Abstract

Payors are under increasing pressure to meet regulatory mandates, contain costs, and find new opportunities for profit and growth. An agile data infrastructure is a new way of looking at traditional healthcare IT storage infrastructures to reduce costs, preserve existing assets, and produce more actionable decision-making through the use of big data analytics. This shift can also more closely tie payors with ACO and other provider partners via secure private clouds to reduce fraud and risk and more quickly and accurately fulfill claims.
1 Overview

Healthcare payors are preparing for the significant changes that will impact their business model as the Affordable Care Act (ACA) goes into full effect in 2014. Although this act has already become law, the complete details surrounding implementation, operation of exchanges, and impact on daily operations are still largely unclear. Although these uncertainties are a major concern to payors, one clear mandate is the requirement to now store and retain a tremendous volume of provider data across their participating partner networks. And the IT impact of this new requirement will be significant. Payors will need to rearchitect existing IT storage infrastructures to collect, store, and manage this tremendous volume of data that is mandated for retention. Payors who effectively implement a shared storage infrastructure will see immediate benefits in productivity and cost efficiencies as they comply with requirements of the ACA.

2 Changing IT Storage Requirements

2.1 Disease Management Improves Patient Outcomes and Reduces Claims

The claims payment database provides a wealth of information and lays the foundation for implementing disease management programs within payor organizations. By integrating claims data with provider patient data, payors can identify patients with chronic diseases and establish proactive wellness and behavioral care management programs. And by improving patient outcomes, payors can expect to see a significant savings in claims remittance.

However, it is crucial to protect the integrity of the core business of processing and paying claims. It will be necessary for payors to establish a new storage repository to house the data for these new disease management programs. This will require replicating the claims database and integrating it with new sources of provider data that enter the system.

New Sources for Data Storage and Retention

Healthcare is an information-rich industry. By 2011, U.S. healthcare organizations had generated 150 exabytes (that's 150 billion gigabytes) of data. At this rate, big data for U.S. healthcare will soon reach zettabyte or even yottabyte scale.\(^1\)

Figure 1) Effect of digital content on storage requirements.
In January 2013, 106 new Accountable Care Organizations (ACOs) were launched, and more than 250 payor-provider partnerships were established as a result of the enactment of the ACA. U.S. Department of Health and Human Services (HHS) officials estimate that integration across these partnerships could save more than $1 billion over four years. Although these partnerships can result in greater payor efficiencies, the volume and size of patient records being generated by these sources will significantly tax existing IT storage infrastructures, with big data coming from:

- Multiology image data
- Electronic health records (EHR) and personal health records (PHR)
- Clinical data
- Laboratory data
- Pharma data

Once this rich repository has been created, payors will be positioned to expand into new business opportunities. And with the advancement in genome sciences, anticipatory medicine will be the next step in care management, with deep insights provided by genomics data. But the size and complexity of this data will further stretch the storage infrastructure, so it is essential to implement a scale-out infrastructure that can easily accommodate changing data requirements in the future.

2.2 The Shift to Decentralized Environments

Payors have traditionally been very centralized in their structure. However, with steps to implement the ACA, payors are shifting to a decentralized business model to facilitate better integration with provider and ACO networks. Implementing a flexible, shared infrastructure will provide operational efficiencies and productivity improvements, allowing payors to anticipate and prepare for future storage demands, particularly as partnerships with providers and ACOs continue to expand.

In addition, cloud computing offers significant efficiencies and cost benefits for decentralized computing. With cloud services, payors can take a virtualized shared IT infrastructure even further, providing new applications and services on demand. By implementing a fully automated, service-oriented infrastructure of pooled resources, they are now positioned to easily deliver IT services that respond more quickly to changes in their business.

2.3 Implementing Value-Based Reimbursement

As the healthcare industry shifts from a volume-based to a value-based reimbursement system, payors will require sophisticated analytical tools to transform the volumes of big data captured in the rich repository into actionable intelligence. With improved insights into patient care and treatment plans, payors will be in a better position to map claims data with clinical data to reveal deeper insights about disease management, demonstrate regulatory compliance, identify potential fraud, and coordinate across Medicare and Medicaid benefits, among others.

However, most payor infrastructures are not equipped to adequately utilize big data to aggregate, normalize, and analyze data. By moving to a shared infrastructure that stores in one repository all of the data that can be mined, payors can now run analyses to better understand the effectiveness and necessity of procedures and treatments in order to gain control over healthcare spending.

