pay premium prices to store it? The challenge is finding an easy, cost-effective way to move inactive data to more affordable storage without making it difficult to access when needed. That's where Spectra StorCycle® storage lifecycle management software comes in.

<sup>1</sup> Horison Information Strategies, The Dawn of AI Disruption: Tape will Become Key Enabler of Massive Data Retention, 2025.

## Meet Spectra StorCycle Software: Smarter Data Management

StorCycle software is an intelligent storage lifecycle management solution from Spectra Logic. It automatically identifies inactive data and moves it to a lower-cost, long-term storage tier—the Archive Tier. This tier can include cloud storage, object storage, NAS, tape, or any combination. The best part? Your data is still accessible when you need it.

With StorCycle software, you can:

- Free up expensive primary storage
- Reduce storage costs without sacrificing access
- Improve performance by keeping primary storage lean
- Shrink backup windows and reduce costs on backup storage
- Increase security with air gapped ransomware protection
- Ensure compliance with data retention policies
- Optimize data workflows by automating tiering and archival processes
- Enable seamless access to archived data without disrupting workflows
- Improve disaster recovery capabilities with multi-tiered redundancy
- Support long-term digital preservation efforts with minimal costs
- Minimize operational complexity through automated storage policies
- Reduce IT staff workload, allowing them to focus on more strategic initiatives

StorCycle software ensures data is stored on the correct tier throughout its lifecycle. It lessens the amount of primary storage needed, backup required, new storage purchases made, storage administration required, cloud egress fees, and power, cooling, and floor space needed.

## Rethinking Storage: The Need for a New Approach

For too long, “storage doom” predictions have lamented data growth. Since data is now widely accepted as the greatest asset of any given organization, data growth should be a point of anticipation, not dread. Often, the naysayers shift the point of contention from data growth to physical storage itself, pointing to cost, physical footprint, and management as the evils.

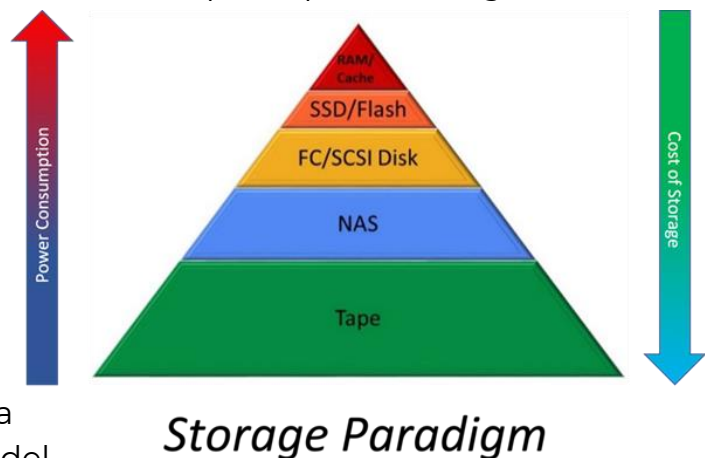
Virtually every new storage technology is touted to solve these problems, yet no single technology has proven the answer. Counterintuitively, combining new technologies often leads to further complexities, costs, and even information isolation.

One of the few things that has escaped the long-term, large data storage debate is the *storage model* itself. This paper suggests a paradigm shift in how we approach information storage, including information management, access to information, sharing of information, protection of information, and the costs associated with all these.

## The Traditional Storage Paradigm and its Evolution

The storage pyramid model has been a foundational data storage framework for decades. In this hierarchical structure, the apex represents high-performance, costly storage with limited capacity (such as RAM and SSDs). At the same time, the base comprises more economical, higher-capacity options with slower access times (such as tape storage).

However, several significant developments have necessitated a reevaluation of this traditional model.



## Cloud and Object Storage Integration

The emergence of cloud and object storage has introduced new complexities. Organizations now frequently deploy multiple storage technologies for similar purposes - for instance, utilizing SSDs and HDDs in primary storage tiers or implementing tape and cloud solutions for backup and disaster recovery.

## Enhanced Data Valuation

The increasing recognition of data's long-term value has led to extended or permanent retention periods. Object storage systems have reduced the necessity for routine data migration between storage formats, allowing for more stable long-term storage solutions.

