# Delivering the Best Telemedicine Experience

Background

Telemedicine refers to the exchange of patient medical information from one location to another using electronic communications. Beginning more than 40 years ago with hospitals extending their services to patients in remote locations, telemedicine has grown rapidly and has become an important integrated function in specialty departments, hospitals, private doctor's offices, home health care, and the patient's residence and workplace.

Telemedicine relies on multiple applications that can be used to support different services, including wireless tools, email, two-way video conferencing, smartphones, and other telecommunications technology methods.

Telemedicine is driven by four concepts, each requiring different applications or supporting technologies for the communication or exchange of data:
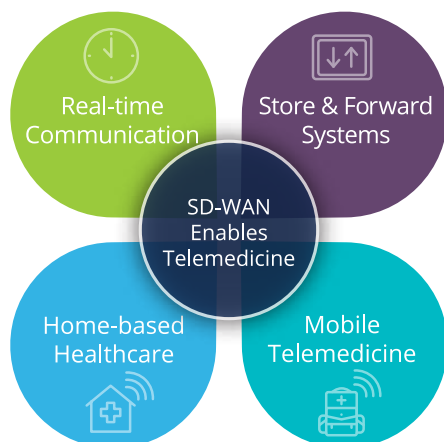
> **Real-time** telemedicine comprises real-time contact between patients and healthcare practitioners via the use of a variety of applications that vary from a simple telephone conversation or email to a complex robotic surgery involving real-time consultation with remotely located specialists.

> **Store and forward systems** involve technologies like PACS (picture archiving and communication system), the medical imaging technology used primarily by healthcare organizations to securely store and digitally transmit electronic images and clinically relevant reports.

> **Home health-based** telemedicine involves remote patient monitoring (e.g. patient statistics and vital sign monitoring) from a distant location using a typical landline, wireless or internet connection as the communication transport service between the patient and the care center.

> **Mobile telemedicine** takes these applications out into the field, perhaps in the form of a mobile EMT vehicles or even a ruggedized backpack. Used by first responders to communicate patient conditions and vital statistics in real-time with doctors located back at a hospital or other urgent care facility.

Telemedicine has proven to enable faster and more convenient access to critical services and/or specialists while improving clinical efficiency and

reducing the cost of delivering care. As such, the adoption of telemedicine is on the rise, with revenues expected to reach $113B by 2025 with an 18 percent CAGR[1]. In fact, 90 percent of healthcare facilities are developing or implementing telemedicine technologies.

As healthcare becomes more data-driven and relies more on distributed care enabled by telemedicine, a high-performance, low latency WAN is imperative. Reliable, high-quality communication is critical to the successful deployment of telemedicine programs.

Architecture Challenges of Deploying Telemedicine

Telemedicine services are challenging to deploy using traditional WAN architectures:

> Real-time or interactive healthcare requires high-quality video, teleconferencing, phone calls, online communications and other technologies. Highly reliable and resilient connectivity is of paramount importance.

> Store-and-forward virtual medicine involves storage and fast transmission of vast amounts of medical information across the network. Traditional WAN architectures might support fast transmission of large files across the network with MPLS, but it comes with a prohibitive cost and dependency on slow delivery times.

> Home-based healthcare including remote patient monitoring and other tools like imaging and visualization, collaboration and sharing, require a secure, high performing and reliable network connection to transfer patient data in a timely manner.

> Mobile telemedicine, used by first responders, requires reliable and resilient connectivity in order to ensure the real-time transfer of critical patient information. The main challenge here is to achieve uninterrupted connectivity across common cellular signals required for remote, mobile emergency telemedicine services.

Silver Peak EdgeConnect SD-WAN Edge Platform

The Silver Peak Unity EdgeConnect™ SD-WAN edge platform delivers the robust wide area network required to deliver high-quality telemedicine services. Telemedicine applications require high-performance network connectivity with low latency in addition to highly reliable connections to ensure high-quality patient to healthcare provider communications. The EdgeConnect SD-WAN edge platform overcomes the challenges of traditional WAN infrastructure by:

> **Running on any transport** including MPLS, broadband and LTE. An EdgeConnect business-driven SD-WAN makes it easy for organizations to increase and leverage bandwidth and run entire businesses on shared, public broadband services — even for real-time voice and video communications — without compromising performance or security. In addition, EdgeConnect provides uninterrupted connectivity across common cellular signals required for remote and/or mobile emergency telemedicine services.

> **Improving real-time application performance and reliability** by utilizing features such as tunnel bonding for real-time traffic steering across any combination of WAN transports and path conditioning to overcome the adverse effects of dropped and out-of-order packets common with internet connections. This highly reliable WAN architecture provides continuous availability of healthcare services and delivers the highest patient-staff quality of experience.

> **Differentiating application priority and QoS** for the different types of applications such as EMR, VoIP, lab systems, drug ordering, IoMT, telemedicine, virtual reality, etc. By giving the highest priority to the most critical applications, medical staff can deliver high quality healthcare services.

> **Accelerating the transfer of patient data** for both remote monitoring and store-and-forward data, using WAN optimization to accelerate TCP and other protocols to minimize the effects of latency on application performance.

[1]https://www.grandviewresearch.com/industry-analysis/telemedicine-industry

Data compression and deduplication eliminates the repetitive transmission of duplicate data, thereby improving bandwidth utilization efficiency.

> **Securing the transfer of sensitive patient health records** and helping organizations achieve and maintain HIPAA compliance by combining the power of zone-based firewalls and network micro-segmentation. The EdgeConnect platform automates the configuration of cloud-hosted security services like Zscaler and Check Point in minutes to maintain network security policy compliance without compromise.

> **Reducing WAN transport costs.** With EdgeConnect, customers can dramatically lower connectivity, equipment and network administration costs. Savings are achieved through a reduction in bandwidth costs by actively using broadband connectivity as well as the time and expertise needed to connect and manage WAN infrastructure at branch offices.

Customer Success Story

swyMed is a leading innovator in mobile telemedicine. This innovative company provides EMS teams and other first responders with a mobile telemedicine solution called the DOT Telemedicine Backpack. This portable, ruggedized backpack contains next-generation telemedicine and connectivity technologies that enable EMS staff in the field to securely and reliably transmit patient data and conduct live video consultations with medical experts from an emergency scene, and en route to the hospital. swyMed couldn't achieve uninterrupted connectivity across common cellular signals required for remote, mobile emergency telemedicine services. By bonding two LTE links together with EdgeConnect, even from different carriers, swyMed is able to achieve an aggregate signal quality in excess of 90 percent, bringing mobile telemedicine to areas that would have been impossible in the past due to poor signal strength.

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

> Improved cellular signal quality from 50 – 70 percent to over 90 percent

> Reliable connectivity for real-time medical evaluation by remote experts

> Fast, easy, cost-effective deployments for medical emergency services teams

> Increased patient confidence and quality of experience when treated by first responders

> Expanded use cases to accelerate new business opppotunity

> Remotely monitor and manage swyMed devices anywhere in the world

> Helping to save lives and expedite favorable patient outcomes

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