White Paper

The Positive Impact of SD-WAN on Healthcare

Leverage Technology to Enhance Patient Experience

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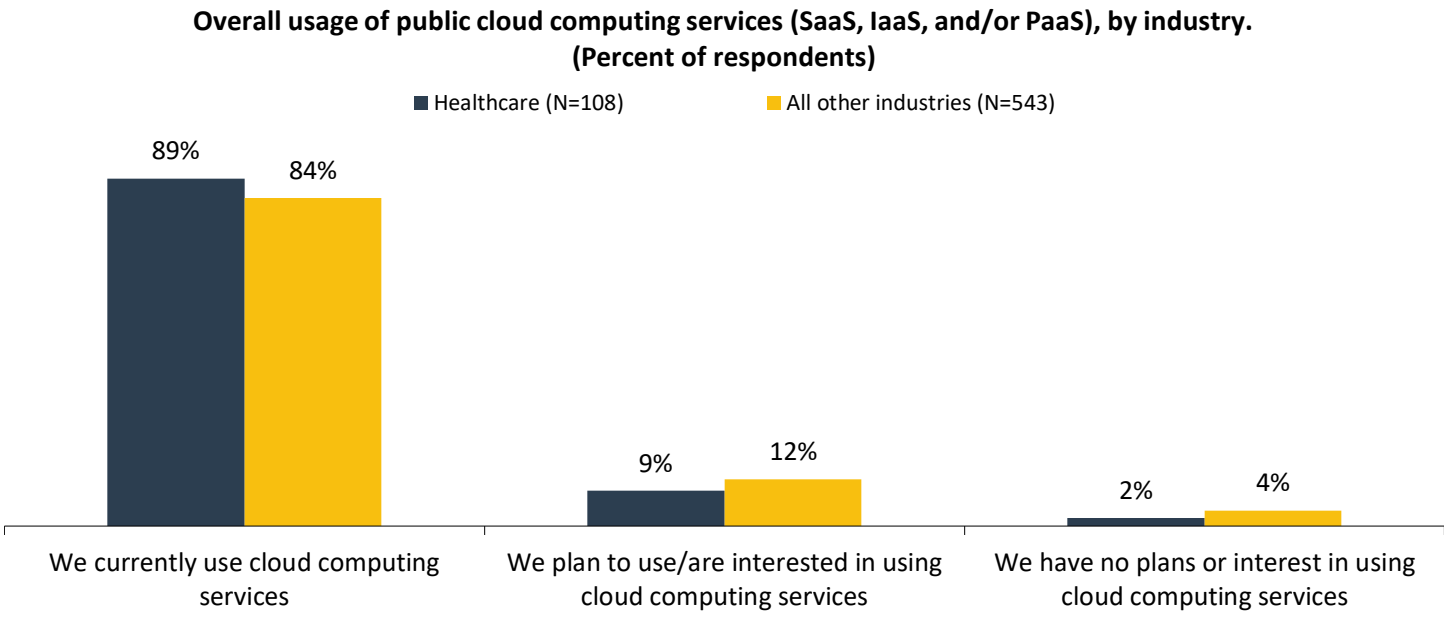
A Rapidly Evolving Market

The healthcare industry is evolving at a rapid pace from both technology and business perspectives. New technologies are dramatically improving healthcare, from diagnostic imaging and scanning tools to the digitization of medical records. From the business side, the industry continues to consolidate, with metropolitan or regional medical providers absorbing local clinics and rural practices, and large retailers acquiring pharmacies, minute clinics, and urgent care facilities. As a result, many healthcare companies are now competing with retailers for business.

This competition may be good for the customers (i.e., the patients) who are demanding higher levels of care and a better overall experience. This could mean better access to new diagnostic tests, test results, and specialists who may be located far from the patient's location. Healthcare providers need to work toward providing the same care and experience to customers in their main facilities as they do in distributed clinics, urgent care centers, and rural offices.

To meet these evolving requirements, many healthcare companies are embarking on digital transformation initiatives to deliver the appropriate workflows, policies, processes, and IT environments to provide a better experience to their customers. Electronic medical records, access to cloud-based applications, and connected IoT devices are all enabling healthcare professionals to provide higher levels of services. ESG research indicates that 7% of healthcare organizations report having a mature digital transformation initiative while 66% report they are either beginning or in process.[1] It also reveals that 89% of healthcare organizations currently use some form of public cloud service, whether SaaS, IaaS, or PaaS (see Figure 1). It is really important to understand that IT transformation can determine the degree of success of the digital transformation program. The underlying IT environment is a key enabler, especially when connecting to cloud applications, centralizing medical records, transmitting diagnostic imaging, etc. ESG research shows that the most important considerations for healthcare when justifying IT investments are improved customer satisfaction (35%), improved security (31%), and increased employee productivity (31%).

