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## Critical Mistakes in Data Infrastructure Design— and How to Avoid Them

**Healthcare's Data Crossroads:** Navigate Performance, Innovation, and Cyber-resilience to Optimize Quality Care without Compromise



Healthcare providers often make storage decisions that, while seemingly practical in the short term, lead to complexity, high costs, and rigidity in the long run. These inefficiencies ultimately hinder patient care and operational effectiveness. This guide is designed to help you avoid the most common pitfalls when choosing a storage platform.

# Mistake #1

## Deploying Multiple Storage Silos for Different Workloads

Many healthcare organizations have inadvertently created a patchwork of departmental systems for EHRs (electronic health records), imaging, analytics, and backend applications without a cohesive strategy for data reuse, maintainability, or quality. These siloed systems not only limit your organization's agility but also prevent you from fully leveraging your data's potential value.

### Consequences:

- **Operational complexity:** Managing disparate storage platforms demands diverse skill sets and processes, straining IT resources.
- **Financial burden:** Redundant storage leads to over-provisioning and inflated maintenance costs, diverting funds from patient care initiatives.
- **Impaired collaboration:** Data silos create barriers to seamless information access, slowing critical workflows and cross-specialty collaboration.
- **Compromised patient care:** Without a unified view of patient data, providers risk delayed diagnoses, redundant tests, and suboptimal treatment decisions.

### How to avoid this mistake:

Streamline storage by adopting a unified, scalable platform that efficiently handles diverse workloads across your entire data landscape (block, file, and object) and on bare metal, VMs, cloud, or containers—with tiered performance and resilience. Choose solutions which are verified to optimize the data workflow driving your EHRs, imaging systems, and analytics tools to enhance interoperability and simplify data access.

“Our PACS storage directly influences our ability to save lives, so when the cache started experiencing errors it created confusion. That all stopped as soon as we switched to Pure Storage.”

JOSH OTTEN, DIRECTOR OF IT AND SOLUTIONS ENGINEERING, ADVENTIST HEALTHCARE

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Storage platform capabilities for a unified data environment

### High-performance, AI-optimized storage for real-time access and workloads.

- Support for mission-critical applications like EHR, PACS, VNA, and other healthcare applications and backend systems.
- Parallel data processing and high bandwidth to handle large datasets (e.g., DICOM, AI) without delays.
- Intelligent data tiering to enable frequently accessed clinical data to remain on-premises while archival imaging and EHR records are moved to cloud storage.

### Seamless scalability and data interoperability.

- Hybrid cloud and object storage for infinite scalability while optimizing costs.
- Software-Defined Storage (SDS) to scale across multi-site hospital environments.
- Interoperability and API Integration with existing hospital IT ecosystems (EHR, PACS, VNA, AI analytics).

# Mistake #2

## Over-reliance on Legacy Storage Architectures

Many hospitals still rely on outdated SAN/NAS architectures designed for pre-cloud environments. These legacy systems are often built on expensive proprietary hardware which often has an end of service and end of life requirement. Legacy vendors lack the agility, scalability, and interoperability required in today's data-driven healthcare landscape. By relying on outdated systems, you're potentially compromising patient care and limiting your ability to leverage cutting-edge technologies.

### Consequences:

- **Scalability roadblocks:** Legacy storage struggles to accommodate the exponential growth in data volumes from advanced imaging, genomics research, and AI-driven applications, which will hinder your ability to adopt cutting-edge technologies.
- **Performance bottlenecks:** Older storage systems fail to meet the real-time access needs of modern healthcare applications, which can impede decision-making, reduce operational efficiency, and potentially compromise patient outcomes.

- **High costs:** Maintaining legacy systems typically involves costly and disruptive upgrades, specialized expertise, and increased downtime.

### How to avoid this mistake:

Adopt a modern storage solution that offers cloud-like agility, non-disruptive upgrades, and powerful performance. Consider implementing NVMe-based all-flash storage arrays or hybrid cloud models to dramatically improve system and application performance and reduce TCO. Prioritize solutions with robust APIs for seamless integration with EHRs, PACS, and analytics tools, enabling comprehensive patient views.

