



Tacoma Radiation Oncology Center Tacoma, Washington

Oncology center deploys Packeteer's PacketShaper® solution to control large image transfers and prevent disruptions in radiation treatment sessions

For the Tacoma Radiation Oncology Center in Tacoma, Washington, a mechanical interruption is a traumatic experience, and not just from a technical standpoint. The oncology center administers radiation treatment to cancer patients via linear accelerators - large, intimidating machines enclosed in vault-like rooms where a patient's survival is the primary objective. As if undergoing radiation is not traumatic enough, a disruption to the accelerator's corresponding radiation therapy system does nothing to alleviate patients' concerns.

Tacoma Radiation uses a radiation therapy system developed by IMPAC Medical Systems, of Mountain View, CA. The system is absolutely critical to a patient's treatment. It instructs the linear accelerators to administer radiation that follows strict treatment plans for patients. If the system is disrupted, the accelerators shut down.

When treatment sessions were disrupted, the staff's first inclination was to blame the IMPAC system. However, the root of the problem was not with IMPAC - the latency-sensitive system was merely an unfortunate casualty. The convergence of bandwidth-intensive image transfers and other traffic over partial T1 connections linking the oncology center to two remote sites produced an unpredictable network environment that made it anyone's guess whether IMPAC system traffic, image transfers, or other applications would successfully access their fair shares of bandwidth. On many occasions, that guessing game did not end in the IMPAC system's favor.

"We were having a lot of trouble with the network," COO Steve Bader said. "We'd run into problems with the record-and-verify function, and the system would just time out. We're treating patients in which the fault tolerance is less than a second. It's extremely sensitive. If the accelerator does not receive a signal from the IMPAC system within a specified period of time, the machine will go down. The treatment process from the time the patient goes into the room to the time the patient leaves can be as short as five minutes, while the treatment itself may take only seconds. The linear accelerator must work without any disruptions."

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THE PROBLEM: Image Transfers Disrupt Treatment Sessions

Image transfers play an integral role in the treatment planning process. But their delivery over shared networks produce frequent performance problems in numerous healthcare organizations because of their tendency to consume disproportionate amounts of bandwidth. For instance, hospitals have reported cases in which the transmission of 20 10MB images tied up their T1 lines for more than 25 minutes. Tacoma Radiation's problems were no different. Because its physicists would access and transmit images, the threat to the IMPAC system's performance, and therefore patients' treatment, was significant.

"Physicists would download CT scans to one location from another, and it wasn't just one image, but a sheet of film's worth of images," Mr. Bader said. "When you're transferring that much information, there's no bandwidth available for anything else."

Although image transfers are important, their delivery is not as time-critical as the IMPAC system's traffic. Tacoma Radiation needed a solution that could manage that distinction - balancing the relative priorities of one critical application over another.

Those needs intensified when the oncology center was installing a second remote linear accelerator that would need IMPAC's record and verify to treat patients. Mr. Bader turned to Citrix, the popular thin-client solution, in hopes of accelerating IMPAC's system traffic. But the improvement was not significant enough to resolve the problems that the practice was experiencing with image transfers and treatment sessions. To compound the problem, the software that physicists were using was incompatible with Citrix.

"We tracked a lot of the problem to what the physicists were doing with their data," Mr. Bader said. "When they would do something with their software and equipment that Citrix didn't like, IMPAC was brought to a halt in the remote sites."

"Everything" included latency-sensitive record-and-verify traffic that runs over Citrix and feeds into the IMPAC system, validating that treatment plans are being followed. The contention between Citrix and the physicists' software only complicated Tacoma Radiation's effort to resolve the original performance problem. Through all of this, the performance of record-and-verify sessions remained unpredictable. The staff and physicians were getting restless, not to mention the patients.

"The whole purpose of us implementing the IMPAC system was to evolve and to be able to treat more patients and have more data on electronic medical records," Mr. Bader said. "But the disruptions were preventing us from doing that. We had to put the treatment machines in standby and then input fields manually. It became a manual operation instead of a computer-generated operation."