2.4 Code Conversion: ICD-9 to ICD-10

The HHS mandated a change in code reporting to provide greater granularity for billing. Due to the cost and complexity of this conversion, the deadline for completion of this migration has been postponed to

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October 1, 2014. However, the increase from 18,000 codes to over 150,000 codes\(^3\) presents an enormous integration/remediation effort, and it will create a new level of storage requirements that will also impact payor storage infrastructures.

Table 1) Impact of code conversion mandate.

<table>
<thead>
<tr>
<th>Code Category</th>
<th>ICD-9</th>
<th>ICD-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnosis</td>
<td>14,000</td>
<td>68,000</td>
</tr>
<tr>
<td>Procedure</td>
<td>4,000</td>
<td>87,000</td>
</tr>
</tbody>
</table>

2.5 Digital Capture of Patient Records

Payors are also examining the merits of scanning documents that are not currently in digital form. Creating a fully digital longitudinal record of care will provide both a complete view of a patient’s medical history as well as required documentation for litigation cases. Having ready access to necessary records will make it possible for payors to make fact-based decisions on whether to settle or defend a case. However, the effort to scan, index, and store these files will also impact storage requirements, so payors will need to take this digitization process into consideration when designing a shared infrastructure.

3 Why Storage Matters in Managing Clinical and Claims Data

Healthcare payor organizations are under extreme pressure to capture, store, and manage the massive volume of data that will be entering their system. Working with NetApp, payors have access to an agile data infrastructure that offers a cost-effective approach for rearchitecting their storage infrastructure. By moving to a shared environment, payors are positioned to benefit from the many operational and cost efficiencies that can help optimize staff productivity; improve claim fulfillment; and reduce error, fraud, and duplication. The key benefits of an agile data infrastructure include:

- **Operational Efficiency.** Achieve improved performance, management simplicity, and reliability to drive improved productivity and cost savings. And with the ability to automatically provision and optimize storage resources, payors will see significant improvements in efficiency and performance over manual processes.

- **Nondisruptive Operations.** The ability to transparently migrate data and network connections and distribute data distributed across the cluster at any time will allow payors to retain access even during updates and technology refreshes.

- **On-Demand Flexibility.** Scale-out storage solutions easily accommodate data growth, supporting a few terabytes up to 50 terabytes using a single unified architecture. Payors can start small and grow incrementally with infinite scaling to meet increasing data requirements and keep pace with changing data requirements.

3.1 Easily Manage Data to Run Effective Disease Management Programs

NetApp\(^\circ\) storage solutions provide the flexible foundation needed to implement effective disease management programs.

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Unified Management

The NetApp clustered Data ONTAP® operating environment delivers a flexible architecture that supports a broad range of medical and business applications, numerous protocols, and diverse workloads that confront healthcare payor organizations today.

NetApp Data ONTAP combined with FAS and V-Series storage systems provides massive scalability and performance. These systems not only provide fast provisioning for additional capacity, but also deliver proven reliability (99.999% availability) and embedded security of healthcare data, meeting HIPAA requirements for patient records. When used with big data repositories, the unstructured nature of imaging and other medical data is more easily indexed and retrieved, resulting in more accurate documentation retention.

Figure 2) Data ONTAP for shared multiprotocol business workflows for payors and ACO partners.

<table>
<thead>
<tr>
<th>Protocols</th>
<th>Broad System Portfolio</th>
<th>Efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC</td>
<td>NetApp FAS and V-Series</td>
<td>Thin Provisioning</td>
</tr>
<tr>
<td>FCoE</td>
<td></td>
<td>Cloning</td>
</tr>
<tr>
<td>iSCSI</td>
<td></td>
<td>Compression</td>
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<tr>
<td>CIFS</td>
<td></td>
<td>Deduplication</td>
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<tr>
<td>NFS</td>
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<tr>
<td>pNFS</td>
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</table>

Unified Management

- Built in multi-tenancy
- Integrated data protection
- Antivirus on-box
- Common software
- Common systems
- Unified management

The Only Unified Clustered Systems Portfolio

Performance, Density, and Flexibility for Data-Intensive Workloads

The NetApp E-Series storage system delivers compelling performance for big-bandwidth applications, extreme storage density, and exceptional uptime, enabling payors to address growing high-performance workload requirements. In addition, the E-Series storage system offers numerous drive shelf options for custom configurations, allowing payors to grow incrementally to keep pace with changing document retention requirements. With the E-Series’ exceptional uptime, redundant components, automated path failover, and online administration, healthcare professionals can be productive 24/7.

