

## UNIVERSITY OF PUERTO RICO SAN JUAN, PUERTO RICO



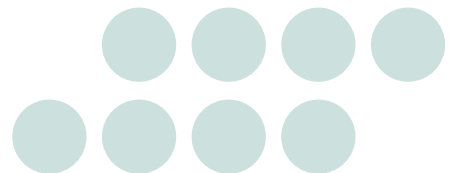
A multi-campus university achieves 50 percent reduction in WAN bandwidth use by non-essential applications and improves ability to control network attacks.

AUGUST 2005

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PACKETEER®

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Like many higher education institutions, the University of Puerto Rico (UPR) utilizes internal networks and Internet access to enhance learning, communications, and business activity. The UPR network serves approximately 70,000 students, 5,200 faculty members, and 14,000 non-teaching staff located in three main campuses in San Juan and eight remote campuses around the island. And like many other enterprises, UPR was caught between growth in network demand, increasing security concerns, and limited budgets for very expensive WAN links.

### THE CHALLENGE: More Traffic, Same Budget

Network administrators at UPR knew that peer-to-peer file sharing by students was making a major and negative impact on network performance for academic and business applications. But with expenses of US \$2 million per year just for WAN links, UPR couldn't afford to add network capacity, even as network demand continued to grow and the administrators knew that bandwidth upgrades were only a short-term solution.

Instead, the administrators needed a way to control bandwidth use on the existing OC-3 links for the Internet connection and three main campuses, and the T1 links that serve the eight remote campuses. "We first tried to control bandwidth by establishing rate limits on certain traffic through policies in the router," explained Felix Ramos, Network Administrator. "But this approach didn't work because the policies didn't have Layer 7 visibility into the different application types and the rate-limiting added a lot of processing overhead to the router."

The University needed a solution for bandwidth control that could distinguish traffic at the application layer. Applications needing priority included IP video-conferencing for distance learning, Oracle business applications, the Horizon library system, IP multicast for the Internet connection, and file transfers from the subnet dedicated to the University's High Performance Computing Center. Applications used by students, particularly file sharing, would receive lower priority for access to the available bandwidth.

*"With our Packeteer implementation, we can guarantee network resources for the critical applications and limit recreational traffic to acceptable levels."*

— Felix Ramos  
Network Administrator

## Executive Overview

### INDUSTRY

- Higher Education

### CHALLENGE

- Serve growing traffic volumes without increasing the budget for expensive WAN links
- Eliminate the negative impact on essential applications by non-critical but bandwidth-intensive file sharing applications
- Detect viruses and attacks quickly and prevent them from spreading throughout campus LANs

### SOLUTION

- Deploy Packeteer® PacketShaper® units to monitor and control WAN bandwidth allocation at 11 campuses
- Implement PacketShaper 9500 units to monitor and control OC-3 links from the main campus to three large remote campuses and for the Internet connection; PacketShaper 6500 appliances for the T1 links to eight additional remote campuses
- Use the Packeteer ReportCenter™ software for centralized reporting

### BENEFITS

- Controlled costs by using expensive WAN bandwidth more efficiently and avoided costly bandwidth upgrades
- Improved network performance through policies that prioritize vital applications
- Identified and controlled bandwidth use by recreational traffic from students
- Enabled faster containment of network attacks and viruses
- Allowed scheduling of large file transfer sessions to minimize impact
- Supported capacity planning for WAN links

## **THE SOLUTION: Control Bandwidth Use with Packeteer's PacketShaper**

After reading about Packeteer solutions in an industry magazine, Ramos and his staff initially tested a PacketShaper 4500 WAN appliance. The information obtained from this initial test was astonishing. "We knew that the student file sharing was having an impact on our network performance, but we thought it was only about 25 percent of the traffic," said Ramos. "The reports generated by ReportCenter showed us that the actual level was 50 percent of both inbound and outbound traffic. The ability of PacketShaper to keep that traffic under control was a big part of our cost justification for implementing the Packeteer solution on all campuses."

Today, PacketShaper 9500 units control bandwidth on the University's OC-3 links and PacketShaper 6500 units monitor and control the T1 remote-campus connections. UPR network staff use the browser-based ReportCenter software for centralized reporting and viewing of in-depth traffic reports for each Packet Shaper. Evertec, a Packeteer channel partner, supplied the products to UPR.

According to Ramos, the initial installation and configuration of the PacketShaper system was easily handled by UPR network staff. Packeteer later delivered training to help the staff configure bandwidth allocation policies and use the system reports for maximum benefit.

## **THE RESULTS: Bandwidth Costs Contained and Security Improved**

UPR students do not pay for Internet access, which means the University can impose controls on how the network is used and determine what is an acceptable level of service. Implementing the Packeteer solution with policies to control peer-to-peer traffic made an immediate and dramatically positive impact on bandwidth use. For example, on each T1 link to remote campuses the bandwidth load was reduced by 50 percent.

