Business White Paper

Migrating Legacy Healthcare Data to the Cloud

Four key considerations for healthcare providers

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There's a Big Data dilemma in healthcare. Data generated by the U.S. healthcare system reached 150 exabytes in 2011, according to the Institute for Health Technology Transformation, and at its current rate of growth, data in U.S. healthcare will soon reach the zettabyte scale. Not long after, the Institute predicts it will reach the yottabyte level. To offer some perspective on the latter, the popular IT blog Gizmodo estimated that storing a yottabyte on terabyte-sized hard drives would require one million city block sized data-centers, big enough to consume the states of Delaware and Rhode Island combined.

Electronic health records (EHRs) are the primary culprit fueling the healthcare data explosion, and providers are sitting at ground-zero. For instance, IHTT surmises that Kaiser Permanente, the 9 million-member California-based health network, stores between 26.5 and 44 petabytes of potentially rich data from EHRs alone, including images and annotations.

Maintaining and securing those records – and putting them to good use – is proving a costly and complex challenge for healthcare providers of all sizes. In this paper, we'll address four key challenges faced by healthcare providers struggling with quickly-multiplying EHRs in legacy data environments, and we'll consider how the migration of legacy healthcare data to the cloud alleviates those problems.

Record Keeping Compliance

Federal and local mandates dictate that healthcare providers retain various healthcare records for a specific period of time, variable by type of record and type of patient. To maintain OCR (Office for Civil Rights) compliance, for instance, providers must retain juvenile patient records for seven years after the patient turns 21, and adult patient records must be retained for a minimum of seven years. These mandates result in the generation and maintenance of an incredible amount of information, which has traditionally been

stored inside healthcare providers' own data centers using legacy storage technologies like tape.

While healthcare's data dilemma was manufactured by mandate, the Meaningful Use incentive to move toward EHRs creates great potential for extracting actionable information from decades of stored data. Unfortunately, it's incredibly inefficient to extract that data from legacy storage infrastructures. To achieve the data access and transparency that Meaningful Use seeks to enable, providers must forego legacy means of data storage. Moving data to a modern platform like the cloud is also beneficial to the individual compliance-seeking provider, as well. In legacy environments, monitoring the expiration of patient records is a manually-intensive and error-prone task. In most cases, providers find themselves retaining records far longer than necessary, and often, indefinitely. In others, human error leads to the erroneous expiration of records that must remain in the provider's possession.

In the cloud, the metadata attached to an EHR solves the record retention dilemma. For example if a 12-year-old patient breaks his arm, the patient's radiology image is attached to his health record and stored for the requisite length of time. When the patient turns 28 (per the OCR mandate, the record must be retained for seven years past the juvenile patient's 21st birthday), the system automatically deletes the 16-year-old data.

The automation of records maintenance in a cloud-enabled EHR system is key to alleviation of the incredible buildup of legacy healthcare data. Next, we'll discuss how the cloud solves another massive burden created by the data explosion in healthcare – the cost of data infrastructure expansion and maintenance.

IT Infrastructure and Maintenance Expenses

As healthcare providers' data volumes swell, so does the cost of their data infrastructures. When all that data is stored in-house on local servers and backed up to legacy technologies like tape, those costs can quickly mount. Data centers require significant

physical space, servers are expensive, and analysts agree that the cost businesses incur to power and cool data centers often exceeds the cost of the hardware they house. Energy management and automation leader Schneider Electric recently reported that worldwide, data center power and cooling infrastructure wastes more than 60,000,000 megawatt-hours per year of electricity. Even in a well-designed data center, cooling accounts for approximately 37 percent of electricity usage.

Beyond the hard costs associated with maintenance of on-site data centers, access to patient records stored on a legacy technology platform adds incrementally to the cost of IT support. Historically and collectively, the U.S. healthcare industry hasn't displayed proficiency in its attempt to archive and store data on disk, a challenge that's exacerbated when EHRs are backed up to tape. Pulling patient data from tape backup is manually intensive and time-consuming, requiring a veritable IT services department to enable data access.

The cloud, on the other hand, supports a recent trend among leading healthcare providers to "get out of the IT services business." From an infrastructure perspective, the cloud's inherent elasticity enables providers to provision and pay for only the storage and computing power necessary, and to ramp that capacity up or scale it back on demand. There is no necessity to expand the physical infrastructure, including square footage, servers, and energy for power and cooling.

Perhaps even more compelling, it enables the retention and retrieval of EHR data without requiring manual and time-intensive involvement from the IT department. In the legacy model, records are typically backed up to tape and shipped to a secure storage facility. The likelihood of tape's failure aside, in the event those records are needed, their restoration could take anywhere from a few days to weeks and require a concerted effort by the IT department.

