



A N A L Y S T C O N N E C T I O N



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Hybrid IT: Realizing the Benefits of Both Worlds for Healthcare

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Healthcare organizations are embracing hybrid IT (sometimes referred to as hybrid infrastructure) as an approach to enterprise computing where some workloads are migrated to the cloud and other workloads or IT resources remain on-premise. Healthcare organizations can elect to keep mission-critical applications that manage highly sensitive information, such as personally identifiable patient health information (PHI), on-premise or in private clouds, while undifferentiated applications such as email or DevOps are moved to public clouds. Blended computing models enable healthcare organizations to take advantage of the best of both worlds: the agility and cost-effectiveness of cloud services for some workloads and the predictable governance control of an on-premise datacenter for other workloads.

The following questions were posed by Hewlett Packard Enterprise to Lynne A. Dunbrack, research vice president of IDC Health Insights, on behalf of Hewlett Packard Enterprise customers.

- Q. Hybrid IT is a trend that is here to stay. What benefits does IDC see for healthcare providers adapting a hybrid IT strategy, and how will it support improved patient safety and outcomes while increasing clinical efficiencies?**
- A. Hybrid IT solutions span traditional infrastructure and private, public and managed cloud services, thus combining the best of both worlds: predictable traditional IT and agile cloud computing. Hybrid IT provides healthcare CIOs the flexibility to determine which parts of the IT infrastructure or workloads should be managed in-house and which parts can be managed by external service providers to take advantage of new technology. Hybrid IT also enables CIOs to decide which IT functions to expense and which IT functions to capitalize, thus taking advantage of cloud economics and the ability to "pay as you grow."

The hybrid approach to enterprise computing can accelerate speed to value. Certain IT resources can be moved away from the traditional siloed IT infrastructure to a more agile cloud computing environment that can keep pace with the dynamic technical and business requirements of the organization and leverage rapidly evolving technology advancements that ensure availability and performance. System downtime brought about by long backups and maintenance of aging IT infrastructure can be problematic for healthcare organizations that require around-the-clock access to mission-critical applications.

Thus, uptime, computing performance, access to vital clinical and operational data, and reliability are key benefits of hybrid IT. By streamlining infrastructure, healthcare CIOs can shift their focus on the tactical delivery of IT functions in-house to play a more strategic role

and become more aligned with the business. Hybrid IT provides an important bridge between "keeping the lights on" in the existing world of traditional IT infrastructure and the new world of digital transformation that will require cloud-based solutions to empower patients, enhance clinical care collaboration, and accelerate the use of genomics to find cures.

Q. What advice does IDC give to healthcare organizations considering the move to a hybrid IT delivery model?

- A. First, healthcare organizations should determine what types of IT models — traditional, converged, hyperconverged, and composable — will best serve their various needs. Composable infrastructure — a framework whereby physical compute, storage, and network fabric resources are treated as services — makes it easier to assemble components into preferred configurations or resource pools. Using composable infrastructure, IT can create the infrastructure it needs on demand.

The next step is to identify and prioritize which workloads should remain on-premise and which workloads would benefit from being moved to either a private cloud environment or a public cloud environment. Once a decision is made to have certain IT functions managed by a cloud service provider, healthcare organizations need to decide between private, public, or hybrid cloud options. Healthcare organizations are becoming increasingly more comfortable with cloud technology. In fact, per an IDC Health Insights survey, 87.5% of provider respondents reported that they were more comfortable planning and operating cloud computing environments. However, healthcare organizations tend to favor private clouds over public clouds, especially for applications that involve patient health information.

Healthcare IT organizations must be aligned with their line-of-business (LOB) colleagues. The buying center for technology has shifted from IT to LOB with more applications and solutions available on a software-as-a-service (SaaS) basis. IDC research reveals that approximately 60% of IT initiatives are funded by LOB rather than IT. Shadow IT is increasingly becoming a problem for IT. Often the only way IT staff become aware of a new application is when users ask for integration with other applications or security scans are conducted and new applications are detected.

