

VCON Case Study

VCON

UNIVERSITY OF SOUTH FLORIDA
HEALTH SCIENCES CENTER

Utilizing IP Videoconferencing for Administration,
Research & Telemedicine

April 2000



The Video over IP Company

Overview

The University of South Florida, created to meet the rising needs of the Tampa Bay metropolitan area and the state of Florida, is driving higher education on a fast track into the new millennium. Already one of the 20 largest universities in the United States, USF has a solid reputation as a leader in learning, offering comprehensive state-of-the-art, student-centered programs. Today the university serves approximately 34,000 students. One of the top 50 public research universities in the country, USF was recently classified as a Research 1 University by the Board of Regents. Within the University's Health Sciences Center, there are three colleges:

Nursing: The college has a long history of student excellence. It maintains affiliation agreements with more than 100 health care agencies in USF's service area, offering students a wide range of clinical experience in both in-patient and community facilities.

Medicine: USF's College of Medicine is renowned for cardiology, ophthalmology and immunology. Through affiliations with Tampa General Hospital, the USF-based Moffitt Cancer Center and Research Institute (Florida's only National Cancer Institute-designated center) and All Children's Hospital in St. Petersburg, medical students train on the cutting edge of trauma, pediatrics and cancer treatment. Admission is highly selective. Each year, the college receives more than 2,000 applications to fill 96 available positions.

Public Health: USF has the only such college in Florida and one of only 27 fully accredited public health colleges in the United States. Areas of concentration include community and family health, epidemiology and biostatistics, environmental and occupational health, and health policy and management.



In order to support the many affiliations over a wide geographical area, the University of South Florida Health Sciences Center's (HSC) 28 departments are dispersed throughout a 20-mile radius. Driving to weekly business and research meetings became an inefficiency problem for staff and faculty, as well as students. Conducting business and medical research over the phone or via email has not proven a realistic alternative. The productivity level of the staff, residents, and students is adversely affected.

Additionally, the HSC is always seeking to improve the delivery of medical services to its patients. With medical costs rising considerably over the last decade, health care institutions are continually under pressure to deliver more advanced treatment methods at an affordable cost to the patient.

The HSC has determined that video can improve the productivity losses due to travel and is evaluating the use of video and networking technologies as a possible solution for lowering costs and raising quality of care.

Video as a Solution

“Our departments were faced with an inefficiency issue that we felt could be addressed by technology advancements that have proven effective for other industries,” said Wayne Thompson, Chief Information Officer at the University HSC. “High-quality desktop videoconferencing has effectively addressed the issue of off-site meetings for numerous industries. Implementing a multimedia network specifically for this need was a sound decision that is expected to save time and HSC budgets.”

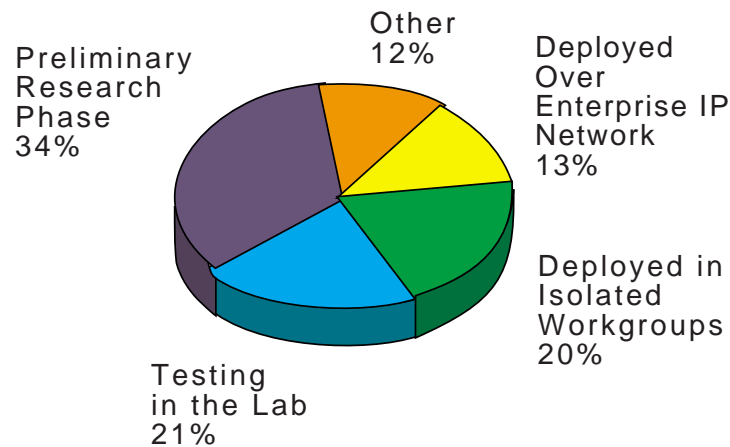
The University HSC now utilizes videoconferencing primarily for weekly staff meetings and medical research meetings. Videoconferencing fills a significant communications void between the telephone and in-person meetings. While the use of videoconferencing is just as responsive as the telephone, it maintains and enhances the relationship aspect of the communication much more effectively than using the telephone. Additionally, hand gestures and other body language that are preserved with videoconferencing add to the effectiveness of the meetings.

Videoconferencing is also being pilot tested for telemedicine in the area of Cardiology. Video images are captured from medical imaging equipment and forwarded to remote sites for consultative purposes. The pilot has been successful enough that telemedicine is an area of likely growth for the HSC. Telemedicine programs commonly include remote consultation, diagnosis, treatment, virtual patient records and distance learning.

Why IP

The University HSC already had a well-established IP network – both for their Local Area Networks (LAN) and their Wide Area Network (WAN). “The fact that IP was already running to everyone’s desktop and across the backbone made it a natural fit for the deployment of our new video applications,” said Thompson. Not only was the IP network already available, it could be more fully utilized by adding multimedia traffic to it rather than installing a separate network just for video. Furthermore, managing and administering a single network infrastructure for all key applications saves cost, improves both efficiency and network service levels, and reduces training requirements for network management personnel.

The desire to deploy videoconferencing on the Enterprise IP network is very common. In fact, a recent survey by Perey Research (Networked Multimedia Briefing, Feb'99) found that 54% of respondents already had videoconferencing deployed on their IP network, either in the lab, in workgroups or across the enterprise-wide IP network.