- **Optimized performance across payor infrastructure.** Sustains high read and write throughput, eliminating performance bottlenecks.
- **Maximum storage density.** Leading rack density saves data center floor space and lowers operational costs while accommodating the increasing volumes and file sizes of medical images, patient records, and other medical files.
- **High reliability.** Field-proven design provides high reliability and 99.999% availability provides care providers with continuous access to stored information.
- **Robust protection.** Advanced protection technologies such as data-at-rest encryption, proactive monitoring, background repair, and extensive diagnostic features fully protect data when it reaches the storage system.
3.2 Transforming Big Data to Action with Analytics

Big data analytics provide payors with greater control, taking advantage of the entire digital data repository and turning clinical data into valuable intelligence. An insurer that has analytical insight to fact-based diagnostics and therapeutic decisions can shift to the new model of value-based reimbursements to drive coordinated care at a lower cost.

The NetApp for Hadoop solution provides payors with the analytical tools that can turn these valuable sources of data into a wealth of information to payors. The solution enables payors to:

- Reveal improved disease management and ongoing patient care efficiencies that can reduce patient healthcare costs.
- Provide fraud detection and litigation support with big data and analytical tools to examine large pools of previously disassociated data.
- Help reduce Medicare and Medicaid duplication through analytical insight across numerous provider claims, resulting in coordinated care at a lower cost.

Figure 3) Turning big data into actionable intelligence.

The NetApp for Hadoop solution is optimized for cost, reliability, performance, and storage density. Payors have flexibility and choice in selecting the configuration that best meets their specific workload requirements.

3.3 Standardize, Automate, and Virtualize with Cloud Computing

Private cloud deployments are becoming a reality and healthcare IT is evolving to this business model to deliver IT as a service through a virtualized shared IT infrastructure, automation, and service efficiencies. But these shared cloud services have created new requirements for secure multi-tenancy, data mobility, storage efficiency, and data protection. NetApp has proven technologies to help provide these critical capabilities, including the following.

- NetApp DataMotion™ data migration software provides the ability to move data from one logical or physical storage device to another, without disrupting operations. The shared storage infrastructure provides continuous availability as capacity is added or refreshed and load balanced for performance.
• NetApp MultiStore® software creates several virtual storage systems within a single physical storage system. With MultiStore software, numerous users can share the same storage resource without compromising privacy and security. This prevents information on one virtual storage system from being viewed, used, or downloaded by users on a different virtual storage system.

• SANscreen® provides real-time end-to-end visibility across heterogeneous storage environments with automatic mapping of infrastructure components to business services and monitoring and alerting on availability, performance, or policy problems.

• The FlexPod® data center platform is a prevalidated solution combining storage, networking, and server components and integrating them into a single flexible architecture. This platform is designed to ease IT transformation to virtual infrastructure and cloud computing with maximum efficiency, minimal risk, and increased flexibility. This solution has been successfully deployed in some of the largest healthcare insurer call centers due to the ease of deployment and the maximum flexibility for shared storage infrastructures with secure multi-tenancy. Although having the right technology is a critical component of private cloud success, having the right technology partners with the right expertise is just as important in making the decision to move to cloud computing. NetApp has established key partnerships with leading virtualization, networking, and cloud technology partners that help with designing the right solution to meet the demanding requirements of payor organizations.

3.4 Accelerate Code Conversion

To facilitate the code conversion process, payors can streamline activities using NetApp FlexClone® capabilities. Payors can instantly replicate existing ICD-9 patient databases in a matter of minutes for use in the ICD-10 conversion process, with virtually no disruption of production and using a fraction of the disk space of the original database. As ICD-10 coded patient records grow, NetApp’s thin-provisioning technology can add additional storage without disrupting operations.

3.5 Cost Savings Through Productivity and Operational Efficiencies

Streamlined Management

NetApp simplifies the complexity of maintaining and accessing patient data and other medical records with policy-based management. By automating the ability to deploy, adjust, and control data storage attributes, payors can now easily respond to changing storage requirements and provide time-sensitive access to patient records to research and pay claims.

Routine operations such as creating a LUN, establishing a replication pair, and monitoring performance bottlenecks become increasingly easier when multiplied by hundreds or thousands of instances. This eliminates or drastically reduces the need for manual intervention. Payors can now easily support terabytes to petabytes of patient files while reducing the time it takes to perform routine administrative tasks. And with improved policies and processes, IT is positioned to manage more terabytes per full-time employee with the push of a button.