Once a decision has been made to move IT functions or workloads to a cloud computing environment, healthcare organizations should set controls by clearly defining service-level agreements (SLAs) with their cloud service providers. IT staff should also have the necessary skills to manage service providers and hold them accountable to meeting agreed-upon SLAs. This may be a new skill set for IT staff who are more used to procuring technology to be used on-premise and managing it themselves than managing outside service providers.

Careful consideration should be given to local regulations concerning data privacy and security to ensure data protection compliance. Healthcare organizations need to fully understand the security measures followed by their cloud service providers. Do they have the appropriate level of security — policies, procedures, and technical security solutions — to provide the necessary data protection? This is particularly important if the cloud service provider is storing or processing patient data in third-party countries.

Data protection regulations are becoming stricter and cloud service providers must meet the same standards of data protection as on-premise solutions managed by the healthcare organization. For example, the HIPAA Omnibus Rule implements stricter privacy and security provisions, which are also extended to apply to business associates including cloud service providers. As technology suppliers assume more responsibility and liability for safeguarding PHI, they will need to sign business associate agreements, a requirement of HIPAA, with healthcare organizations.

Q. The intelligent edge will unleash a medical Internet of Things (IoT) revolution. How does IDC define the medical IoT, and how is it relevant to healthcare organizations?

A. Increasingly, computing power is being moved to the connectivity source, thus creating an intelligent edge. The ability to process clinical data at the point of acquisition or care on this intelligent edge will further enhance the use of IoT devices in healthcare. Medical IoT involves connecting a wide variety of medical devices and sensors that collect information about patients to monitor their health as well as machines and equipment to monitor their performance and location. Healthcare organizations are embracing IoT.

In a recent IDC Health Insights survey, 74% of providers and 84% of payers reported that they are prepared for IoT. The top use cases include telemedicine, medical imaging solutions, and remote patient monitoring. Other use cases involve real-time location services to help clinicians locate equipment such as infusion pumps, gurneys, and wheelchairs as well as other equipment that often "goes missing." Applying analytics to sensor data enables healthcare organizations to optimize where equipment is located across the facility so that it is readily available when needed and valuable time is not wasted looking for equipment that is not where it belongs. Sensors inside medical imaging machines can alert the manufacturer and biomedical engineering staff that it is time for preventive maintenance or that a piece of the machine is about to break.

Unplanned downtime of imaging machines is costly, not only in terms of the financial loss to the healthcare organization but also in terms of patient safety being compromised when care is delayed. Another patient safety use case for medical IoT is to place sensors by sinks and in clinicians' employee badges to measure hand hygiene compliance and identify clinicians who need to be reminded to wash their hands before examining patients. Proper handwashing plays an important role in reducing the risk of hospital acquired infections, which result in the deaths of approximately 100,000 patients annually per the Centers for Disease Control and Prevention. There are numerous opportunities to use medical IoT in healthcare and home settings to monitor the health of patients, enhance patient safety, and improve operational efficiencies to reduce the cost of healthcare.

Q. What role does IoT play in the future of healthcare organizations?

A. IoT will drive digital transformation across the healthcare enterprise. According to an IDC Health Insights survey, 28% of payers and 36% of providers reported that IoT was part of their digital transformation strategy. The digital hospital of the future will rely heavily on medical IoT to glean all manner of insights about patients, medical equipment and supplies, and staff to improve decision making and transform how care is delivered. Sensors will continue to decrease in size, passively and unobtrusively collecting and transmitting data to be aggregated and analyzed. For example, sensors may be embedded in patients' clothing to collect vital signs. Similarly, medical tattoos affixed to patients' skin could provide the same function. Miniature sensors — as small as a grain of sand — could be embedded in pills to monitor patients' medication compliance.

Medical IoT will extend to patients' homes, sending vital information to clinicians about how their patients are recovering at home or simply managing their health. Combining medical IoT with video-based telehealth services will enable patients to receive care in the comfort of their own homes, or wherever they may be, without having to travel great distances for in-person care. This combined approach will create operational efficiencies for healthcare organizations while saving patients time and money (e.g., travel expenses, parking, lost wages, and child care). As the industry makes the shift from *sick* care to *health* care under value-based health initiatives, healthcare organizations will leverage technology, like medical IoT and virtual care, to create new care delivery models that are most efficient and cost effective and provide more convenient access to care, thus improving the patient experience.

