IMPROVING HEALTHCARE DATA MANAGEMENT
Beyond Silos: Meeting the Data Management Challenge

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A DELUGE OF DATA

A big part of routine daily healthcare management operations is managing huge volumes of data—and it’s becoming increasingly more of a challenge. EMC estimates the amount of stored healthcare data nearly doubles every two years. The amount of data managed will continue to grow as healthcare organizations add new equipment and incorporate data-intensive, next-generation diagnostic tools.

Healthcare data is typically housed on “siloed” systems based on department usage or specific functions. This siloing creates complexity; each storage system must be managed separately, reducing storage utilization efficiency and making data more difficult to search, share, and analyze.

EMC® Isilon® scale-out NAS storage simplifies healthcare data management. EMC Isilon provides a single file system that manages data as a single pool of storage, while maintaining the performance required of each use case. A single file system reduces management complexity and increases storage utilization rates.

EMC Isilon solutions work with many healthcare ISV applications, and easily scales at the push of a button to meet growing storage needs. Isilon also serves as a foundation for a scale-out data lake, making data analytics-ready in place.

TRENDS DRIVING A NEED FOR CHANGE

Several factors are forcing healthcare organizations to rethink their storage strategy:

**More data to store:** Storage capacity requirements continue to grow at a significant rate. The shift to data-intensive digital images for X-rays, ultrasounds, and other diagnostic instruments, and the increased use of diagnostic tests in general all contribute to the rate of data volume increase. As the number of storage devices increases to support the rising volume of data, so too does the IT resource capability required to maintain the growing systems.

**Inefficient use of storage capacity:** In many healthcare organizations, storage is organized and managed by diagnostic function or department. Each department has its own application—with associated storage—which creates multiple storage systems, each requiring independent management. Further, since capacity is not shared between departments, independent management of storage systems constrains disk sharing. For example, a Radiology PACS system may require additional capacity, and while a Cardiology PACS system within the same organization may have capacity to spare, that storage cannot be easily made available for the radiology department.

The inability to share surplus capacity between functional areas regularly leads to healthcare storage utilization rates well under 50 percent. Siloing of resources increases storage management cost, complexity, and inefficiency, causing healthcare organizations to buy more storage than necessary to meet the demands of different groups.

**Changing data retention requirements:** Patient records, clinical study results, and medical diagnostic images are now required to be stored for longer periods of time. While there is a need to have all of the data available, it’s not cost effective to keep all of the data at the highest performance storage tier at all times. The longer retention periods place additional burden on staff to migrate the data to new storage arrays repeatedly and redirect existing applications to the new infrastructure, which increases in cost as the amount of data increases.

**Emerging diagnostic and therapeutic fields generate vast volumes of new data:** The adoption of new diagnostic imaging techniques and tools increases the generation of data. Examples include digital pathology and microscopy, sleep studies involving video surveillance data, and the incorporation of next-generation sequencing (NGS) and proteomics to customize disease treatments.
Equipment associated with these new fields can produce unprecedented volumes of data: for example, a typical NGS study can create an additional 100 to 200 GB of data per study, per patient. Current siloed storage infrastructures will not scale to meet this expanding data management demand, and costs and complexity will rise.

Need data to provide insight: As the market moves towards an outcomes-based model such as Accountable Care Organizations, access to data (both current and historic) is more important. As more multidisciplinary and personalized treatments are introduced, healthcare organizations need to ensure extended access to shared data, especially as the cost of lost data is so high. Also, IT staffs need to prepare to handle the upcoming demands to help their users make data-driven decisions to improve quality at a lower costs. As they acquire an increasing amount of data, how do they leverage their infrastructure to enable analytics without creating yet another future silo of data for their analytics needs?

INFRASTRUCTURE MANAGEMENT COMPLICATIONS DUE TO DATA GROWTH
To keep pace with the explosion of data, many healthcare organizations simply add dedicated, capacity for each new workload. Unfortunately, while this may seem as the easier solution, it creates yet another siloed data repository. Creating siloed storage requires more floor space, electricity and cooling, additional backups, and separate management of each data volume. In most cases, this means running systems at low utilization rates, which translates to increased cost and management complexity.