Executive Overview

INDUSTRY

- Healthcare/Oncology

CHALLENGE

- Prevent IMPAC system, linear accelerators from crashing during critical radiation treatment sessions
- Prevent radiology image transfers from disrupting IMPAC traffic
- Control variety of important traffic over Citrix
- Ensure network supports need to balance physicists' demands with patients' treatment plans

SOLUTION

- Deploy PacketShaper solution at facility's two remote sites to manage IMPAC system traffic, image transfers, and other applications in line with patient needs

BENEFITS

- Prevents system crashes during treatment sessions
- Prevents image transfers from disrupting IMPAC traffic
- Produces greater opportunities to treat more patients and administer more complicated treatment procedures
- Improves staff productivity
- Boosts efficiency by avoiding manual data entry

THE SOLUTION: PacketShaper Protects IMPAC System Traffic, Controls Image Transfers to Ensure Reliable Treatment Sessions

Mr. Bader attended an IMPAC users meeting in 2001 to find out if other users were experiencing the same problems. He discovered that some facilities with remote locations were facing the same challenges. At the meeting, IMPAC representatives announced a solution they had just discovered that would resolve the system crashes by controlling image transfers and allocating ample bandwidth to IMPAC traffic.

"IMPAC was talking about a product from Packeteer® called PacketShaper," Mr. Bader recalls. "What caught my attention was that PacketShaper would be able to manage bandwidth and control traffic on my network. Hopefully, it would stop the treatment machines from crashing. We decided to try that product on our system. We deployed PacketShaper in the fall of 2001, and immediately we saw a 1,000 percent improvement in the uptime on the treatment machines. We just don't have a problem anymore."

Tacoma Radiation deployed two PacketShaper units at the most bandwidth-constrained points of the organization's network – the remote site WAN links. From this vantage point, PacketShaper provides instant management of IMPAC system traffic as well as unwavering control over image transfers and other important traffic at the oncology center's most critical bottlenecks. It identifies the applications running on Tacoma Radiation's network, analyzes their performance, then allocates appropriate amounts of bandwidth to each one depending on its relative importance. Its built-in reporting validates that the control measures were successful.

PacketShaper's application-intelligent traffic management ensures that the IMPAC system receives the bandwidth it needs to perform reliably. The system's efficient performance prevents the linear accelerators from shutting down and ensures that treatment sessions proceed as planned, without any disruptions. Meanwhile, large radiology images and other traffic are controlled according to their relative priority as determined by the oncology center. Image transfers no longer inhibit the progress of IMPAC's radiation therapy system, yet they still perform efficiently to meet physicists' needs.

According to Mr. Bader, the effective management of the oncology center's traffic reveals that the system crashes were never a result of faulty equipment or unreliable software. There was never anything wrong with the IMPAC system or other critical applications. The disruptions in performance were merely a product of a network environment that is naturally unpredictable. All IMPAC system traffic, image transfers, and other applications needed was a controlled network that would enable them to perform efficiently and in harmony with each other.

"When we installed PacketShaper, it alleviated all of my problems," Mr. Bader said. "The performance of the IMPAC system and the treatment machines has improved 1,000 percent. From a priority standpoint, the IMPAC traffic is extremely latency-sensitive. For image transfers, if files are delivered in a few minutes versus a few seconds, it's acceptable. With PacketShaper, we're able to get physicists the bandwidth that they need while balancing the truly critical priorities, such as cancer patient treatment."

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About **Tacoma Radiation Oncology Center**

- Founded in 1979
- 1 central facility, 2 remote sites
- Each remote site has one linear accelerator
- 5 radiation oncologists on staff

THE BENEFITS: Tacoma Radiation Administers Treatment That's Under Control

The network stability and control that PacketShaper offers Tacoma Radiation opens the doors for greater opportunities that benefit the oncology center and its patients. With its IMPAC system performing efficiently and predictably, Tacoma Radiation can accommodate more patients and administer more complicated treatment procedures.

"It's all about patient care and keeping the staff happy," Mr. Bader said. "Can I quantify that I can keep my staff happy and treat more patients per day in a shorter amount of time? Yes, I can."

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