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White Paper

SD-WAN: the right connection for remote healthcare facilities

The healthcare sector never sleeps. The wheels keep turning: mergers and acquisitions, connected communities of care, accountable care organizations (ACOs) and the rise of value-based care mean complexity for providers. Add to that the critical demands of a 24 x 7 x 365 operation. More services must be delivered. Larger patient populations must be addressed. All the while, roaming physicians, clinicians and healthcare staff members still demand always-ready secure access to apps and data.

Consolidating infrastructure, serving distributed organizations, onboarding new facilities and users, and moving everything to the cloud — or at the very least, becoming cloud-ready — has become a sprint rather than a marathon. In the race to deliver more value and an increasingly higher quality of care, it's your network that can help you maintain a healthy lead.

The healthcare landscape is unique

The challenge: remote clinics and roaming clinicians

Roaming clinicians and staff provide care from multiple locations — on-site at the hospital, and in remote clinics, off-site offices, rehab facilities, long-term care hospitals, and independent physician group locations. An extremely high level of application performance and availability is expected in all of them. Electronic health records, critical SaaS applications, Virtual Apps and Desktops, and clinical tools and applications all must be supported.

Network managers feel the heat when apps don't perform well. The networking solutions needed to serve remote facilities are increasingly more complex, inflexible, and costly to deploy and manage. Some solutions — apps such as VoIP, video conferencing, VDI and 3D graphics imaging and modeling — require high-performance WAN links. Others are subject to jitter, packet loss, latency, or even complete WAN link failures.

In healthcare, the UX impacts patient care

In a provider environment, there's no time to wait for apps and data to load or to time out. EMRs and protected health information simply can't be unavailable. While lack of bandwidth, poor network conditions and outages spell trouble for clinicians and physicians, networking teams don't always have the visibility and control to detect problems. Traditional WANs aren't cloud-ready and don't have enough built-in flexible or resiliency to ensure great app performance.

The typical fix for remote locations

More often than not, IT teams increase WAN capacity by adding more bandwidth to account for electronic health records and imaging files. The idea is to route most traffic between a remote healthcare facility and a data center through a reliable, yet costly MPLS connection -- including traffic for critical clinician apps. Then add one or two broadband paths through the public Internet as backup in the event that the MPLS link goes down.

Sure, MPLS is reliable, and fairly consistent, but it's costly and contracts can be inflexible for making network changes. Broadband and LTE are more economical and, in rural areas, more readily available, but may deliver less-consistent performance. When a connection goes down, for example, legacy failover mechanisms can take seconds or even minutes to switch over to backup connections disrupting clinicians' virtual sessions and, as a result, patient care. Critical healthcare applications cannot be unavailable or seriously degraded for too long.

Citrix technology is purpose-built for healthcare

Citrix SD-WAN: a comprehensive solution for healthcare

A US-based hospital centralized its networking environment with Citrix SD-WAN and reduced its cost for delivering services to multiple clinics by using broadband. ROI was achieved in just three months: the average cost of hardware in a typical remote site was cut in half and annual circuit costs decreased to ten percent of what they had been. The hospital system gained redundancy and doubled bandwidth.

There is a better fix. Enter Citrix SD-WAN. It's application-optimized and secure. It's reliable and cloud ready. It's built to accelerate over 4,500 applications, including Citrix Virtual Apps and Desktops. This makes it a great solution for healthcare providers. It delivers consistently stable, high-performance connectivity by logically bonding MPLS, broadband or LTE links into a single virtual path or overlay. Citrix SD-WAN uses a path selection algorithm that monitors latency, jitter, congestion and loss in real time. It then performs intelligent load balancing to match the application with the most optimal WAN link. Using that intelligence, SD-WAN applies Quality of Service (QoS) rules for traffic shaping, real-time, packet-level path selection and link bonding to ensure critical apps always perform well. In fact, it can see into the Citrix Virtual Apps and Desktops protocol, ICA, and prioritize and monitor the individual streams of this HDX traffic even over a single port.

With SD-WAN, if a link degrades or has an outage, critical application traffic is switched over in milliseconds so clinicians can continue working without interruption. What's more, bandwidth can be increased using economical broadband or LTE instead of or in addition to MPLS. This allows you to rollout more apps to more users and stand up new locations faster. It can reduce the cost of app delivery by up to 80 percent. Application awareness allows IT to logically direct traffic for mission critical apps. Aggregation of available paths and the combination of WAN with cloud resources helps ensure 24 x 7 x 365 application availability through seamless network failover.

A great example is remote scanning facilities. Clinicians must be able to send large image files from these locations to the hospital system's central radiology department to be read quickly by a radiologist. SD-WAN ensures high quality reliable performance not only for imaging applications, but also for clinical apps, including those that require high-performance WAN links.

Not only does SD-WAN provide significant benefits for remote clinicians and healthcare staff, but also, it can ease the wait. SD-WAN enables waiting rooms in remote locations to be outfitted to cater to both digital natives and families. With SD-WAN, technology enthusiasts can stream video and enjoy great connections so they can be entertained while they wait. What's more, family members can participate in the care of a loved one because they have the bandwidth to review large images or videoconference with the healthcare team.

