WHITE PAPER

SD-WAN for Healthcare

velocloud™ by Broadcom

A deep dive into the drivers and solution

TABLE OF CONTENTS

Introduction

The ability to provide excellent care to patients, enable access to all medical records regardless of location, and process transactions among customers, care facilities, insurance agencies and more, are all triggers for today's increasing technology change in the healthcare industry. With mergers and acquisitions on the increase, payments taking place online, and greater and greater amounts of data analytics needed, healthcare organizations require robust, scalable, secure, and easy to manage networking infrastructure that allows them to keep up with changing technology trends.

Security Service Edge (SSE), software-defined wide area networking (SD-WAN), and software-defined access (SD-Access) have emerged as game changers for healthcare. Their easy-to-deploy architecture allows organizations to implement it alongside or over the top of any existing networking infrastructure, with any transport option available, and to any site regardless of location. With the shift to cloud applications, SD-WAN allows any clinic, remote site, pharmacy, or hospital to quickly and seamlessly gain access to those applications.

In this paper, we'll investigate healthcare's unique use cases, user pain points, and the unique functionality of SASE—in particular VeloCloud™ SD-WAN, VeloCloud SD-Access, and VeloCloud SASE, secured by Symantec—highlighting how they enable healthcare organizations to accelerate digital transformation journey and provide superior patient care. We'll start by examining current trends and use cases that VeloCloud SASE is seeing in the industry.

Primary Pain Points for Healthcare

Healthcare, like other industries, relies heavily on its network to conduct business and serve clients. However, the traditional wide area network (WAN) that healthcare depends on is often complex, static, and slow to adapt to the rapidly changing demands of the industry.

Digital transformation and expansion into the cloud are causing significant disruption in healthcare. To fully embrace this transformation and capitalize on its benefits, healthcare organizations must scrutinize the WAN and eliminate its obstacles by adopting new technologies and platforms.

WITH THE SHIFT TO CLOUD APPLICATIONS, SD-WAN ALLOWS ANY CLINIC, REMOTE SITE, PHARMACY, OR HOSPITAL TO QUICKLY AND SEAMLESSLY GAIN ACCESS TO THOSE APPLICATIONS

Under-Performant and Expensive MPLS Network

A significant pain point in the healthcare industry is the ongoing challenge of providing reliable and secure access to critical information, such as patient medical records and medical imaging, to geographically diverse branch sites while maintaining compliance with industry regulations. Healthcare providers are often tied to legacy MPLS contracts that are expensive, inflexible, and underperforming. Additionally, setting up new sites is slow. Provisioning MPLS circuits can take days or even months.

Distributed Security

Protected health information (PHI) is highly sensitive, making it a prime target for hackers who go to great lengths to obtain it. Constant threats necessitate increasingly sophisticated levels of security. This complexity is heightened by the varying WAN architectures across different access groups and branch sites within an organization. Managing this variability presents significant security and operational challenges.

Distributed Network Visibility

Most networks lack a comprehensive and centralized management and monitoring portal, hindering complete visibility of the WAN. To truly understand and optimize the WAN, IT managers need the ability to measure and assess application traffic, prioritize individual applications, and report on their performance. However, this capability is often absent in traditional networks, making it difficult to identify issues, determine solutions, and plan for future needs based on the current situation.

Access to Care in Remote Locations

Access to healthcare in remote locations where broadband or private circuits are unavailable poses significant challenges, requiring reliance on satellite or 4G/5G networks. Satellite and 4G/5G networks often have lower bandwidth compared to traditional broadband, leading to slower data transfer rates. This can hinder the timely access and transmission of large medical files such as imaging studies or electronic health records (EHRs). Satellite connections in particular suffer from high latency due to the long distances that signals must travel. This can affect real-time communications and remote consultations, making video conferencing and telemedicine less effective. Both satellite and 4G/5G connections can be less stable than wired connections. Weather conditions can disrupt satellite signals, while 4G/5G coverage may be inconsistent, leading to dropped connections and unreliable service. These less reliable networks also pose compliance and data security risks.