## Evolution of Data Types

While the traditional pyramid model was developed during an era dominated by structured data, today's storage systems must primarily manage unstructured data generated by users, IoT devices, machines, and sensors. This shift demands more sophisticated data management capabilities.

## Storage Format Convergence

The conventional tiered model struggles to accommodate the modern reality in which block, file, and object storage operate across multiple tiers simultaneously. This convergence requires a more nuanced approach to storage architecture.

## Moving Forward

A contemporary storage framework must address these challenges while enabling organizations to manage, share, and monetize their data assets effectively. The positive aspect is that most organizations possess the fundamental components necessary for this transition. By implementing a more sophisticated storage strategy, organizations can better serve their stakeholders, facilitate research sharing, and maintain competitive advantages through improved data accessibility and management.

This evolution represents a technological advancement and a fundamental shift in how organizations approach data storage and utilization.

## The Data-Drive Transformation of Enterprise Storage

Our capacity to leverage data for organizational advancement has transformed the contemporary business landscape. While social media's data proliferation often captures headlines, the more significant transformation lies in how organizations discover novel applications for their accumulated data to achieve strategic objectives. Research shows that 97.2% of organizations currently invest in big data and artificial intelligence initiatives<sup>2</sup>.

Data growth is not a challenge to be managed but an opportunity to be leveraged if organizations implement appropriate management strategies. Storage infrastructure can no longer be relegated to a secondary consideration. Current analyses suggest that approximately 80% of enterprise

<sup>2</sup> Edge Delta, Break Down the Figures: What Percentage of Companies Invest in Big Data?, March 26, 2024.

data may be classified as "inactive"<sup>3</sup>, yet continues to reside on primary storage systems, indicating significant inefficiencies in data management practices.

Traditional storage architectures have emphasized storage tier hierarchies while failing to address the characteristics and value of the data residing within these tiers. This misalignment between data utility and storage placement can result in substantial operational costs and impede organizations' ability to monetize and distribute their data assets effectively. The critical element absent from conventional storage paradigms is comprehensive data intelligence.

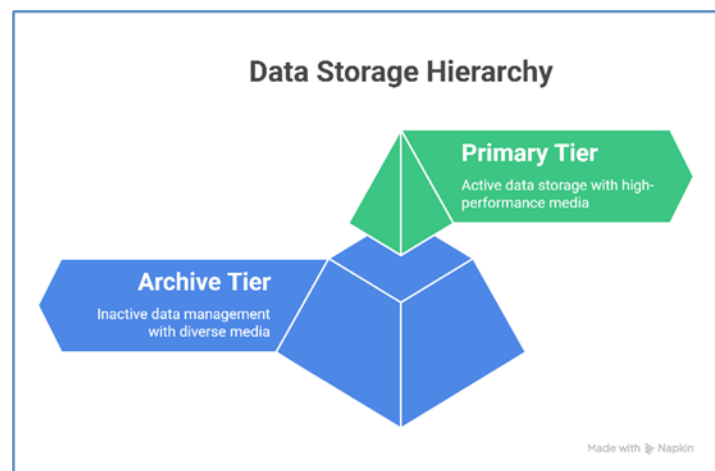
StorCycle software introduces a modern storage paradigm based on a two-tiered model that prioritizes data classification over storage medium characteristics. This approach segments data into two primary categories:

1. Active Data: Content currently undergoing editing, processing, or modification
2. Inactive Data: All other content requiring retention

This classification system enables the implementation of two distinct tiers:

### Primary Tier

Designed for active data, typically utilizing flash storage, NVMe, and high-performance disk drives. Organizations can optimize their primary storage infrastructure for high-performance workflows by relocating inactive data to the Archive Tier.