Figure 1. Public Cloud Usage Trends, Healthcare Organizations versus All Other Industries



Source: Enterprise Strategy Group

[1] Source: ESG Master Survey Results, *2018 IT Spending Intentions Survey*, December 2017. All ESG research references and charts in this white paper have been taken from this set of master survey results.

Healthcare organizations recognize that patients' experience is important and are looking for IT solutions to help improve that experience while ensuring security and mitigating risk. These organizations face a number of challenges as they transform into highly flexible and agile organizations.

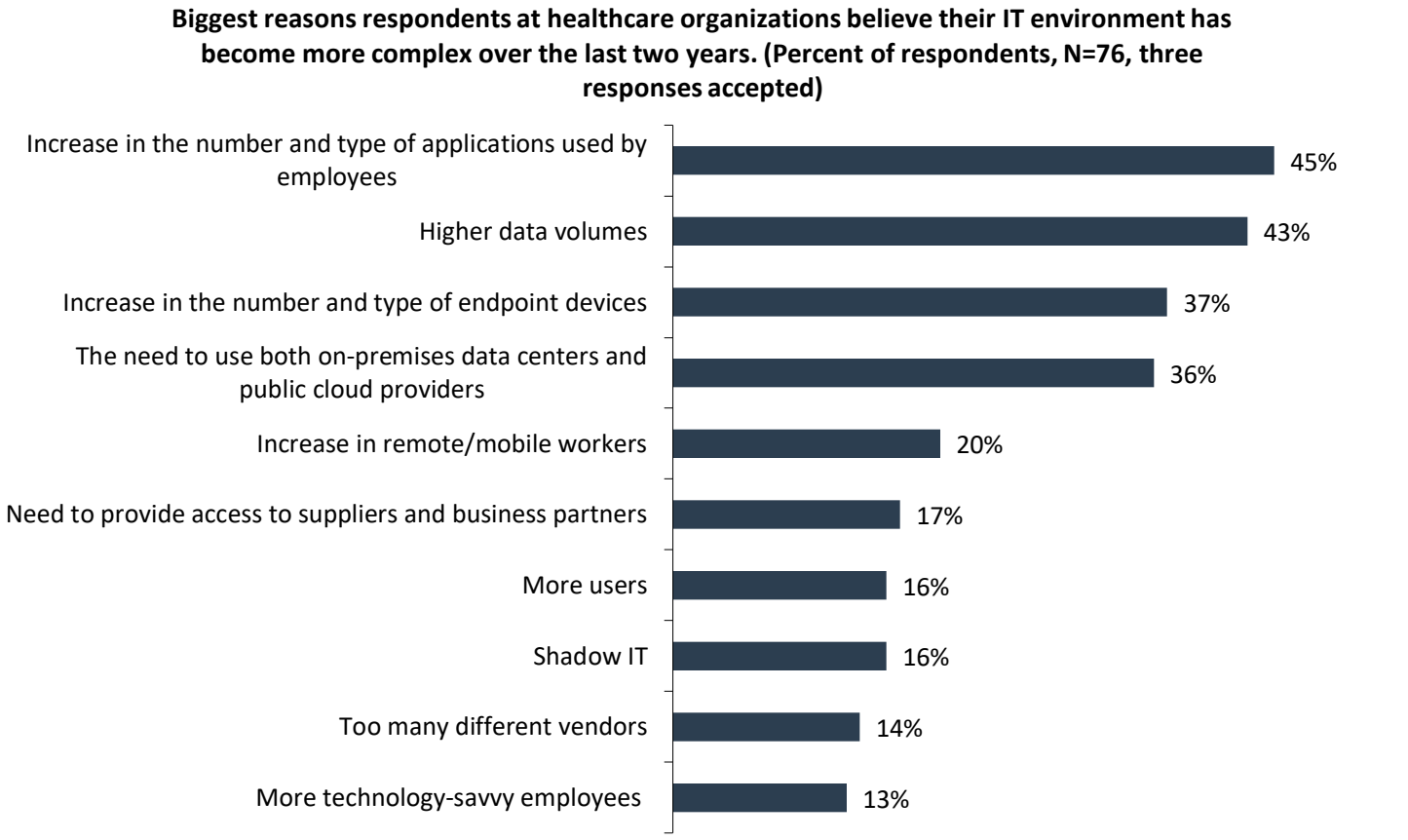
The majority of these challenges involve the network, connecting healthcare organizations' main data centers to distributed urgent care centers, clinics, rural offices, and even cloud applications. The problem is that many organizations still rely on outdated, legacy, service provider-fixed network connectivity and it is holding those organizations back from delivering an optimized experience.