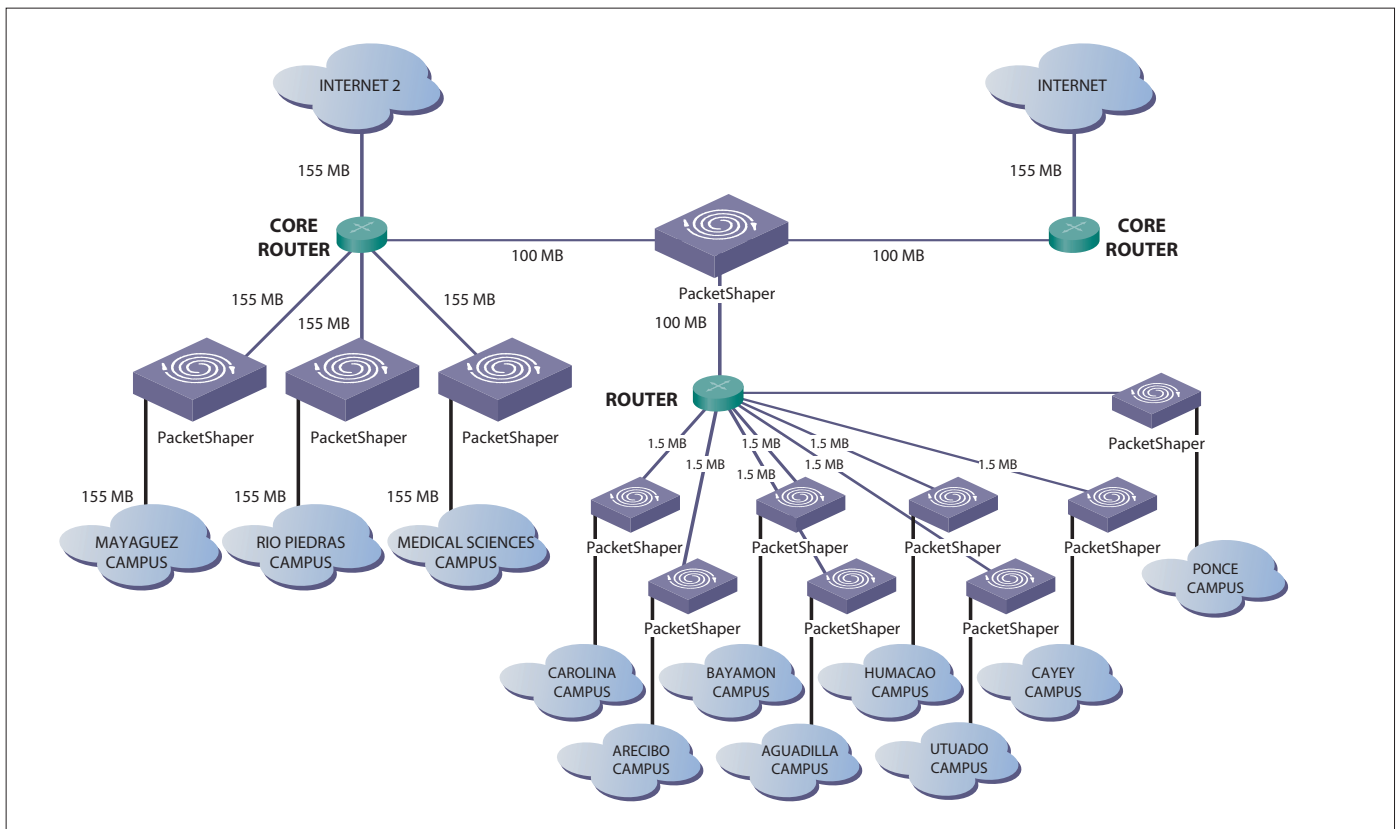
At all campuses, users noticed performance improvements for the academic and business applications carried on the network. "Because we can use PacketShapers to allocate bandwidth to specific applications, our researchers can now work without network latency," said Ramos. Network staff have defined policies that give the researchers bandwidth for peer-to-peer file sharing, even though these applications are restricted for students. The PacketShapers also schedule large file transfer protocol (FTP) sessions outside of business hours to reduce their impact on other users.

UPR has also used the Packeteer solutions to improve network security against viruses and denial of service (DOS) attacks. Administrators use the ReportCenter reports to identify the traffic spikes that indicate an attack, then implement policies to contain it.

*"Previously, it would have taken us four or five hours to determine that a problem was an attack. The reports available from ReportCenter help us identify the attack immediately. These capabilities have helped us avoid many widespread virus attacks."*

**— Felix Ramos**

“Previously, it would have taken us four or five hours to determine that a problem was an attack,” said Ramos. “The reports available from ReportCenter help us identify the attack immediately, and apply control policies to the specific device, application, or subnet. These capabilities have helped us avoid many widespread virus attacks.”



*Packeteer Application Traffic Management System controls and prioritizes bandwidth on WAN links that connect University of Puerto Rico campuses to each other and to the Internet.*

UPR staff use the reports, with their detailed data on actual traffic demands, to plan for capacity needs across the WAN. For the future, Ramos is planning to implement the compression feature on the PacketShaper 6500 appliances that control the T1 remote campus links. Compression will make even more efficient use of available bandwidth and allow the University to further avoid the expense of purchasing additional WAN capacity. At a cost of US \$30,000 per year for T1 links and US \$1 million for OC-3 links, additional links would have a noticeable impact on the University’s budget.

The Packeteer system will also be part of UPR’s deployment of voice over IP (VoIP) technology by helping to assure quality of service (QoS). According to Ramos, “The Packeteer systems will have a critical role in guaranteeing bandwidth to voice applications. It is a very good and easy-to-use QoS tool, especially compared to using the QoS features on a router, which are difficult to configure and manage.”

By implementing the Packeteer application traffic management system, the University of Puerto Rico can manage its network to meet budget constraints, protect against security threats, accommodate new applications—and, most importantly, serve its educational mission.