### Archive Tier

Dedicated to inactive data management, this tier incorporates multiple storage media, including NAS, object storage, cloud services, and tape

<sup>3</sup> Horison Information Strategies, The Dawn of AI Disruption: Tape will Become Key Enabler of Massive Data Retention, 2025.

systems. While designated for inactive data, this tier maintains significant functionality, supporting the following:

- Secondary storage operations
- Content distribution
- Redundant copy management
- Backup and archive processes
- Project archiving
- Disaster recovery protocols

StorCycle software enables organizations to configure their Archive Tier according to specific workflow requirements. Administrators can establish "responsive copies" on economical NAS or similar local storage for data requiring occasional but rapid access. This architecture supports both direct machine/application access and distribution needs. Simultaneously, the system can maintain additional copies across various media - tape storage for air-gap protection against ransomware, cloud storage for off-site disaster recovery, or combinations thereof - while optimizing for cost efficiency and accessibility.

## **Modern Storage Lifecycle Management: Evolution and Implementation**

The concept underlying StorCycle software builds upon established Information Lifecycle Management (ILM) principles, which have demonstrated effectiveness in specific applications. Various hardware and software manufacturers have developed different approaches to storage lifecycle management.

### **Primary Storage Solutions and Their Limitations**

Primary storage providers have developed sophisticated solutions for data staging within their ecosystems. While these solutions excel within single-vendor environments, their effectiveness diminishes when integrating hardware from multiple vendors. This limitation often results in vendor dependency and impedes organizations from implementing optimal multi-vendor solutions. Moreover, these systems typically don't address the fundamental need to transition cold data to more cost-effective storage options such as economical NAS, tape, or cloud storage - a limitation inherent to their design objectives.

## Hierarchical Storage Management

High-end Hierarchical Storage Management (HSM) solutions represent another approach specifically designed for managing data across storage tiers. These solutions are primarily deployed in High-Performance Computing (HPC) environments, managing hundreds of petabytes to exabytes and numerous tape drives. While effective in these scenarios, HSM implementations typically require:

- Dedicated support personnel
- Extended deployment periods
- Specialized file systems
- Substantial financial investment

The limited worldwide deployment of such systems, estimated in the hundreds, reflects their specialized nature.

## Contemporary Storage Lifecycle Management Challenges

Recent Storage Lifecycle Management solutions often encounter challenges like HSM systems - excessive complexity or prohibitive costs. Some implementations employ capacity-based licensing models that assess fees based on scanned data volume, regardless of data movement. This creates an inverse relationship between hardware and software costs: as storage hardware costs decrease, software management costs increase exponentially.

## Spectra Modern Storage Management Vision

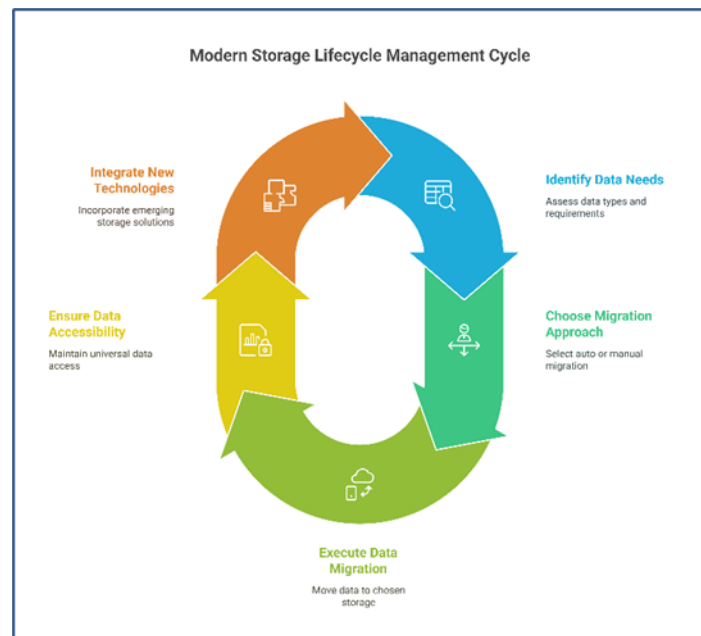
StorCycle software was developed to address these limitations by providing:

- Rapid deployment capability
- Cost-effective implementation
- Universal accessibility of migrated data
- Comprehensive data management functionality

The platform offers dual migration approaches:

1. Auto Migrate: Policy-driven movement based on age, type, or other file attributes
2. Project Archive: Manual migration of logically grouped files

Both methods support diverse storage destinations, including NAS disk, object storage, tape, cloud, or replicated sites, with user-defined data placement policies.