Challenges Adapting to New Environments

Healthcare organizations undergoing digital transformations, acquiring new facilities, and supporting rural locations will face challenges including:

- Increasing IT environment complexity – ESG research shows that 71% of survey respondents from the healthcare industry believe that their IT environment is either more complex or significantly more complex than two years ago. Why is that? According to Figure 2, these organizations are seeing an increase in the number and types of applications that need to be supported (45%), higher data volumes (43%), an increase in the number and types of endpoint devices (37%), and the need to use both on-premises data centers and public cloud providers (36%). Clearly, digitization and digital transformation are driving more applications, which are available on more connected devices servicing both medical (imaging, pumps, monitors, etc.) and productivity (iPads, tablets, etc.) use cases.

Figure 2. Factors Driving Increased IT Complexity among Healthcare Organizations



Source: Enterprise Strategy Group

- Increasing numbers of connected medical devices – This was mentioned as a contributor to complexity but deserves its own breakdown: ESG research shows that 20% of healthcare organizations have an IoT initiative underway, and another 51% plan to deploy within 12-24 months. This is important not only because it creates more complexity for the IT staff, but also because it creates a greater risk. The more connected devices, the greater the attack surface. Organizations need to ensure these devices remain segmented or isolated from applications that contain sensitive or private information and are patched to avoid vulnerability. It could also mean that large imaging files or lots of small bits of information need to be transferred over the wide area network to centralized repositories in data center or cloud environments.

- Geographically dispersed locations – Hospitals in large metropolitan areas are typically connected to one another with plenty of bandwidth and availability; however, these healthcare systems now need to connect these metro rings to regional clinics, urgent care centers, and rural doctors' offices. Plus, all these remote locations may need to be connected to cloud applications and services as well as one another. Depending on the location, it may be difficult and prohibitively expensive to achieve adequate connectivity and resiliency in remote locations. This is problematic because organizations want to deliver the same level of application performance and experience regardless of the location.

- Critical security considerations given the variety of traffic over the WAN – A lot of traffic traverses the WAN in a distributed healthcare organization. IT needs to be able to separate traffic generated from all the different devices, EMR, back office or productivity apps, and guest Internet. To mitigate the risk, IT needs to be able to differentiate between medical images or a telemedicine session and someone trying to stream an entertaining video on the guest network.

  In addition, healthcare systems often need to communicate with one another or host visiting doctors, and remote locations need to collect and process copays and insurance deductibles, typically in the form of a credit card payment. Organizations need to ensure each new center or office conforms to a standard set of policies and technology, all traffic is segmented and secure, and there is proper alignment with existing firewalls, which could mean rolling trucks and people to every remote site to validate the proper configuration.

- Compliance with regulations – The healthcare industry must adhere to strict regulations set forth in HIPAA, the HITECH act that has increased penalties for data breaches, and even PCI compliance, which has requirements for organizations to maintain a secure network for credit card transactions. With medical records and diagnostic imaging being digitized, organizations need to ensure this digital data remains safe.

  Just as important as being protected, the data needs to be available: In order to meet with a patient, doctors and other caregivers must access the patient's medical record, but if the files are centralized, organizations are dependent on the WAN. In remote locations where there may only be a single network link, that means significant risk.

- Legacy network infrastructure – One of the biggest challenges these organizations face is a legacy network environment comprised of fixed links (MPLS) that are costly and rigid and have limited scalability. For organizations with distributed clinics, urgent care centers, and offices, IT teams will struggle to maintain a mix of dedicated and independently managed links. As each new location is added, organizations will struggle to spin up connections to the requisite data centers or clouds in a timely fashion. And with increased competitive pressure, organizations need to make sure networking costs are not prohibitive.

How SD-WAN Can Enable Healthcare Organizations

SD-WAN solutions can help transform a hodge-podge collection of inflexible legacy WAN links into a dynamic enabler for healthcare organizations by delivering:

- Secure connectivity between remote offices, satellite offices, hospital data centers, hosted applications, and cloud applications – Given the need to be in compliance with HIPAA, HITECH, and PCI regulations for the healthcare industry, it should not come as a surprise that ESG research shows that security improvements are the top reason for healthcare organizations to deploy SD-WAN solutions. SD-WAN solutions provide encrypted traffic across broadband and MPLS connections. For many rural locations, the only connectivity available may be broadband, and SD-WAN enables secure connectivity. This is also an important factor for organizations acquiring new locations as broadband connections can usually be turned up much faster than MPLS links. One of the keys to offering enhanced security is that many SD-WAN vendors have service integration with next-generation firewalls (NGFW) to eliminate any gaps in protection. When evaluating solutions, organizations should evaluate security ecosystems that SD-WAN vendors have built with NGFW vendors.