The Healthcare Profile

Now that we understand the pain points faced in healthcare, let's take a deeper look into the technology needs of emerging customer profiles.

While every potential healthcare customer varies slightly in the pain points they want solve with SD-WAN, the network architecture across these customers are not significantly different from each other.

- Most have centralized data centers (typically two) that host applications or services.
- There are 24/7/365 regional hospitals or campuses with several remote clinics, urgent care clinics, or individual doctor's offices running during business hours.
- They do not have a main hospital or campus, but are made up of many remote clinics, doctors' offices, or doctors working from home providing specialized services.

The remote clinics can be in a fixed brick-and-mortar location or mobile. In both scenarios, the remote sites rely on VPN connectivity back to the main data centers. All traffic flow is to and from the regional hospital campus and remote clinics to the data center. In some cases, remote sites require communication with each other or send information to each other.

The WAN Must Change

Considering the predominantly north-south traffic flow described in this healthcare profile, the WAN becomes the lifeblood for organizations that host critical applications and services in the centralized data centers. Patient information must be available at all times for healthcare professionals to provide care to patients. This requires that the information be stored in the centralized data centers. Because care is provided at the remote sites or regional campuses, the patient information is uploaded or downloaded to the data centers on a continuous basis.

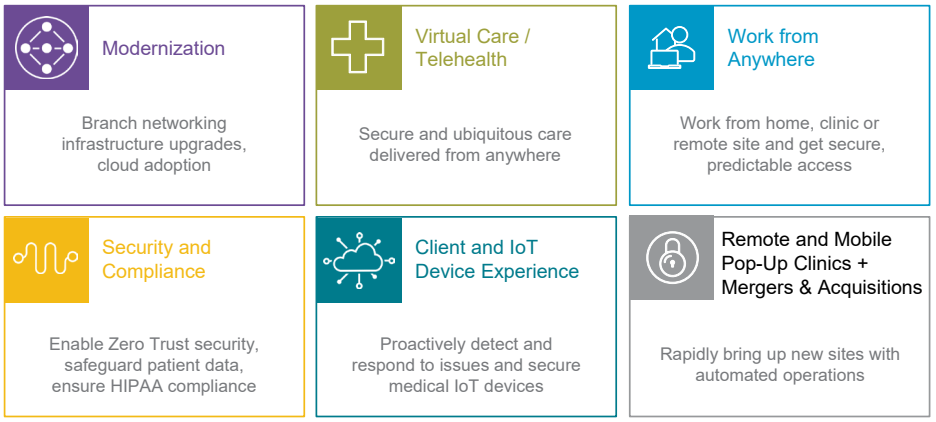
SD-WAN, SD-ACCESS, AND SSE HAVE BECOME A SAVING GRACE FOR THE HEALTHCARE INDUSTRY

The WAN must be able to support large file transfers in a secure and efficient manner. The size of the files can be hundreds of megabits of data at a time due to the high resolution required by imaging data and medical records. Outages are detrimental to health care because if care providers cannot access patient records, it could affect their ability to deliver care when needed and put them in breach of Health Insurance Portability and Accountability Act (HIPAA) regulations.

SD-WAN, SD-Access, and SSE have become a saving grace for the healthcare industry. Because it can be deployed over the top (OTT) or as a replacement to existing infrastructure, it is a highly flexible and scalable technology that enables healthcare organizations to provide continuous patient care and support care personnel with improved efficiency, access, speed, and security. Let's look at the use cases.

Healthcare Use Cases

Figure 1: Use Cases for SASE in Healthcare



Modernization and Cost Reduction

Traditionally, healthcare facilities relied on MPLS as the connectivity between sites and primary data centers. MPLS is private and highly secure but is difficult to implement in every location, especially smaller offices or remote clinics, due to its high cost. More and more, healthcare organizations are shifting away from MPLS and adopting SD-WAN either alongside it or as a substitute when MPLS contracts expire. Hybrid WAN allows this shift to occur without compromising security or compliance with regulations such as HIPAA or SOC2.