Microsoft partnership opens up even more opportunities

Thanks to the Citrix preferred partnership with Microsoft, Citrix SD-WAN leverages Microsoft REST APIs to quickly detect Microsoft Office 365 cloud entry points, or Front Doors. Citrix SD-WAN allows you to optimize Office 365 and steer traffic locally in accordance with published Microsoft Office 365 Connectivity Principles to reduce latency and significantly improve the user experience for Teams calls, Exchange Online searches and file uploads and downloads.

Citrix SD-WAN enables you to take advantage of Microsoft Azure's global network. With support of Microsoft's REST API, Citrix SD-WAN allows you to automatically connect all of your sites to Azure via IPsec in mere minutes and apply firewall policies to SD-WAN directly from Azure's management tool, Azure Resource Center. Site-to-site connections leverage the speed of the Azure global backbone.

Citrix SD-WAN gives you choices in how you design your infrastructure

One US-based urgent care system capitalized on Citrix SD-WAN, and a suite of other Citrix solutions, to reliably deliver and manage Citrix traffic over spotty connectivity. The team eliminated metro-E and high-level dedicated internet and moved to broadband and LTE. This translated into ROI in three months. They were able to move network traffic seamlessly from primary to secondary (and back) without any service interruption — even of voice traffic. Clinic setup time for edge networks went from 60 min with only a 20% success rate to 15 min with a 95% success rate.

SD-WAN in Telehealth

Citrix SD-WAN can play a huge role in enabling non-home-based telehealth in remote workplaces such as rural schools without nurses or doctors and dangerous work environments such as oil rigs or ships. Citrix SD-WAN ensures redundancy and a high level of reliability. It enables traffic to capitalize on less reliable WAN technologies, yet still deliver a high-quality result. What's more, it provides visibility into the health of network operations.

On-prem or in the Cloud, Citrix improves the connection

Citrix SD-WAN is HDX-aware, so it monitors the ICA protocol's individual streams of traffic and automatically prioritizes them to ensure quality of service. Traffic for virtualized softphones and unified communications apps is duplicated across multiple links; this increases reliability and results in reduced latency and improved audio quality.

Whether on-premises or in the cloud, with Citrix SD-WAN, you get a high-quality experience for Citrix Virtual Apps and Desktops. Network admins easily can assess a user's session quality or pinpoint a problem with a network link or path.

Fast on-ramp to SaaS and Cloud

Regardless of where you are in your cloud journey, Citrix SD-WAN helps you get there faster. By reliably and securely connecting users in remote sites directly to the apps they need, SD-WAN provides an easy secure on-ramp to SaaS and apps in the cloud. This drastically improves the remote clinic user experience by eliminating the need for network traffic to first travel long-distance over legacy networks to a central data center.

A properly implemented SD-WAN delivers the stability that remote healthcare entities and roaming clinicians need: increased reliability, better security, centralized management and onboarding of new locations, and high availability.

Security is crucial in healthcare

Securing the network in distributed healthcare environments

In the highly regulated world of healthcare, Citrix SD-WAN provides several security methods to protect patient records and payment information both in the data and control planes.

In the data plane, Citrix SD-WAN encrypts virtual paths with IPsec with strong 256-bit level virtual path encryption and encryption key rotation using Elliptic Curve Diffie-Hellman (ECDH) key exchange every 10-15 minutes. A FIPS-compliance mode adheres to strict NIST guidelines when encrypting the data path.

An integrated application stateful firewall allows traffic filtering even before it's encrypted. It supports zone-based policies for segmenting traffic and carries the zone information to the other end of the overlay by maintaining traffic segregation and policy consistency.

Securely connect users in branches to apps in the Cloud

Apps and services are increasingly being consumed from the cloud via the public internet which introduces security risk. Maintaining security infrastructure in the branch is costly. Enterprises are looking at cloud-based security options to give them agility, flexibility and centralized and simplified policy management.

Citrix SD-WAN speeds connectivity to the cloud via automated IPsec tunnels to secure web gateways by redirecting traffic out to the internet via the local ISPs. The secure web gateways' cloud services provide further security inspection and next-gen firewall capabilities. This reduces the overhead of having to update and manage firewalls at the branches.

In the control plane, users are authenticated via TACACS+/RADIUS protocols prior to accessing the SD-WAN management console, SD-WAN Orchestrator. Communication between any appliance and SD-WAN Orchestrator is encrypted via HTTPS (where TLS is the transport protocol). It verifies appliance identity before it is admitted to the SD-WAN fabric.

Conclusion

As the healthcare industry continues to evolve to a value-based care model, Citrix SD-WAN enables healthcare organizations remove the complexity, inflexibility and high cost of deploying and managing networking capabilities. SD-WAN allows clinicians and healthcare professionals to seamlessly roam and enjoy a high-quality user experience. What's more, it provides IT professionals with choices in how they manage infrastructure, deliver services and move to the cloud.

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