Deployment and Configuration Information

At the LAN level, all HSC departments are on switched Ethernet connections. The campus backbone is running Gigabit Ethernet with 100Mbps full-duplex to downstream switches, and either switched 10Mbps or 100Mbps Ethernet to the desktop, depending on location. However, the 100Mbps requirement in select locations is not due to video applications alone. In fact, overall network utilization has not been a problem since the implementation of videoconferencing. The HSC is using Cisco Catalyst 5500 switches for the campus backbone, and a mixture of Cisco 1900 series switches and ATI brand switches to support the departmental LANs that are using video.

At the WAN level, a Cisco 7206 router is connected to one of the Catalyst 5500 backbone switches via ATM running at OC-3 (155Mbps). All IP traffic, including the videoconferencing traffic, runs over this ATM backbone using LAN Emulation (LANE). HSC communicates with their two affiliate hospitals via an ATM connection as well. LANE is an ATM service defined by the ATM Forum specification LAN Emulation over ATM (ATM_FORUM 94-0035). This service emulates the following LAN-specific characteristics:

- * Connectionless services
- * Multicast services
- * LAN MAC driver services

LANE service provides connectivity between ATM-attached devices and LAN-attached devices, including connectivity between LAN-attached stations across an ATM network. Because LANE connectivity is defined at the MAC layer, upper protocol-layer functions of LAN applications can continue unchanged when the devices join emulated LANs. This feature protects corporate investments in legacy LAN applications when an ATM backbone is implemented.

For H.323 videoconferencing, the University HSC has a 24-port VideoServer NetServer Multipoint Control Unit (MCU) and utilizes a VideoServer gatekeeper. The gatekeeper is used primarily

*The requirement for multipoint conferences was initially underestimated. As a result, the 8-port MCU was upgraded to 24-ports.

*As a general rule, the HSC uses dynamic IP addressing via DHCP. However, they decided to use static IP addresses for their videoconferencing clients to allow for increased control by the network managers. From an auditing standpoint, the static IP addresses allow them to know who is conversing over video at any given time. They also feel that it allows them to troubleshoot problems quicker by knowing which subnet may be having problems, etc. Another reason for using static IP addresses on their video clients is that it provides a backup form of call resolution in case the gatekeeper (or its segment) is down. Users are still able to make direct calls via IP addresses.

*Switched 10Mbps to the desktop is considered a minimum standard for video users. The dedicated bandwidth between the endpoint and the switch is certainly optimal. Additionally, the HSC is progressively upgrading segments to switched 100Mbps – not solely for video, but it will enhance performance even further. According to the network manager, the use of switches and dedicated bandwidth has proved to make this project, and future IP video applications, run more smoothly, thereby providing better service to the end user.

Next Steps

The use of video-based communications within the Health Science Center has proved to be so effective that there are already plans to expand its use. HSC is interested in utilizing streaming video (multicast) for internal training and distance education. Using streaming video technology, many more participants than usual can engage in a training course than otherwise is practical. “Now that our IP network is ‘multimedia enabled’, adding new and different video applications will be relatively easy,” said Thompson. “Our initial investment will now continue to pay for itself over and over again.”

Additionally, due to the success of the telemedicine pilot for Cardiology, the project is likely to be expanded to include both live consultations as well as store & forward video capabilities for the Cardiology, Emergency Medicine and Family Medicine departments.

Thompson and his network administration staff are anxious to evaluate VCON's 4.0 software release, which includes advanced bandwidth management and QoS features embedded into the endpoint itself. Rather than arbitrarily limiting bandwidth for H.323 calls using the gatekeeper, they would be able to utilize VCON's Adaptive Bandwidth Adjustment feature to automatically monitor the network capacity and performance, and allow the endpoint to dynamically optimize the video quality based on available bandwidth. There is also a great deal of interest in VCON's new QoS features, including IP Precedence, Packet Ordering, and Jitter Correction. “We're anxious to put VCON's new PacketAssist Architecture to the test,” said Thompson.

“We see video-based communications becoming an increasingly important and integral part of health care delivery at the University HSC,” said Thompson. Additionally, one of Thompson's network managers said, “The future is IP video. Whether it's simple teleconferencing or telemedicine, the interest in IP video is growing by leaps and bounds. The services and applications provided by this medium of communication are innumerable.”

Related Reading and Internet Links

University of South Florida Health Sciences Center
(<http://www.hsc.usf.edu/>)

“ATM and Token-Ring LANE” by Cisco Corporation – March 27, 1998
(<http://www.cisco.com/univercd/cc/td/doc/product/lan/trsr/b/atmelan.htm#xtocid54009>)

Stardust Forums “Internet Bandwidth Management” White Paper
(<http://www.stardust.com/iband2/ibandbackgrounder.pdf>)

“Cisco IOS Software Quality of Service Solutions”
(http://www.cisco.com/warp/public/732/net_enabled/qosio_wp.htm)

“VCON PacketAssist: An Architectural Approach to Delivering QoS for IP Video”
(<http://www.vcon.com>)

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