- The ability to leverage virtualization to segment all traffic traversing the network – Given the need to mitigate risk and reduce the attack surface, segmentation can ensure medical records are separated from PCI traffic or IoT/OT and guest Internet. Although segmentation seems like an obvious step, a number of public data breaches have been the result of hacks on connected thermostats or HVAC devices that were not properly segmented. In those scenarios, hackers gained access to sensitive files. The ability to segment traffic by type and even link variety (broadband or MPLS if both are available) is important to enhancing the security posture and mitigating risk.

- Effective failover protection – SD-WAN technologies enable healthcare organizations to leverage a combination of fixed and broadband connections that can be used to ensure availability in the event of an outage. For example, a typical SD-WAN connection may have a fixed MPLS connection and two broadband connections. Traffic flow will be segmented and based on priority going over one of those links. If a site lost its MPLS link, SD-WAN would automatically divert that traffic to run on the best performing broadband link. The most important applications would be given priority for the remaining bandwidth. This is critical because it means that even if performance was slightly degraded, organizations could continue to provide uninterrupted patient care and credit card processing. This enables organizations in ensuring their critical application and patient services SLA's are not impacted. When the down link is restored, the SD-WAN rebalances the applications across the available links.

- Centralized and simplified control of policies and management – This is a key point for IT teams responsible for managing these distributed environments. In fact, it was the third most compelling reason to deploy SD-WAN. This is because SD-WAN vendors offer zero-touch deployments and the ability to centrally manage policy and configuration. This allows organizations to dramatically reduce the time to provision a new site. Simply connect the SD-WAN solution to the Internet at the remote site, and the rest can be done remotely. In some cases, this is done automatically.

  Just as important as getting new sites up and running is the ability to enforce global policy changes quickly and easily. With a legacy routing environment, a highly skilled network engineer may have to connect to each device at every location to issue a series of commands via CLI to implement a change. This method could take days or weeks to implement across a large environment. With SD-WAN solutions, it may only require a few mouse clicks. Most importantly, these changes are all done with an easy to understand user interface that doesn't require an advanced degree to use. Thus, freeing up IT staff to be more productive and work on strategic projects.

- Appropriate levels of performance to ensure highest level of customer experience – Because SD-WAN technology enables organizations to leverage broadband as well as MPLS connections, each remote site will typically have access

to more bandwidth. According to ESG research, this was the second most compelling reason for deploying SD-WAN solutions. Having additional bandwidth provides healthcare organizations with the ability to not only segment traffic but also prioritize it to ensure performance. This means that telemedicine applications with latency-sensitive voice and video are assured priority, even in the event of an outage. It may also mean that traffic is shifted to an alternate route if the current one can't support the defined performance requirements. Advanced SD-WAN providers leverage self-aware systems with artificial intelligence or machine learning to continuously monitor performance and automatically rebalance traffic based on the assigned policy or performance requirement. This is a tremendous time saver and ensures the best possible experience for end-users. In contrast, if a link was degraded, end-users would complain to IT, who then would open a ticket with the service provider, who would then do some investigation to potentially fix the problem. This process might take hours at best, and days or weeks at worst.

The Bigger Truth

Healthcare is advancing at a rapid pace, diagnostic techniques are improving, innovative connected medical devices are making their way into the lives of patients and professionals, and organizations are embracing digital transformation and cloud-based applications. In addition, healthcare organizations are expanding by acquiring clinics, urgent care centers, and offices in rural locations. The goal is to ensure they can provide higher levels of care and a better experience to all these remote locations.

As these healthcare organizations have become more geographically dispersed, the role of the network and more specifically, the wide area network has become more important. Unfortunately, legacy WAN solutions are costly and inflexible, hindering progress in many cases. This is especially true for organizations that need to connect remote clinics, urgent care centers, and offices directly to cloud apps. It is time for these organizations to see how SD-WAN solutions can provide higher levels of service and customer satisfaction across the entire organization, from the largest hospital to the smallest satellite office.

SD-WAN solutions will enable healthcare organizations to have a flexible, cost-effective, and secure WAN that will enhance customer experience and improve IT productivity. The technology is already proven in the field and delivering value to organizations. It is only a matter of time before it becomes ubiquitous in healthcare. With all the consolidation that is linking remote locations to large healthcare organizations, now is the time to see how SD-WAN could have a positive impact on your healthcare organization.

Enterprise Strategy Group is an IT analyst, research, validation, and strategy firm that provides actionable insight and intelligence to the global IT community.

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