Tight IT budgets may strain matters further, as healthcare organizations find themselves with budgets unable to support increased storage needs. With siloed storage, costs and management duties increase as more devices are added, forcing IT staff to divert time and resources ordinarily spent on other projects. IT staff time becomes dedicated to storage management instead of managing growth, and CapEx and OpEx increase.

SEEKING A SOLUTION
Healthcare organizations need a unified storage solution that is highly scalable and highly efficient—one that is able to meet the requirements of multiple use cases while offering price/performance tiered storage that supports multidisciplinary computational workloads. EMC Isilon scale-out NAS storage offers healthcare providers a path to simplify data management, increase storage utilization, achieve leading scalability and prepare the infrastructure to support the future analytic needs.

EMC ISILON SIMPLICITY, SCALABILITY, AND BEST-IN-CLASS PERFORMANCE
EMC Isilon solutions are already used in leading healthcare organizations around the world, providing industry-leading data protection and a single pool of storage without sacrificing performance. The EMC Isilon storage pool scales at the push of a button—with no downtime—to meet future storage needs, providing unsurpassed investment protection. As additional nodes are added, data is automatically balanced to evenly spread load across the entire cluster, increasing performance linearly as storage capacity increases.

Every EMC Isilon solution can seamlessly scale on demand, enabling healthcare organizations to add hundreds of terabytes of storage or expand performance in minutes without downtime. At the same time, Isilon’s modular architecture and intelligent software make deployment and management simple. Powered by its OneFS® operating system, every EMC Isilon cluster is a single pool of storage with a single namespace, eliminating the need to support multiple volumes and file systems.
OneFS combines the three layers of traditional storage architectures—file system, volume manager, and data protection—into one unified software layer, creating a single intelligent file system that spans all nodes within a cluster. Unlike simple NAS namespace aggregation products, the EMC Isilon OneFS operating system is truly distributed and intelligently stripes data across all nodes in a cluster to create a single, shared pool of storage. OneFS offers unsurpassed mission-critical reliability and industry-leading drive rebuild times.

OneFS also delivers unique cluster-aware symmetric multiprocessing (SMP) capabilities that enable the system to move tasks between processors for extremely efficient workload balancing. In conjunction with the OneFS ability to stripe data across all nodes in a cluster, EMC Isilon achieves the high aggregate bandwidth performance required to power next-generation healthcare data centers.

EMC Isilon also offers the industry’s first suite of scale-out storage data management applications. The enterprise-class applications allow an administrator to meet critical data protection, access, management, and availability requirements. Three applications that are particularly relevant to healthcare are the SyncIQ, SmartPools and SmartLock—applications that provide data replication, auto-tiering, and data protection capabilities.

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<thead>
<tr>
<th>APPLICATION</th>
<th>PURPOSE</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>SyncIQ™</td>
<td>Data Replication</td>
<td>Replicate and distribute data sets to multiple shared storage systems in multiple sites to provide a reliable disaster recovery capability, compliant with healthcare needs</td>
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<tr>
<td>SmartPools™</td>
<td>Resource Management</td>
<td>Healthcare data is retained for longer periods than ever before. While it’s important to have all the data available, older, less-frequently accessed data can be automatically moved to lower cost tiers—transparently to the application—optimizing storage costs for older data.</td>
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<tr>
<td>SmartLock™</td>
<td>Data Retention</td>
<td>Protect your critical data against accidental, premature, or malicious alteration or deletion with our software-based approach to write once read many (WORM)</td>
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**MOVING BEYOND SILOS TO BETTER HEALTHCARE DATA MANAGEMENT**

The combination of EMC Isilon hardware, single file system, and OneFS management software delivers the performance needed to meet the growing data challenge facing today’s healthcare organizations. The Isilon solution simplifies storage management while providing robust data protection, efficient storage utilization, and lower operating costs essential to successful healthcare data storage management. Isilon also natively support Hadoop based applications via HDFS. This allows organizations to create a “data lake” for their enterprise, easing the road to data analytics to improve patient care and lower costs.