"In healthcare, every second counts. With Pure, we can complete backups with zero impact on crucial systems. This saves clinicians and those who support them a lot of time over the course of a day so they can focus on delivering the best patient care."

JESSE FASOLO, DIRECTOR OF TECHNOLOGY INFRASTRUCTURE AND CYBER SECURITY  
AND THE INFORMATION SECURITY OFFICER

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Storage platform capabilities to support modern healthcare needs

### Digital transformation across the healthcare data landscape.

- Data management platform that can scale across multi-site hospital environments.
- AI- and ML-ready storage to support deep learning models for imaging analysis, ambient listening, video monitoring, etc.
- Proven history supporting all hospital IT ecosystems (EHR, PACS, VNA, AI analytics, etc.).

### Powerful scale, performance, and data protection.

- Flash Storage or NVMe for high-speed performance over traditional disk-based systems.
- Hybrid cloud and object storage for infinite scalability and data mobility.
- Immutable snapshots and audit logs to enable tamper-proof backups and detailed forensic tracking for compliance.
- Simplicity at scale to eliminate the operational overhead associated with tuning, workload balancing, and manual optimizations.

# Mistake #3

## Treating Backup and Disaster Recovery (DR) as an Afterthought

Many organizations underestimate the critical importance of robust backup and disaster recovery (DR) systems, often relying on outdated methods like tape backups or slow on-premises replication. This oversight can have severe consequences in the wake of a power outage, cyberattack, or other disruption.

### Consequences:

- **Data loss risk:** Inadequate backup strategies leave your organization vulnerable to devastating cyberattacks, particularly ransomware, and catastrophic system failures.
- **Prolonged downtime and disrupted operations:** Slow recovery times directly affect patient care and hospital operations, leading to higher costs and potential brand damage.
- **Compliance issues:** Healthcare regulations like HIPAA demand stringent data protection and swift recovery capabilities.

### How to avoid this mistake:

To safeguard electronic protected health information (ePHI), ensure continuous patient care operations, and mitigate ransomware attacks, implement a modern backup and DR strategy that includes immutable snapshots, rapid restore capabilities, and a layered resilience architecture. Automating your recovery processes is vital to reduce downtime and keep operations running smoothly. Be sure your strategy aligns with stringent compliance requirements for HIPAA, GDPR, etc.

Storage platform capabilities for a comprehensive backup, DR, and cyber-resilient strategy

### Cyber resilient security and ransomware protection.

- Immutable backups to ensure tamper-proof data protection that cannot be deleted or altered by ransomware.
- End-to-end encryption (at rest and in transit) to prevent unauthorized access to patient records.
- Zero trust security model and RBAC so only authorized personnel can access critical data.
- AI-driven threat detection and anomaly monitoring that identifies and mitigates suspicious activities in real time.

### DR and business continuity capabilities.

- 99.9999% uptime guarantee and multi-site replication to ensure continuous availability of critical patient data.
- Automated failover and rapid recovery to quickly restore operations with minimal downtime.
- Hybrid cloud disaster recovery (DRaaS) to support offsite backups and cloud-based recovery for resilience.
- Geographically redundant storage to protect against regional outages or disasters by maintaining copies in multiple locations.

“Ransomware attacks are rampant in healthcare, which is an all-day, every-day business. SafeMode™ snapshots give us fast access to immutable backups, providing valuable layers of data protection to ensure maximum data availability.”

**BILL YOUNG, HEALTH SYSTEM SERVER AND STORAGE ASSISTANT DIRECTOR,  
THE UNIVERSITY OF KANSAS HEALTH SYSTEM**

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# Mistake #4

## Failing to Optimize for AI and Advanced Analytics

Healthcare providers often deploy storage without considering the impact of AI and analytics applications. Your valuable data is often trapped in complex infrastructures and disparate legacy storage systems that become significant barriers for AI adoption and innovation. Legacy architectures weren't built for the level of data intensity and concurrency that AI demands. This oversight can lead to significant bottlenecks when processing large-scale medical imaging studies, for example. The consequences of this short-sighted approach are far-reaching.