Q. How will the move to digital pathology improve patient care and increase access to diagnostic decision support?

A. Pathologists play an important role in diagnosing cancer and other illnesses and monitoring disease progression. While pathologists today may still use a microscope and stained slides to view tissue specimens, increasingly they are turning to digital pathology to transform their practice. The Digital Pathology Association defines digital pathology as "a dynamic, image-based environment that enables the acquisition, management, and interpretation of pathology information generated from a digitized glass slide."

Digital pathology is useful for primary diagnosis, diagnostic consultation, medical education, clinical research, diagnostic decision support, peer review, and tumor boards. Digital slides are created by scanning glass slides. They can then be viewed and managed using a digital pathology system that complements the workflow of pathologists. SaaS-based digital pathology platforms enable telepathology providing worldwide access to pathologists for primary histopathology diagnoses, second opinion diagnoses, and subspecialty pathology expert diagnoses. This increased access to diagnostic talent improves patient care.

Another benefit of digital pathology that is emerging is the application of deep learning to aid image analysis. It is not uncommon for there to be significant variability in diagnoses made by different pathologists for the same patient, which can result in misdiagnosis and delay appropriate treatment. The volume of data per patient to review is also increasing, adding to the time constraints faced by already overburdened pathologists. Deep learning applied to digital pathology could address both issues by enabling pathologists to review greater volumes of data more efficiently. While the use of deep learning as an approved diagnostic tool is still in the very early stages, early experiments applying deep learning to digital pathology have been promising.

Q. What recommendations do you have for healthcare organizations continuing down this path of digitalization, now including pathology and moving toward a complete enterprise diagnostic imaging management strategy?

A. Diagnostic imaging management across the enterprise is essential as more diagnostic modalities involve the capture and storage of high-definition images and video than ever before. Value-based care and precision medicine underscore the importance of managing patient data, including images, in a patient-centric manner and maintaining a 360-degree data set capturing all the patient's interactions with the health system. Healthcare organizations are adopting enterprise image management as a strategy to make images widely available to clinicians regardless of their location (e.g., department, site, or region).

Solid IT planning is required when deploying an enterprise image management solution. Careful consideration must be given to network bandwidth and where images will be stored to ensure medical-speed performance and high availability of all images. Access to other patient information such as lab results, demographics, and clinical notes that will aid clinical decision making requires integration with other healthcare IT systems. Central to enterprise image management is intelligent workflow to balance clinicians' workloads and increase the productivity of clinicians.

Healthcare organizations will want to leverage cloud services to scale up storage and improve access to images across a geographically distributed enterprise. Consider choosing offerings that are provided as SaaS or repositories hosted in the cloud to gain the advantages of the cloud. Cloud-based options will enable flexibility and agility as well as access to services from suppliers and can support collaboration with other departments and partner healthcare organizations on the platform. Healthcare organizations should ensure that selected cloud service providers understand the constraints associated with handling HIPAA-protected data and the unique demands of healthcare regulatory compliance.

Because stakes are so high, many healthcare organizations seek out strategic partners to help them on their journey toward digital transformation. Healthcare organizations should look for partners that can combine solid next-generation technology solutions with strong advisory services. Governance and change management services are important considerations given the number of new IT and business processes that digital transformation will bring about and that will need to be managed by IT and the line of business. Healthcare organizations that manage change well will thrive in the new digital healthcare economy.

ABOUT THIS ANALYST

Lynne Dunbrack is a nationally recognized thought leader in the application of information technology to the business problems of the health industry. Her understanding of the needs of the health industry is grounded in experience over the past 25-plus years working as a consultant and in the field. She also served as the Director of HIPAA Compliance at NaviMedix Inc. (now NaviNet). As research vice president for IDC Health Insights, Ms. Dunbrack provides research-based advisory and consulting services that will enable health payer and provider executives to maximize the business value of their technology investments and minimize technology risk through accurate planning.

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