

Alaska's Largest Service Provider Enables Telemedicine in the Remotest Areas Using Juniper Networks WAN Acceleration Platforms

**Organization:**

General Communication, Inc.

Industry:

Service Provider

Challenge:

Offer innovative services such as telemedicine and differentiate high-speed data service offerings in an increasingly competitive market, while meeting the challenges of communicating over satellite links

Solution:

Juniper Networks WX application acceleration platforms

Benefits:

- Provides physicians at major hospitals with remote diagnoses capabilities via custom tele-health applications
- Offers real-time emergency support to clinics in even the most remote villages of Alaska
- Mitigates impact of using TCP/IP on satellite links to improve application performance and minimize costs
- Delivers WAN application acceleration as a service differentiator to attract and retain customers

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Mike Journey
Tele-health Systems Manager
GCI

Providing healthcare to citizens living in the farthest reaches of Alaska is not for the faint of heart. Many areas are reachable only by small passenger airplanes – that is, when flights are available. In rural places like Alaska, telemedicine health services can dramatically raise the quality and accessibility of healthcare and reduce costs associated with medivacs and delayed treatments.

General Communication, Inc. (GCI), Alaska's largest provider of voice, video and data communications services, is on the cutting edge of providing broadband tele-health services to residents of the U.S.A.'s forty-ninth state.

With tele-medicine, health aides in remote town clinics scattered across the vast frontier can send detailed diagnostic information over the wide-area network (WAN) to major hospitals and other specialists. A typical village clinic has the basic diagnostic tools, plus a cart stacked with computers, TV monitors and high-resolution cameras. Using a videoconferencing link, physicians at large regional hospitals can remotely diagnose patients, train clinical staff, and provide real-time support during an emergency. Tele-health also makes it possible to have a “virtual” doctor present at births, or eliminate several months’ wait for a resident of a remote village to see a specialist.

In Alaska, however, network connections can prove as challenging as human transportation, and delivering broadband services means communicating via geo-synchronous satellites. The physics of getting bits from here to there when the data takes a 23,000-mile trip into space and back means serious latency, and without TCP acceleration strategies to minimize the impact of 540ms to 800ms round trips, vital applications like tele-health suffer significant delays.

That’s the challenge facing Mike Journey, tele-health systems manager at GCI.

The Solution

“The goal was to alleviate the application delay when transferring files and running applications over satellite circuits,” says Journey. Improving application performance over the satellite-based WAN enables GCI to provide a higher quality service to its customers and to deliver those services more cost-effectively, since it pays on a per-satellite transponder basis.

As Journey evaluated his options for improving application performance over satellite links, he considered products from a number of different vendors. One solution he evaluated, considered a favorite due to its reputation as an early leader in the application acceleration market, couldn’t encrypt communications – a fatal shortcoming, since GCI’s healthcare customers must comply with HIPAA requirements. Another couldn’t

address the latency problems presented by the satellite links, another important consideration.

Lynette Babcock, regional manager at Structured Communications, a GCI consultant and Juniper elite partner, suggested Journey take a look at the Juniper WAN application acceleration platforms. “We knew about the Juniper solutions and felt they would be an excellent fit,” says Babcock. “We arranged to get them an evaluation unit, and they tested it in their labs with the satellite links. They were immediately impressed with the results and quickly made a business case for securing the Juniper units and deploying them for their clients.”

According to Journey, while the overall breadth of capabilities was important, one feature in particular helped tip the scales in favor of Juniper. “IP acceleration is critical to alleviate the effects of latency,” says Journey. “The big seller for us was Juniper’s TCP acceleration. The compression capabilities were a nice bonus.”

The Juniper WX application acceleration platforms improve application performance over the WAN by eliminating redundant transmissions, accelerating TCP and application-specific protocols, prioritizing and allocating access to bandwidth, and ensuring high availability at sites with multiple WAN links.

With the WX platforms, GCI has been able to make more efficient use of available satellite capacity thanks to the Juniper solutions’ powerful compression and caching techniques. Molecular Sequence Reduction™ (MSR™), the flagship compression algorithm employed by the WX platform, recognizes repeated data patterns and replaces them with labels before forwarding across wide-area links, including satellite connections, dramatically reducing WAN traffic volumes. The MSR technology benefits a broad cross-section of applications, including both short, chatty applications such as Citrix and HTTP, as well as larger data patterns, such as Word files.

