

# Broadcasting Live Surgery

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Imagine a scenario where doctors from different hospitals can collaborate on a surgery without having to actually be in the operating room. What if doctors in remote locations could receive immediate expert support from top specialists in hospitals around the world?

This environment could soon become a reality thanks to research by a multi-university partnership that is testing the live broadcast of surgeries using the advanced networking consortium Internet2 and the NYSERNet Research and Education (R&E) Network.

Rochester Institute of Technology is collaborating with a team led by the University of Puerto Rico School of Medicine that recently tested technology, which allows for the transmission of high quality, real time video to multiple locations. Using a secure, high-speed network, an endoscopic surgery at the University of Puerto Rico was broadcast to multiple locations in the United States reaching RIT over NYSERNet's R&E Network. The experiment also included a multipoint videoconference that was connected to the video stream, allowing for live interaction between participants.

Results from the test were presented at a meeting of the collaboration special interest group at the fall 2008 Internet2 member meeting in New Orleans. "The University of Puerto Rico has been performing this type of transmission between two sites for more than a year, but we are now able to utilize a combination of technologies that allows us to transmit to multiple sites simultaneously," notes José Conde, director of the Center for Information Architecture in Research at the University of Puerto Rico Medical Sciences Campus.

"Being isolated geographically from major research centers, we need to use information technology to foster research collaborations with scientists around the world," Conde adds.

"Previous efforts in telemedicine have been hampered by the quality of the video stream produced and the potential for network interruptions," says Gurcharan Khanna, director of research computing at RIT and a member of the research team. "This test demonstrates that by using the speed and advanced protocols support provided by the Internet2 network and NYSERNet's R&E Network, we have the potential to develop real-time, remote consultation and diagnosis during surgery, taking telemedicine to the next level."

The researchers utilized a 30-megabit-per-second broadcast quality video stream, which produces high quality images, and configured it to be transmitted via multicast using Microsoft Research's ConferenceXP system. This level of real time video was not possible in the past due to slower and lower quality computer networks. The team also utilized a Polycom videoconferencing system to connect all parties.

The team will next conduct additional tests with different surgical procedures and an expanded number of remote locations. The researchers' goal is to transfer the technology for use in medical education and actual diagnostic applications.

"Today, physicians often need to travel to both examine patients and conduct consultations," says Khanna. "Given the growing capacity of Internet technologies, the development of live remote consultation with high quality video could revolutionize medicine and greatly enhance the care patients can receive while reducing overall costs to the health care system."

The research is being funded through a grant from the National Center for Research Resources at the National Institutes of Health to the University of Puerto Rico. The team also includes Johns Hopkins Hospital, the University of Michigan School of Medicine and the Office of High-Performance Computing at the National Library of Medicine. For more information about the project visit <http://rc.rit.edu/endo.html> or <http://rcmi.rcm.upr.edu>.