Virtual Care/Telehealth

SD-WAN HAS DRAMATICALLY REDUCED HEALTHCARE DOWNTIME FROM ONE HOUR TO JUST SIX MINUTES PER YEAR

Networking availability and uptime are paramount in healthcare, even at additional costs. Reliance on legacy networking systems often led to significant outages and downtime, impeding critical patient care and transactional capabilities. However, customers who have adopted SD-WAN technology no longer face connectivity issues. Proven data shows that SD-WAN has dramatically reduced healthcare downtime from one hour to just six minutes per year, thereby enhancing the service level agreements (SLAs) for patient care from 99.999% to 99.9999%.

Work from Anywhere

The COVID-19 pandemic permanently transformed our lives, compelling radiologists and other physicians to work from home or anywhere. IT departments must ensure that these professionals experience seamless connectivity as if they were in the clinic, avoiding issues like VPN logins, emails getting stuck in the outbox, and problems with telehealth applications loading. VeloCloud SD-WAN and VeloCloud SD-Access are invaluable tools for delivering optimal business performance for remote workers. They enable radiologists to diagnose their most critical patients more efficiently from remote locations. The ROI is quick, as optimized network traffic delivery allows them to increase the number of scans analyzed per day.

BY SEGMENTING DIFFERENT KINDS OF TRAFFIC, SD-WAN HELPS CUSTOMERS MAINTAIN A HIPAA-COMPLIANT NETWORK, ENSURING SECURE AND EFFICIENT OPERATION

Security and Compliance

Providing healthcare today extends beyond making diagnoses or prescribing medications. Advancements in medicine, increased regulations to protect patients and doctors, and the digitization of healthcare processes demand a scalable, secure, uninterrupted, and bandwidth-flexible healthcare IT network. HIPAA compliance is crucial for healthcare networks, ensuring patient data security by segmenting various types of traffic.

Healthcare networks typically handle three types of traffic:

- Corporate traffic
- Guest traffic
- Payment card transaction traffic

SD-WAN can segment this traffic, routing each type to its appropriate destination regardless of the point of origin. Corporate traffic is backhauled to the data center for Unified Threat Management (UTM) inspection, guest traffic is managed locally at each site, and payment traffic must comply with PCI standards and being routed through the appropriate payment channels.

By segmenting different kinds of traffic, SD-WAN helps customers maintain a HIPAA-compliant network, ensuring secure and efficient operation.

Client and IoT Device Experience

Healthcare IT teams now have comprehensive visibility into their entire network with SD-WAN. Utilizing a cloud-based centralized orchestrator, SD-WAN provides IT managers with single-pane-of-glass visibility into traffic flows, network issues, and enables network-wide configuration or rule changes with a single click.

Dynamic Multipath Optimization (DMPO) measures traffic flow across the network, ensuring that critical applications are prioritized over less-critical ones. This capability is particularly crucial when connectivity is down or diminished. SD-WAN can predict and remedy these scenarios, often repairing connections to maintain consistent connectivity. The network dynamically adjusts to underlying conditions, steering or remediating access and transport to ensure the continuous performance of critical applications.

Remote and Mobile Pop-Up Clinics

With the onset of the pandemic in early 2020, healthcare providers quickly recognized the need to establish testing sites outside their campuses. Protecting non-COVID patients and managing the high volume of people needing tests and care became a priority. Traditionally, setting up pop-up sites was complex due to limited connectivity options. However, SD-WAN revolutionized this process, enabling rapid deployment of sites within minutes using 4G/LTE/FirstNet/satellite links. This allowed hospital systems to test and treat tens of thousands of people in non-traditional locations.

Though the pandemic is waning, the innovative changes it introduced will endure. The need to provide healthcare facilities in remote locations, where large numbers of patients can be served, remains critical. SD-WAN continues to support these efforts, ensuring connectivity and efficient operation even in the most challenging environments.

