Medical Imaging Transformation

This Excerpt was developed from the IDC White Paper, "Storage Infrastructure Better Enables Healthcare Providers to Get the Most Out of Digital Transformation", commissioned by Dell Technologies, October 2022 See the Full Paper here.

Driven by several recent dynamics, including an aging population with increased chronic conditions, cost pressures, the rise of consumerism, rampant cyber threats, and more widely distributed patient populations, healthcare providers are adopting digital technologies to improve their ability to provide patient care. Referred to as DX, this increasing use of data to drive better patient outcomes is already widespread, and the pandemic only accelerated this evolution. Digitization has resulted in an explosion of patient data, the use of AI/ML technologies to assist in diagnosis and therapeutics, and the increasing use of telemedicine for care delivery; all these initiatives depend heavily on a storage infrastructure that transcends the capabilities of legacy systems. IT services are driving better, faster, more accurate patient care and are now a critical component of care delivery. As a result, they must be highly available, and the data they collect must be secure and protected from disasters, malware and ransomware.

Use Case Overview

Medical imaging transformation relies heavily on scalable storage and data protection to improve operational and diagnostic imaging workflow performance. Imaging workflows can be complicated due to the need to quickly retrieve and reliably search vast amounts of stored and archived images with metadata across EHRs, picture archiving and communications systems (PACSs), and vendor-neutral archives (VNAs) in standardized formats. Furthermore, medical images can also quickly inundate IT infrastructure due to large file sizes: radiography (10MB per image), computed tomography (250MB–1GB per exam), magnetic resonance imaging (10–300MB per exam), ultrasound (30–50MB per exam), and digital pathology (2–3GB per slide). In addition, the following new imaging techniques and longer-term studies are creating richer, more detailed, and voluminous scans as well as longitudinal image libraries that add even more data:

• Enterprise imaging (EI) refers to enterprise-wide platforms that strategically centralize, manage, and govern Digital Imaging and Communications in Medicine (DICOM) and non-DICOM imaging data from multiple sources across different settings. EI transforms medical imaging through strategies and technologies that can unify the data silos that often result from imaging devices and solutions commissioned

at various units, departments, and facilities over time. EI delivers more unified and efficient medical imaging environments, workflows, and life cycles, resulting in a higher likelihood for providers to extract value from data, especially when combined with imaging analytics and artificial intelligence (AI). In the United States, 30.9% of healthcare providers increased spending on medical imaging and archiving, with 60.4% dedicated to EI. A common EI challenge for IT is to provide sufficient cost-effective capacity to enable the consolidation of both DICOM and non-DICOM data on a single storage platform since the objective of EI is to house the data from all the various "-ologies" (i.e., radiology, cardiology, oncology, nephrology, gastroenterology, neurology, dermatology, ophthalmology, and pathology) together.

• Encounter-based imaging (EBI) occurs when image acquisition was not the intended purpose of a clinical encounter, or there was no prior order for a medical image to be taken. EBI has seen increased utilization in dermatology, wound care, infectious disease management, and emergency department triage adding to imaging data growth. EBI enables more holistic approaches since there is no delineation between the encounter and imaging procedure, yet it also requires robust integration, data management, and workflow

optimization. Images need to get attached to the patient record so that the encounter is linked for future reference. Therefore, acquired images must be seamlessly integrated with associated metadata about the patient, encounter, and imaging procedure, which many departments cannot do because they still rely on "order-based imaging" and legacy functionality for image reports.

• Digital imaging in pathology has also witnessed an uptick in utilization lately, leading to additional imaging data growth. Whole slide imaging sparked a shift in pathology as a first step to unlocking the potential

to integrate image features into high-dimensional analysis for personalized and precision medicine. This development leads to new opportunities, including digital collaboration, integration with EHRs, and AI-based diagnostic support solutions. Digital pathology will require extensive storage and information life-cycle management systems. Organizations will further seek options that guarantee fast access to high-quality digital imaging data to support pathologists when reviewing cases through essential functions from analysis to consultations for pathology image management.

How Dell can help

As the healthcare market evolves, performance, data protection, security, agility, efficiency and hybrid multicloud support are key requirements as healthcare providers move towards more digitized operations.

As a leading provider of enterprise IT infrastructure solutions, Dell Technologies' portfolio spans servers, storage, networking, storage infrastructure software, security, and cloud-based solutions (both public and private). Dell's unified management capabilities extend beyond just their own offerings to include on-premises IT infrastructure from other vendors as well as infrastructure that may reside in various hyperscalers like Amazon Web Services, Microsoft Azure, Google Cloud and others.

Healthcare providers modernizing their storage infrastructure with solutions purchased from Dell Technologies are in good company, since the vendor holds the #1 market share by revenue in enterprise storage overall (source: IDC Enterprise Storage Tracker, 2016-2022). Dell Technologies is also a major provider of storage infrastructure for healthcare environments. The vendor has established relationships with key application providers in healthcare offering integrated solutions in the EHR, medical imaging, edge, and cybersecurity arenas for healthcare providers.

Dell Technologies' enterprise storage offerings include:

• Multicloud and as-a-Service solutions: Dell Technologies APEX

• Entry-level block storage: PowerVault

• Midrange unified storage: PowerStore and Unity XT

• High-end block storage: PowerMax and PowerFlex

• Scale-out file storage: PowerScale

• Scale-out object storage: ObjectScale and ECS

• Data protection: PowerProtect

Conclusion

Healthcare storage platforms must deliver performance at scale, high availability, multi-petabyte scalability, proven security and flexibility. They must support cloud integration as healthcare providers look to the cloud for new services, lower-cost DR and business continuity solutions, and access to cost-effective capacity for long-term retention. The way that healthcare IT infrastructure is being built today uses a hybrid multicloud model, and legacy storage generally does not support the agility needed in that environment very well.

Dell Technologies is a leading IT infrastructure provider with a rich storage portfolio of healthcare solutions. Healthcare IT organizations will find the technologies they are looking for as part of DX, regardless of whether their data is structured (block) or unstructured (file/object), in the storage solutions offerings from Dell Technologies. Those solutions are available in a variety of different deployment and consumption models that give healthcare providers the choice to craft the storage infrastructure that best fits their individual needs.

Learn more about Dell APEX for Healthcare

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