



www.internet2.edu

Streaming high-quality digital video over advanced networks is essential to nearly all Internet2 applications, whether in the arts, sciences, or healthcare. Many initiatives in our member community are producing a new generation of digital video applications, advancing worldwide research and education.

Streaming Video



Streaming Video

Interactive Video

Live Coast-to-Coast Undersea Video

University of California, Santa Cruz
University of Connecticut
VBrick Systems

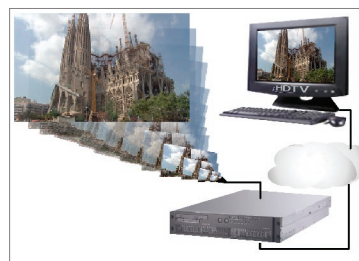
<http://mysticaquarium.org/newthings/articles/immersion.asp>

Visitors at Connecticut's Mystic Aquarium immerse themselves in an underwater world 3,000 miles away by remotely controlling underwater cameras in California. Using interactive consoles at the Mystic Aquarium's Immersion Institute, visitors control three video cameras on an underwater submersible in Monterey Bay, the largest U.S. marine sanctuary. The live video is encoded into DVD-quality MPEG-2 and sent at an average rate of 6 Megabits per second (Mbps) to the University of California, Santa Cruz, where it travels across Internet2 high-performance networks to the University of Connecticut and on to the Mystic Aquarium.

High Definition Video Array

ResearchChannel Consortium

<http://researchchannel.org/inside/i2wg/projects.asp>



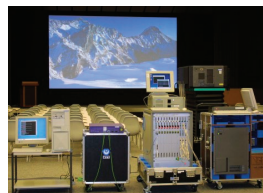
ResearchChannel pushes the boundaries of High-Definition (HD) video over advanced networks with a variety of

projects ranging from uncompressed, extreme-quality HD at 1.5 Gbps; to editable, studio-quality HD at 270 Mbps; to production-house-quality HD at 45 Mbps; to viewer-quality HD-to-the-desktop at 19.2 Mbps. Having successfully tested these prototypes, ResearchChannel will continue to develop projects involving networking configuration and hardware and software development. Areas of further work include uncompressed HD for interactive videoconferencing, decreasing the latency of 270 Mbps HD, and improving the desktop HD client.

Super High Definition Video

Nippon Telegraph and Telephone Corporation
University of Illinois at Chicago
University of Southern California

<http://www.onlab.ntt.co.jp/en/mn/>



The successful transport of a Super High Definition (SHD) stream over advanced networks occurred at the Fall 2003 Internet2 Member Meeting, where an NTT sys-

tem at the UIC Electronic Visualization Laboratory sent SHD to the Robert Zemeckis Center for Digital Arts at the USC School of Cinema-Television. SHD scientific visualizations and student films—four times the resolution of HDTV—were compressed to 200-400 Mbps streams using an experimental JPEG codec, stored, and sent to an NTT real-time decoder. NTT's prototype SHD frame buffer then fed an eight-megapixel projector for display.

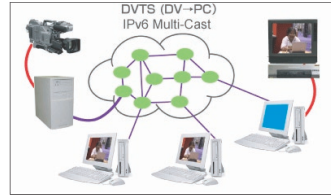
Interactive Video

Digital Video Transport System

WIDE Project Japan

<http://www.dvts.jp/en/>

<http://www.sfc.wide.ad.jp/DVTS/software/>



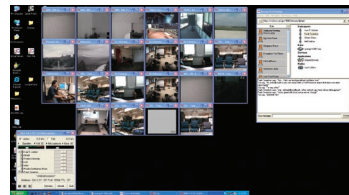
Digital Video Transport System (DVTS) enables high-quality, real-time communication using free, downloadable software and off-the-

shelf video and audio equipment. DVTS streams DV across advanced networks at 30 Mbps using Internet Protocol version 4 (IPv4) or 6 (IPv6). The DVTS client for Windows XP supports IPv6 unicast and multicast. PAL support has been included in the Mac OS X and Linux clients, and redundant audio transport capabilities have been added to improve audio performance in low packet-loss conditions. DVTS has been used to link instructors with students, and researchers with research laboratories around the globe.

The Access Grid 2.0

Argonne National Laboratory

<http://www.accessgrid.org/>



The Access Grid is a set of resources for multi-site, group-to-group collaborations over advanced networks, consisting

of large-format video displays of participants, presentation sharing, and multimedia streaming. Access Grid version 2.0, released in May 2003, has been completely rebuilt using the Globus Toolkit for security and access to the Grid infrastructure. This allows developers to create advanced collaborative applications using the Access Grid Toolkit. The new Access Grid is capable of supporting a wider range of client platforms, including desktop computers, laptops, and traditional room-based nodes. The Access Grid project at Argonne National Laboratory is supported by the National Science Foundation, the U.S. Department of Energy, and Microsoft Research.

Virtual Rooms Videoconferencing System 3.0

California Institute of Technology

<http://vrvs.org/>



Virtual Rooms Videoconferencing System (VRVS) is a web-based system for interoperable videoconferencing and collaborating. VRVS supports multiple plat-

forms—Windows, Mac, Linux, Unix—and diverse collaborative applications—Access Grid, H.323 videoconferencing, QuickTime, chat, desktop sharing, and, soon, Microsoft Messenger. Ninety-five percent of the code was re-written for the spring 2003 release of VRVS 3.0, which includes an advanced booking system, new virtual rooms for meeting spaces, a streamlined web-based user interface, firewall and NAT solutions, Access Grid tunneling, self-selection of video streams, user authentication, and synchronized time zones. No port reservations are required in order to initiate a videoconference—simply book a room in advance for any number of participants to join. Funding provided by the National Science Foundation and the U.S. Department of Energy.