### Consequences:

- **Stalled innovation:** Inadequate storage performance severely limits your ability to train AI models on large datasets in real-time, or even delay implementing purchased AI models.
- **Missed insights:** AI-driven decision support tools become less effective when hindered by slow data access.
- **Increased IT complexity:** Retrofitting storage for AI workloads adds unnecessary complexity and cost and can also impact the physician experience.

### How to avoid this mistake:

To drive the next wave of AI innovation, storage needs to evolve. The ideal solution combines a flexible, modular architecture with a highly efficient, scalable metadata system, ensuring seamless performance and growth as AI workloads expand. Choose a unified, high-performance, AI-ready storage with high throughput, low latency, and integration with GPU-accelerated environments. A unified data lake approach can improve accessibility and analytics efficiency to accelerate more accurate outcomes for clinicians.

“Pure Storage and AIRI prepare a platform for innovation to make advancements in AI development.”

MR. SHUTA YANAGITA, SOFTWARE STRATEGY MANAGER, OLYMPUS

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Storage capabilities to optimize AI analysis and embrace new use cases

### High-performance, AI-optimized storage for real-time data processing.

- All-Flash or NVMe storage to deliver ultra-fast IOPS and low-latency performance for AI model training and inference.
- Metadata-optimized performance for instant access to billions of small files and low-latency metadata access.
- High-bandwidth architecture for extreme throughput, capable of sustaining multi-terabyte-per-second workloads.
- Built-in AI integration to support GPU-powered analytics and AI inferencing for faster decision-making in clinical workflows.

### Architecture flexibility to reduce TCO and allow for future AI expansion.

- Effortless scalability to scale AI workloads dynamically without requiring costly infrastructure overhauls.
- Future-ready platform designed to evolve with next-gen AI models, foundational architectures, and emerging innovations.

# Mistake #5

## Not Adopting a Cohesive Cloud Strategy for Data Mobility

Many healthcare organizations either avoid the public cloud due to security apprehensions or use a fragmented, inconsistent cloud storage strategy without clear governance. Insufficient planning to implement a cohesive cloud strategy may lead to compromising patient care quality, reducing operational efficiency, and hindering innovation, particularly in AI and analytics adoption.

### Consequences:

- **Limited data accessibility:** Without a strategic cloud strategy, remote and multi-site access becomes cumbersome.
- **Increased costs:** Fragmented cloud storage leads to unnecessary egress fees and redundant data storage, or delays in clinical data delivery to physicians.
- **Elevated security risks:** A poorly planned cloud approach can expose sensitive patient data to breaches.

### How to avoid this mistake:

Develop an end-to-end hybrid cloud strategy designed to ensure secure, compliant data mobility across on-prem and cloud environments. Seek out solutions that can dynamically scale storage and compute power and offer the performance for real-time access to patient records, imaging, and analytics. Prioritize solutions that offer seamless data management, end-to-end encryption, and access controls to balance security with accessibility.

### Storage platform capabilities for a cohesive and agile cloud environment

#### High scalability and seamless data mobility across on-premises and cloud.

- Intelligent data mobility strategy where frequently accessed clinical data remains on-premises while older, archival imaging and EHR records are moved to the cloud.
- Cloud-native AI and analytics support to leverage cloud-based AI tools for medical imaging analysis, predictive analytics, and research.
- Multi-site replication and cloud bursting to support load balancing between on-premises and cloud environments to handle demand spikes.

#### Security, compliance, and cyber resilience for data protection.

- End-to-end encryption (at rest and in transit) to prevent unauthorized access and secure data transmission between on-premises and cloud.
- Immutable backups and ransomware protection utilizing snapshots and cyber-resilient storage to prevent data corruption and breaches.
- Automated compliance and regulatory alignment to enforce compliance policies across hybrid storage environments.
- 99.9999% uptime with built-in DR to reduce downtime risks using automatic failover and real-time replication.