This approach represents a streamlined yet powerful solution that:

- Enhances existing storage infrastructure value
- Enables integration of emerging storage technologies
- Ensures future-proof data migration capabilities
- Maintains data accessibility independent of system continuity

The system emphasizes data reliability and protection while providing flexibility in storage management strategies, offering organizations a comprehensive solution for modern storage lifecycle management.

## The Strategic Value of Archive Tier Implementation

Establishing an Archive Tier storage architecture enables organizations to address historical and contemporary storage challenges while maintaining adaptability for future technological evolution and operational requirements.

### Impact on Primary Tier Optimization

The implementation of an Archive Tier storage strategy yields substantial benefits for Primary Tier operations through multiple efficiency mechanisms:

#### Cost Reduction

- Decreased hardware acquisition requirements
- Reduced software licensing expenses
- Minimized storage system overhead
- Lower administrative and maintenance costs

#### Operational Efficiency

The reduction in Primary Tier storage volume enables IT administrators to:

- Optimize infrastructure management processes
- Enhance organizational efficiency
- Focus resources on strategic initiatives
- Implement more effective data management practices

This architectural approach provides dual benefits: immediate cost optimization of primary storage resources and long-term operational flexibility. Subsequent analysis of specific use cases demonstrates how the Archive Tier methodology effectively reduces Primary tier-associated expenses while maintaining operational effectiveness.

The system's ability to address current and future storage requirements is a significant component of modern enterprise storage architecture. It provides a foundation for sustainable storage growth and adaptation to emerging technologies.

## Environmental Impact of Storage Architecture: The Archive Tier Solution

As organizations experience unprecedented data growth, data center operations have significantly contributed to carbon emissions and environmental impact. The exponential increase in data creation and storage requirements has prompted organizations to examine their ecological footprint and critically implement sustainable storage strategies.

### Storage Infrastructure and Environmental Sustainability

The proliferation of storage devices necessary to accommodate expanding data repositories presents operational and environmental challenges. Organizations are increasingly recognizing the importance of:

- Optimizing storage device utilization
- Reducing power consumption
- Minimizing cooling requirements
- Implementing environmentally conscious storage strategies

The Archive Tier architecture offers a systematic approach to addressing these environmental concerns through:

- Efficient resource allocation
- Reduced active storage requirements
- Optimized power utilization
- Strategic data placement

Organizations can significantly reduce their carbon footprint by implementing environmentally conscious storage architectures while maintaining operational effectiveness. This approach aligns with broader corporate sustainability initiatives and demonstrates environmental stewardship in data center operations.

Adopting such strategies reflects a growing recognition of data centers' environmental impact and the importance of implementing sustainable solutions in enterprise storage architecture.

## Real-World Savings: How StorCycle Software Works

StorCycle intelligent software automatically classifies and moves data in multiple ways:

- **Auto Migrate:** Set policies based on file age, type, or usage and StorCycle software will move inactive data automatically.
- **Project Archive:** This tool groups related files and archives them together, making it ideal for research, media production, and data-driven industries.
- **Custom Tiering:** Administrators can define custom policies based on storage type, security level, and frequency of access.
- **Hybrid Storage Management:** Seamlessly integrate on-premises and cloud storage solutions to optimize data workflows.
- **User-Driven Archival:** Empower end-users to manually migrate and retrieve archived files, reducing reliance on IT staff.



Organizations using StorCycle software report up to **70% savings** on storage costs. Let's explore some real-world examples.

