

SOLUTION OVERVIEW

Accelerating access to medical imaging services

BACKGROUND

Medical imaging is the technique and process of capturing visual representations of the interior of the human body for clinical analysis and medical intervention, as well as visual representation of the functions of internal organs and tissues. Common imaging modalities include X-ray, ultrasound, CT (computed tomography scan) and MRI (magnetic resonance imaging).

Medical imaging services are often conducted in specialized clinics or imaging centers. Images are transmitted to a PACS (picture archiving and communication system) that is often located remotely. The PACS securely stores and transmits electronic images and clinically relevant reports for viewing by authorized healthcare professionals. Imaging service providers may also use a hybrid cloud system, in which primary images are stored on-premise and backups are retained in the cloud. A cloud-based PACS also enables medical staff to view medical imaging data anytime and from any device.

Transmission of medical images can take several hours depending on the size of the file and the WAN bandwidth available at the time. The file size of medical images varies but can be very large. For example, breast MRI studies can average 300MB. Some other studies generate even larger file sizes.

A critical component of the PACS architecture is a secure wide area network for the distribution and exchange of patient images. Having digital access to the most updated version of a patient's medical images, clinical reports and history imagery can expedite and improve care, improve patient safety and even save lives when performed in a timely manner. For example, medical staff might need to access current and historical imagery to view, compare and create a medical diagnosis prior to the patient's scheduled appointment.

The WAN plays a critical role in enabling the timely transmission and access to previous imaging records and therefore delivering the best quality of experience for both the healthcare provider and the patient.

In addition, healthcare professionals and organizations alike are required to address government regulations that set privacy information and usage standards for patient healthcare records, such as HIPAA. The WAN is instrumental in helping organizations to become HIPAA compliant by ensuring that the right security measures and policies are implemented across the network to control access to health-related information.

CHALLENGES OF TRADITIONAL WIDE AREA NETWORK ARCHITECTURES

Conventional router-centric WAN architectures were not designed to provide the best infrastructure to expedite the secure transmission of large imaging files across the network to meet modern healthcare provider and patient needs. Traditional WAN architectures face the following challenges:

- **Inability to transfer large medical files** in an acceptable time frame, when MPLS is the only reliable and secure service to transfer sensitive medical data; the prohibitive cost of MPLS and circuit provisioning delays often inhibit deploying larger amounts of bandwidth required to reduce image transfer times
- **Inability to leverage, bond multiple transport links** to speed network performance
- **Inability to maintain 24/7/365 network resiliency** or business continuity, impacting patient experience and satisfaction
- **Lack of bandwidth management and differentiated QoS** across applications; real-time applications like telemedicine and VoIP may suffer in the process as large files transfers consume most of the bandwidth
- **Inability to reach medical images in the cloud** by the most efficient and highest performing means. Backhauling traffic adds latency which negatively impacts application performance, and consumes expensive bandwidth that could be used for critical applications
- **Complex and costly security** implementations required to meet HIPAA compliance requirements



ARUBA EDGECONNECT SD-WAN EDGE PLATFORM BENEFITS

Aruba is revolutionizing WAN architecture for healthcare providers with a business-first networking model. The Aruba EdgeConnect™ SD-WAN edge platform delivers the requirements needed at the WAN edge to expedite the transmission of large medical imaging files across the network:

- **Accelerating the speed of transmitting large medical imaging files** such as 2D/3D mammogram images, ultrasound images, X-rays, CT scans and MRIs to PACS over the most cost-effective transport. Optional Aruba Boost™ WAN optimization employs data reduction techniques like compression and deduplication to accelerate transmission of PACS images. Boost application acceleration techniques mitigate the negative effect of latency when transmitting images over long distances to significantly improve application response times
- **Increasing available bandwidth** by running on any transport (MPLS, broadband, LTE) and fully utilizing all available WAN transport services bandwidth. A business-driven SD-WAN makes it easy for organizations to run their businesses on shared, public broadband, even voice and video, without compromising performance or security
- **Improving network performance** by utilizing features such tunnel bonding and real-time traffic steering over multiple WAN links. Path conditioning overcomes the adverse effects of dropped and out-of-order packets enabling the active use of lower cost, higher bandwidth internet connections
- **Increasing reliability** by continuously monitoring all connections and automatically adapting when a WAN transport service experiences an outage or brownout — e.g: sub-second link failover to assure uninterrupted sessions — provides continuous availability of medical imaging services to deliver the best patient-staff experience
- **Differentiating application priority and QoS** for the different classes of applications such as electronic medical records (EMR), VoIP, lab systems, drug ordering, Internet of medical things (IoMT), telemedicine, virtual reality, and more to continuously improve the services that the medical staff delivers to patients

- **Enabling direct secure access to the cloud** using secure local internet breakout, by intelligently identifying and classifying application type and dynamically steering traffic to the closest hosting destinations, without backhauling to headquarters
- **Securing the transfer of sensitive patient health records** and helping organizations achieve and maintain HIPAA compliance by combining the power of zone-based firewalls, network micro-segmentation, WAN optimization, routing, and application visibility and control. The EdgeConnect platform also automates the configuration of cloud-hosted security services in minutes to ensure superior network security without compromise — like Zscaler and Checkpoint.

CUSTOMER SUCCESS STORY



Solis Mammography transmits more than a petabyte of data across its wide area network each year. A national leader in mammography service, Solis deployed the Aruba EdgeConnect SD-WAN edge platform in its primary data center and nationwide branches, bonding MPLS and QoS-enabled broadband circuits, and implementing Aruba Boost to accelerate the transmission of critical PACS images across the WAN to provide exceptional patient care.

The results of deploying the EdgeConnect SD-WAN platform are:

- Reduce nightly image prefetch times from 13 hours to 4.5 hours
- Increase application performance by 50 percent or more with enhanced network resilience
- Reduce WAN costs, saving nearly \$100,000 per year
- Accelerate new site deployment from up to 100 days to about 2 weeks
- Double available bandwidth while lowering costs by 40 percent