Comprehensive Business Continuity

NetApp business continuity solutions help payors recover quickly in the event of a system, site, or regional outage. These solutions help maintain availability across a broad spectrum of recovery point and recovery time requirements during planned as well as unplanned downtime. NetApp SnapMirror® technology, clustered Data ONTAP, and FlexClone can all play an automated role in improved disaster recovery, point-in-time backups, and application and data failover in the event of an emergency or a system failure. And integration with deduplication helps boost network and storage efficiency and enhances performance.
Security in a Shared Environment

Sharing sensitive patient information between payor and ACO facilities must be handled in a secure fashion as mandated by HIPAA, and includes both data in motion and data at rest. A range of NetApp embedded data security technologies helps these organizations comply with regulatory requirements to protect stored patient data without impeding payor or ACO productivity.

- Implements full disk encryption at the hardware level
- Prevents unauthorized access to data

In addition, many payors are moving to virtualization and cloud services to efficiently integrate data operations with their ACO partners. With NetApp software, payors can share storage across partner and ACO data with maximum privacy and data security. In addition, NetApp with Cisco® and VMware® helps provide secure, end-to-end multi-tenancy across applications and data to further extend the benefits and business advantages of a shared IT infrastructure with virtualized computing.

4 Summary

With changing regulations, payors are positioned to play a significant role in the overhaul of the U.S. healthcare system and to help shift the industry to a more cost-effective business model. By leveraging a shared storage infrastructure, payor organizations will be able to aggregate digital healthcare data from clinical care to claims information to identify necessary treatments that result in effective patient outcomes. The ability to use technology in a smarter way is now a necessity. And with the correct tools, it is possible to automate processes that make it easy to manage, retain, and retrieve time-sensitive information.

Many U.S. health insurers have already experienced the many benefits from using NetApp storage solutions across numerous applications and workloads. The following table highlights key areas in which scale-out storage solutions are driving key operational and cost benefits.

<table>
<thead>
<tr>
<th>Business Function</th>
<th>NetApp Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attain cost reduction for claims processing</td>
<td>Leverage NetApp FAS systems to run tier 1 and 2 applications, including TriZetto Facets, SQL Server® databases, AMISYS Advance, and McKesson CERM to keep overhead costs at less than half the industry average.</td>
</tr>
<tr>
<td>Achieve IT cost and efficiency savings</td>
<td>Drive application efficiency on the back end with NetApp storage solutions (FlexClone technology, deduplication, SnapMirror technology, vFiler® units).</td>
</tr>
<tr>
<td>Accommodate data growth in multiology image archives</td>
<td>Easily adapt to exponential growth in data using NetApp E-Series storage solutions that scale in both capacity and bandwidth to meet demanding workloads.</td>
</tr>
<tr>
<td>Improve call center operations</td>
<td>The multiprotocol capabilities and secure multi-tenancy features of the FlexPod data center platform provide seamless integration with telecommunications companies supplying centralized information services.</td>
</tr>
<tr>
<td>Speed deployment and reduce risk for VDI</td>
<td>Leverage NetApp FAS systems running Citrix VDI and VMware ESX® hypervisor to expand and upgrade storage to optimize VDI usage.</td>
</tr>
<tr>
<td>Replace tape with disk for cost-effective backup</td>
<td>Take advantage of NetApp E-Series operational efficiencies and performance to significantly reduce cost and time for routine backups.</td>
</tr>
</tbody>
</table>

NetApp delivers superior storage solutions to help payors design an effective storage strategy to manage and maintain the growing volume of clinical and claims data generated across their growing partner and...
ACO networks. And through certification, testing, and a large partner ecosystem, we can help you build and deploy a storage infrastructure at any scale.

- On-demand scalability to accommodate growing multiology imaging, EHR, clinical, pharma, ICD coding, and laboratory data
- Nondisruptive operations and storage provisioning
- Preservation, retention, and utilization of existing legacy data
- Open, high-performance platform for big data analytics
- Secure multi-tenancy cloud for ACO partner data sharing

Now is the time to design and rearchitect IT storage infrastructures to meet the tight deadlines of these new mandates. Working with NetApp, organizations can implement successful storage strategies that address both short demands as well as a long-term roadmap that will continue to extend improvements across data collection, retention, analysis, and reporting as business needs change.

Refer to the Interoperability Matrix Tool (IMT) on the NetApp Support site to validate that the exact product and feature versions described in this document are supported for your specific environment. The NetApp IMT defines the product components and versions that can be used to construct configurations that are supported by NetApp. Specific results depend on each customer's installation in accordance with published specifications.

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