## Use Case 1: Mid-Sized IT Department with Exploding Data Growth

A corporate IT team managing **600TB of storage** saw their data growing by **40% per year**. Expanding primary storage wasn't feasible, so they deployed StorCycle software. By moving **70% of their inactive data** to a combination of NAS and tape, they:

- **Avoided spending \$850,000** on new primary storage
- Cut backup storage needs by **half**
- Extended their primary storage lifespan by **18-24 months**
- Increased employee productivity with faster data access for active workloads
- Enhanced compliance reporting with improved data retention visibility
- Created automated tiering workflows to streamline future data growth management
- Deployed air-gapped tape storage for added security against ransomware threats
- Integrated StorCycle software with existing backup and disaster recovery solutions to optimize long-term data resilience

## Use Case 2: Small Business Moving to the Cloud

A small IT team had **120TB of data** and was backing up to the cloud. However, their backup costs spiraled, with software licensing costing **\$300,000**. With StorCycle software, they:

- Identified **60TB of inactive data** and moved it to low-cost cloud storage
- Reduced cloud storage costs to just **\$10,000 per year**
- Saved over **\$100,000 in three years** while improving backup efficiency
- Decreased cloud egress fees by storing non-critical data in archival cloud tiers
- Enhanced cybersecurity posture by enabling long-term archival with immutability features
- Created a disaster recovery (DR) plan by replicating critical data across multiple cloud providers
- Leveraged hybrid storage to balance performance and cost while maintaining fast access to key datasets

## Use Case 3: Research University Managing Massive Data Sets

A major university with **50+ research teams** was drowning in data. Their high-performance storage was expensive, and researchers needed a better way to archive projects. StorCycle software helped by:

- Moving **historical research data to tape and NAS** for long-term storage
- Implementing **metadata tagging** so archived projects remained searchable
- Cutting archive storage costs to **just 2.5 cents per GB**
- Ensuring research data **met long-term retention and compliance mandates**
- Establishing a fully indexed, searchable archive for research collaboration across departments
- Enhancing cloud-based sharing capabilities while maintaining secure, on-prem storage backups
- Automating tiered storage policies to ensure compliance with grant-funded research mandates

These are but a few of the ways how StorCycle software is making a simple, two-tiered storage paradigm a reality for organizations working with a few terabytes up to those working with hundreds of petabytes and beyond.

## The Dynamic Nature of the Archive Tier Storage

The Archive Tier represents a versatile architecture accommodating diverse storage platforms across technological generations. This comprehensive framework integrates multiple storage solutions, including:

- Legacy and contemporary NAS systems
- Object storage infrastructure
- Tape storage systems
- Cloud storage platforms
- Replication facilities

This flexibility enables seamless technology transitions as organizations adopt emerging storage platforms and interfaces.

## Data Integrity and Protection

The Archive Tier implements critical data protection strategies that extend beyond traditional Primary Tier backup protocols. The architecture emphasizes maintaining multiple data copies across diverse storage media and locations to ensure data preservation and accessibility.

## Strategic Copy Management

The system enables sophisticated copy management configurations:

- Responsive copies maintained on NAS for immediate access requirements
- Disaster recovery copies distributed across tape and cloud storage
- Cost-optimized restoration paths utilizing local tape copies
- Cloud-based copies facilitating collaboration and specialized workflows (transcoding, AI analysis)

## Accessibility and Administrative Efficiency

The Archive Tier ensures data accessibility through:

- Symbolic link integration
- HTML link implementation
- Web-based search functionality

This architecture reduces administrative overhead while enhancing operational efficiency, eliminating the need for additional personnel resources. Instead, it streamlines IT management processes, enabling more effective resource allocation and system administration.

The implementation provides a comprehensive solution that balances accessibility, protection and administrative efficiency while maintaining flexibility for future technological adoption.

## A Smarter, More Cost-Effective Storage Strategy

With data growing exponentially, companies can't afford to keep everything on expensive primary storage. StorCycle software makes storage smarter by automating data movement, optimizing costs, and simplifying access. Whether you're a small IT team, a large enterprise, or a research facility, StorCycle software delivers the cost savings, efficiency, and flexibility you need.

It's time to rethink how we store data. StorCycle software is the future of intelligent storage management.

## About Spectra Logic

Spectra Logic modernizes IT infrastructures to preserve, protect and defend data from days to decades, whether on-premises, in a single cloud, across multiple clouds or in all locations at once. Our cost-effective solutions help organizations efficiently manage, migrate, and store long-term data, from terabytes to exabytes, with features that make ransomware resilient.

To learn more, visit [www.SpectraLogic.com](http://www.SpectraLogic.com) or contact our sales staff at [sales@spectralogic.com](mailto:sales@spectralogic.com)