# Pure Storage is Purpose-built for Healthcare

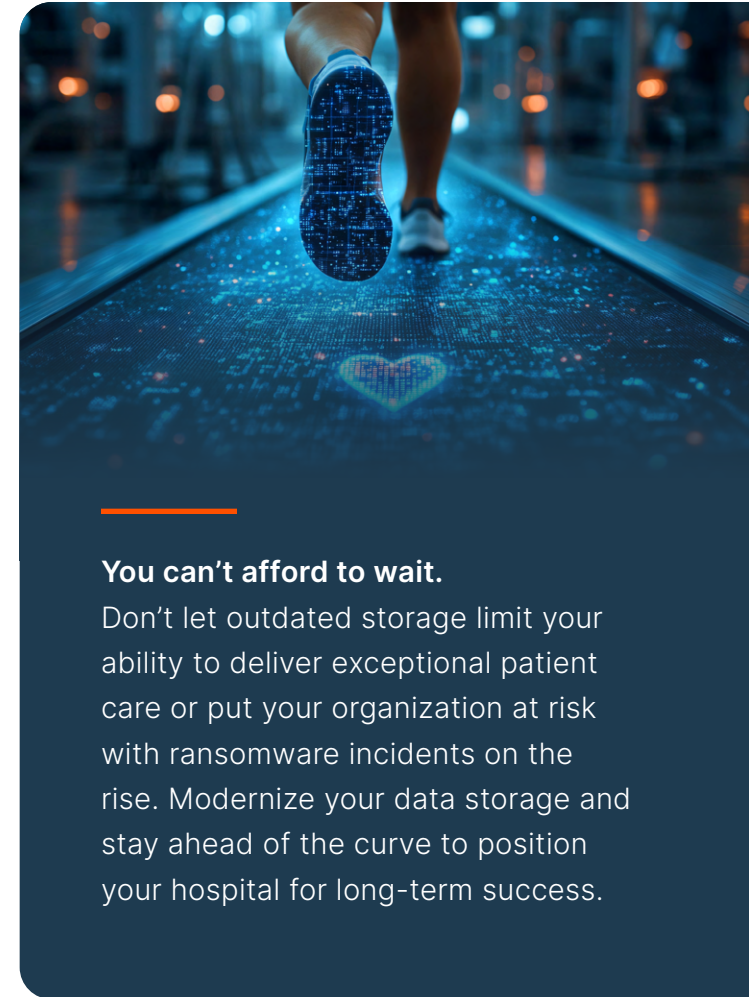
Pure Storage empowers healthcare organizations to embrace digital transformation with high-performance, secure, and scalable storage solutions. As real-time data, AI-driven diagnostics, and security are critical to modern care, Pure Storage provides the foundation to improve patient outcomes, streamline operations, and ensure data protection.

Swift access to EHRs and medical imaging is essential for effective clinical decision-making. Pure Storage's all-flash architecture eliminates delays, ensuring clinicians can retrieve vital data instantly. Our AI-ready storage supports AI and machine learning models and accelerates diagnostics and enhances precision in treatments.

With healthcare data increasingly targeted by ransomware, cyber-resilience is paramount. Pure Storage strengthens protection with immutable snapshots, rapid recovery capabilities, and end-to-end encryption, ensuring data integrity while meeting HIPAA compliance requirements.

By eliminating complexity, reducing risk, and enhancing efficiency, Pure Storage ensures healthcare organizations can meet today's demands and prepare for the future. With a secure, scalable, and high-performing storage platform, providers can focus on what matters most—delivering exceptional patient care.

Learn more about [Healthcare solutions](#).



## You can't afford to wait.

Don't let outdated storage limit your ability to deliver exceptional patient care or put your organization at risk with ransomware incidents on the rise. Modernize your data storage and stay ahead of the curve to position your hospital for long-term success.

[purestorage.com](https://purestorage.com)

800.379.PURE