In the cloud, users can log in, conduct an index search, find the file, and pull it out of the archive as simply as they pull a family photo from Dropbox. Patient care records are accessible within the hour, as opposed to within weeks.

Because healthcare providers are often predisposed to maintaining active patient records on site, many take a hybrid approach the migration of legacy data to the cloud. Let's consider a common scenario. A patient's cancer diagnosis and subsequent treatment generates volumes of data attached to an EHR, which is continuously accessed and updated. When the patient goes into remission and treatment ends, that data occupies expensive disk space until or unless it's backed up manually or expired. Through integration with the cloud, the system can automatically recognize that the files aren't active and move them to make room for data that needs to be more accessible. The file is quicker to archive, effectively reducing the footprint of the provider's active system and freeing up bandwidth to allow apps to run faster. Likewise, it's much easier to extract and leverage the file from the archives in the unfortunate event the patient's disease returns.

The agility of data in the cloud has cost-cutting implications of their own, potentially enabling the repurposing of storage administration teams and freeing up IT expenditures previously dedicated to servicing tech infrastructure. As data storage and retrieval costs are reduced and access improved, healthcare organizations can focus less on IT and more on innovative care. Which leads us to another key consideration of the cloud in healthcare: application development.

Application Enablement

Healthcare CIOs are fast losing interest in maintaining archives and budgeting for data center power and cooling. Instead, they're focusing on application development that improves patient care through agile access and analysis of patient records. In fact, IDC Health Insights reports that 70 percent of healthcare organizations will invest in mobile applications, wearables, remote health monitoring, and virtual care by 2018. Much of that investment is dependent on unfettered access to large volumes of healthcare data, so we can anticipate that those investments will increase demand for data and analytics capability.

In the cloud, patient records are available and at the ready on demand, whenever they're needed. It's also incredibly easy to index

EHRs by any number of identifiers. That reality opens up a whole realm of application development possibilities, from provider-based, patient-facing records access to larger population health initiatives. EHRs in the cloud are a foundational building block to pulling yet-to-be-realized value from large volumes of data, and extending that value through application development.

Security

Finally, there's a huge data liability in patient records keeping. In many ways, Protected Health Information (PHI) is even more valuable than credit card data. In the event of a payment card data breach, consumers can get a new credit card. They can't get a new social security number in the event their identity is stolen. That puts severe pressure on cloud solutions providers to ensure the security of long-held EHRs. While there remains some degree of bias that the cloud is less secure than physical storage of PHI, history has shown that data security breaches in healthcare typically involve lost or stolen laptops and tablets, as opposed to attacks on the cloud.

Protecting PHI in the cloud is a simple matter of securing the network, setting internal parameters, and leveraging cloud providers that offer secure features. Some best practices for cloud security include:

- A VPN. With a dedicated connection, network access is restricted to the client and the cloud provider.
- Strong access controls. When healthcare data is stored in the cloud, that data should be available only to those granted access.
- Homomorphic encryption. This allows service-level data access and manipulation in applications without exposing the data, rendering it useless to indiscriminate endeavors.

Other industries, including retail and finance, have moved mission-critical data and applications to the cloud because of the security that's inherent in redundancy, virtualization, and the elimination of risk that comes with storing data on local, physical hardware.

Conclusion

IDC predicts that by 2020, 80 percent of healthcare data will pass through the cloud at some point in its lifetime as providers increasingly turn to the cloud for data collection, aggregation, analytics, and decision-making. Taking the first step is the biggest challenge. Providers with terabytes or petabytes of data face physical challenges moving that much information to the cloud, necessitating a strategic, staggered approach. Often, that strategy includes designating the cloud for the newest records to be archived in an effort to stem the flow of data to an unsustainable legacy platform, followed by the batch migration of larger sets of data. That strategy also typically involves leaving the oldest patient records – those set for expiration within a year or two – on the legacy platform that will eventually be radically downsized or altogether eliminated. A reputable cloud services provider will demonstrate its ability to help devise the strategy that makes sense for the individual healthcare organization.

Progressive healthcare providers recognize that the cloud is a strong contender for facilitation of their long-term data management and access goals. Those goals include compliance improvement, a reduction in IT infrastructure, more agile data access to feed application innovation, and increased security.

About Us

ClearDATA is the nation's fastest growing healthcare cloud computing company. More than 310,000 healthcare professionals rely on ClearDATA's HIPAA compliant cloud computing HealthDATA platform and infrastructure to store, manage, protect and share their patient data and critical applications.

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