WHY IS NETWORK INTEGRATION VITAL FOR MAPS?

In any sector, merging or acquiring companies can be complex, particularly for large organizations. In healthcare, this complexity is magnified by the need to ensure that patient records remain secure and accurate while being accessible to both organizations involved. Successful integration is achieved only when data from both entities is fully integrated, which relies on a smooth and effective network integration.

The number of mergers and acquisitions in the healthcare industry is increasing, with 65 transactions occurring in 2023 alone. After a merger or acquisition, the individual companies must integrate their systems, combining numerous disparate platforms—a traditionally laborious and challenging task. Initially, the parent company grants the acquired sites limited access to resources, and once fully on-boarded, converts them to production standards, providing full access to data centers and existing corporate sites. However, with SD-WAN, this process is streamlined. Each site can be integrated into the existing network quickly and efficiently, eliminating the usual complexities.

Growth by Merger and Acquisition

Healthcare is continually evolving, with advancements in treatments, cutting-edge medical devices, and shifts in service delivery locations, such as hospitals versus clinics. This evolution also includes organizational changes like mergers, acquisitions, and partnerships (MAPs). The success of these MAP activities hinges on the seamless integration of each organization's networks. As the trend of high-revenue healthcare organizations engaging in MAPs continues to grow, the importance of network integration becomes increasingly critical.

Orchestration and Automation

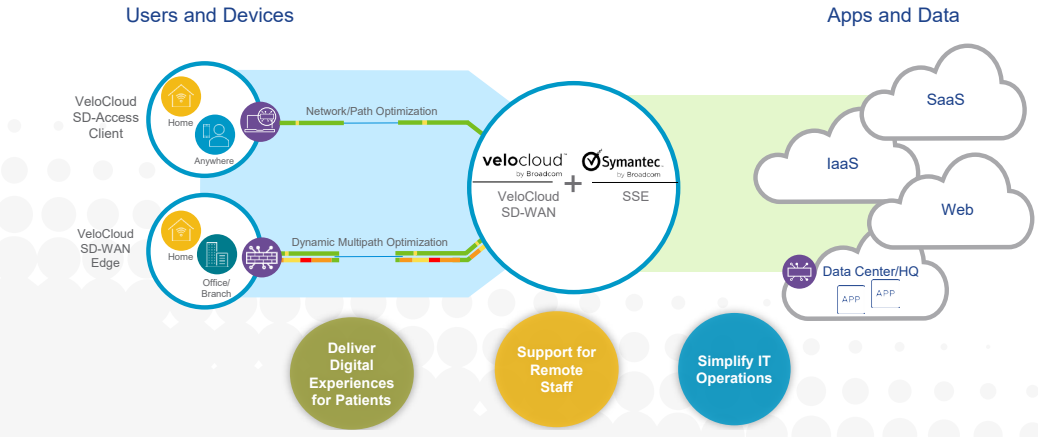
One of SD-WAN's key features is its ability to centrally manage and control all sites in the network. If policies or configurations need to be implemented or modified, the centralized management plane can remotely deploy these changes, eliminating the need to send a trained technician to each location. This process allows new sites or acquired locations to be deployed using standard templates or profiles, reducing human error and speeding up go-live time. Additionally, it helps reduce operational costs by streamlining the deployment and management processes.

Why Should You Invest in VeloCloud SASE?

The advancements in healthcare are growing by leaps and bounds. Without a strong infrastructure to enable the seamless, secure, and optimized delivery of those advancements throughout the organization, the ability to deliver quality care will be impacted. SD-WAN and SSE have emerged as technologies that are changing the networking status quo for healthcare. Their ability to deliver on the promise of faster, better, cheaper and more is causing healthcare providers and their IT staff to take notice.

VeloCloud SASE—which includes VeloCloud SD-WAN, VeloCloud SD-Access, and Symantec® SSE for VeloCloud—has been successfully deployed across numerous healthcare organizations, demonstrating a strong alignment with their needs. While SASE offers a broad range of benefits and features tailored for healthcare, let's delve into a few key advantages that make healthcare IT professionals say, "I need VeloCloud SASE!"