To reduce the impact of latency on the satellite links, the WX platforms also include unique Packet Flow Acceleration™ (PFA™) technologies

that accelerate TCP-based application performance over the WAN. The PFA technologies include Active Flow Pipelining, which improves TCP performance by terminating TCP connections locally and using a more efficient transport protocol for sending data over the WAN between WX platforms, improving application performance on high-latency connections like satellite.

Another PFA technology, Fast Connection Setup, further improves the performance of short-lived connections by eliminating one round-trip time from the TCP connection setup, speeding up applications such as HTTP and limiting the need for retransmissions on lossy networks.

Additionally, the WX platforms simultaneously support quality of service (QoS) and IPsec encryption – an important attribute for GCI, as it allows clinics that couldn't afford to upgrade their routers to support the encryption requirements.

The Benefits

The WX platforms have been accelerating applications for GCI customers for several months. “Users get used to the speed very quickly,” observes Journey. “The initial reaction is that it is very cool.”

The installation was so transparent and seamless that some customers weren't convinced anything had changed until the performance improvements were demonstrated for them – often leaving them incredulous. To illustrate that “wow” factor, Journey recalled a conversation with a customer. The WX platform had been installed, but the customer wasn't convinced it was working. To show him firsthand the dramatic increase in WAN capacity, Journey set up an FTP transfer between the customer's clinic in the Aleutian Islands and GCI's data center in Anchorage. Without the Juniper TCP acceleration enabled, it took nearly seven minutes to transfer a 10MB file over the satellite link. After asking the customer to delete the file, Journey then turned the WX platform on and transferred the file again. While the first – or “cold” – transfer between the Juniper platforms took 6.5 minutes,

the next “warm” transfer took just seconds. “All he could say was, ‘Wow,’” says Journey. “I think he was convinced.”

The WX platforms have allowed GCI to distinguish themselves through a variety of value-added services:

- **Acceleration as a Differentiator:** As a service provider, GCI has some special requirements – and gains some unique benefits from WAN application acceleration. “We approached IP acceleration from an ISP standpoint,” says Journey. GCI uses TCP and application acceleration as a service differentiator, helping them retain existing customers and attract new ones with offers of a faster service than competitors can provide. The ISP market in Alaska is highly competitive, and the ability to offer TCP and application acceleration has been a successful customer retention strategy for GCI.

“IP accelerators give better utilization for bandwidth and a better look and feel for applications,” says Journey. “Most other service providers are not reselling these IP accelerators in this way. It's a competitive advantage for us.”

- **Easy Management:** When customers are located at the Arctic Circle and temperatures reach 50 below zero, ease of management takes on a whole new meaning. Journey was initially reluctant to use the WX Central Management System™ (WX CMS™) software, remarking that “In my experience, any device with a GUI management interface is sad.” But once he saw the WX CMS interface and began to use the software to centrally manage, monitor and configure the hundreds of WX platforms deployed across the state, he found it “incredibly easy to manage the boxes.” As for the GUI, Journey admitted he had been wrong about the WX CMS: “I have to say, this is the best GUI management interface I've ever seen. I use it weekly, if not daily, to keep track of the Juniper devices.”

Journey particularly likes the ability to provide customers with secure, direct access to their own reports and statistics. “We give customers a logon to access their reports,” he says. “They can view all of their devices and see their WAN statistics anytime, 24 hours a day, without my intervention.” Setting up multiple user accounts with different rights is simple and straightforward, he says – “As easy as I’ve ever seen it.”

GCI has deployed more than 120 Juniper WX platforms across its Alaskan network – and plans to continue the rollout to more healthcare organizations, schools and business customers.

Today, most healthcare organizations connect to the GCI network in a hub-and-spoke architecture. But direct connections between physician offices are a growing trend, as they increasingly embark electronic healthcare practices. As a result, GCI plans to roll out WAN application acceleration solutions to improve applications originating on its customers’ internal networks, particularly for video and Internet traffic.

Additionally, GCI is rolling out the WX application acceleration platform to the major hospitals on its ConnectMD network. Many small and mid-sized practices use ConnectMD, an electronic health platform for electronic medical records, e-mail, videoconferencing, and medical-grade Internet access.

With tele-health, the leading edge of medicine is within reach – even on the Last Frontier.



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