Figure 2: Symantec SSE for VeloCloud, VeloCloud SD-WAN, and VeloCloud SD-Access Enables the New Enterprise Edge with an Architecture for Distributed Clouds, Workers, and Edge Applications.



Dynamic Path Selection using Dynamic Multipath Optimization

DMPO aggregates all available links—broadband, LTE, MPLS, and FirstNet circuits—and employs application-aware per-packet link steering along with on-demand remediation. This ensures optimal performance in all conditions, including during periods of no connectivity or reduced connectivity. As a result, healthcare data remains consistently accessible and transmittable, enabling rapid transfer of radiological images (PACS, DICOM) and maintaining subsecond failover to ensure stable VDI sessions and uninterrupted real-time traffic for voice, video, and telehealth communications.

- **Automated bandwidth discovery:** During VeloCloud SD-WAN deployment, the system automatically detects WAN links and measures both upload and download bandwidth to the nearest VeloCloud SD-WAN Gateway or hub. Continuous link monitoring, performed every 100 milliseconds, assesses link characteristics—latency, packet loss, and jitter—for every packet on each tunnel between DMPO endpoints.
- **Dynamic application-aware per-packet steering:** Leveraging real-time link measurements and business policy configurations, DMPO enables application-aware per-packet steering with sub-second adjustments, even during periods of no connectivity or reduced connectivity. As a packet-based solution, VeloCloud SD-WAN can adjust packet routing mid-flow without disrupting overall traffic flow.
- **Bandwidth aggregation:** DMPO performs per-packet load balancing across all available links, considering real-time WAN performance to optimize path selection. It ensures proper resequencing at the destination to maintain packet order and flow integrity.
- **On-demand remediation (key differentiator):** When application-aware per-packet steering is not feasible—due to single or multiple problematic links—DMPO provides on-demand remediation. This includes high-priority traffic support through FEC, jitter buffering for real-time applications, and TCP NACK for file transfers.

SD-WAN ALLOWS HEALTHCARE IT MANAGERS TO APPLY NETWORK-WIDE BUSINESS AND SECURITY POLICIES, INTEGRATE LOCAL, THIRD-PARTY, AND CLOUD SECURITY SERVICES AS NEEDED, AND EXTEND THE WAN PERIMETER

Security

As mentioned in the Primary Pain Points for Healthcare section, security is a major concern for healthcare organizations. Protecting highly sensitive data is paramount, especially with the reliance on broadband links to connect nonprimary offices. SD-WAN addresses these concerns by allowing healthcare IT managers to apply network-wide business and security policies, integrate local, third-party, and cloud security services as needed, and extend the WAN perimeter. While more information can be found in our blog post, How VeloCloud SD-WAN Helps Organizations Attain HIPAA Compliance, let's highlight a few major points below.

The Enhanced Firewall on the VeloCloud SD-WAN Edge is equipped with IPS, IDS, URL filtering, and malicious IP reputation capabilities. It can handle Internet-bound traffic locally, eliminating the need to route all traffic through a central point. This flexibility allows customers to choose an integrated solution that combines VeloCloud SD-WAN for networking needs with Symantec SSE for VeloCloud or other SSE partners for security enforcement.

Segmentation separates different types of network traffic from each other and prioritizes certain traffic over others. With VeloCloud SD-WAN, segmentation includes the isolation of the control, data, and management planes, and plays a major role in the expansive growth of IoT devices. Using segmentation, healthcare organizations can ensure critical devices such as infusion equipment, pumps, blood pressure, and temperature measuring devices receive prioritized access to the WAN over less critical devices.

Secure and scalable cloud-based SD-WAN PKI infrastructure can be activated with a single click in the VeloCloud Orchestrator, creating VPN tunnels as needed to cover branch-to-branch, branch-to-data center, and any-location-to-cloud traffic patterns.

Symantec SSE for VeloCloud helps safeguard sensitive patient data by integrating advanced security features like encryption, threat detection, and data loss prevention (DLP) into a network with single-vendor SASE capability, ensuring compliance with HIPAA regulations.

Quality of Service (QoS)

Patients and doctors expect seamless voice and video communication to ensure continuous care across any device, anytime. For telehealth providers, maintaining reliable connectivity is crucial to comply with HIPAA regulations. VeloCloud SD-WAN addresses this need by safeguarding VoIP traffic from latency, packet loss, and jitter, and by providing effective remediation when issues arise. VeloCloud SD-WAN offers substantial benefits to healthcare organizations aiming to optimize, scale, and secure their networks, making it a transformative solution for those who adopt it.

VELOCLOUD SD-WAN EMPOWERS EMPLOYEES TO WORK REMOTELY—SECURELY, EASILY, AND PRODUCTIVELY

Work from Anywhere

VeloCloud SD-WAN empowers enterprise employees to work remotely—securely, easily, and productively. This customer case study shows how a customer is not only able to extend the same level of user experience to radiologist's homes as if they are working onsite, but also increase the number of scans per day, allowing more patients to be seen. The VeloCloud SD-Access client is a simple, secure, and high-performance remote access service to securely connect both users on the go and headless endpoints such as patient check-in kiosks—without hardware edges—while providing visibility and insight into users' application experience using integrated AIOps.

Interoperability with Legacy Networks

VeloCloud SD-WAN can integrate with legacy networks using traditional routing protocols. Interoperation between SD-WAN and non-SD-WAN environments is a key differentiator during phased approaches for VeloCloud. Traffic from an SD-WAN site to legacy/non-SD-WAN sites can be forwarded either directly to the legacy site using the MPLS underlay network, or backhauled via the SD-WAN Hub at the data center using the SD-WAN overlay.

Zero-Touch Provisioning

The challenge in the healthcare industry is how quickly and securely organizations can turn up new sites or integrate recently acquired sites. With VeloCloud SD-WAN, healthcare organizations can extend SD-WAN network architecture to new sites via true zero-touch provisioning (ZTP) capability. With ZTP, SD-WAN sites can be turned up in a matter of minutes vs. the weeks or months that it takes to bring up traditional WAN routers. Without SD-WAN, entirely new equipment must be deployed to each site and highly trained technicians must spend much time installing, manually configuring and testing the new equipment, and ensuring that each site is connected and accessing the appropriate information. SD-WAN eliminates this time-intensive process as its edges do not require a highly skilled technician to install (it's often as simple as plugging in two to three cords). With preestablished templates/profiles deployed instantaneously across all edges, human error is eliminated. This process not only eliminates potential mistakes but shortens the window to full data and network integration.

LEARN MORE

- VeloCloud SD-WAN
- VeloCloud SASE, secured by Symantec
- VeloCloud SD-Access

Simplified Mergers and Acquisitions

By leveraging VeloCloud SD-WAN, healthcare organizations can manage complexities of M&A more effectively, ensuring smooth transitions, enhanced operational efficiency, and robust security across the newly unified network. Its built-in segmentation feature plays a crucial role in supporting healthcare M&A by allowing rapid integration of different networks. Merged organizations can take advantage of zero-touch provisioning to save time and cost when integrating disparate networks.

Native Multicast Support

Healthcare applications, such as the Informacast mass notification system and Philips bedside monitors, rely on multicast traffic. VeloCloud SD-WAN supports these applications by handling multicast both natively within its SD-WAN tunnel and through GRE tunnels encapsulated within the SD-WAN. This capability ensures seamless operation and integration of critical healthcare applications.

Conclusion

SASE continues to change the networking landscape in bigger and more widespread ways. With healthcare's reliance on its network, VeloCloud SASE is uniquely positioned to provide a future-proof infrastructure that can handle increasingly stringent regulatory and medical requirements.

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