Remote Site
Client using RICE software to access the electron microscope.

OSU CAMM
Electron microscope

RICE: Removing roadblocks to sharing scientific instruments

The Ohio Supercomputer Center and its partners are enabling researchers around the state and beyond to remotely access some of Ohio's most valuable and expensive scientific instruments over the Internet.

Remote access to instrumentation such as electron microscopes, NMRs, Raman spectrometers, and ion accelerators demand high-resolution video image transfers with simultaneous, real-time mouse and keyboard controls.

"With such high-bandwidth demands, end-user quality-of-experience during 'tele-observation' or 'tele-operation' is affected by last-mile network bandwidth limitations," said Prasad Calyam, a systems developer and engineer at OSC. "Quality-of-experience is also highly sensitive to network traffic congestion. Improper mouse and keyboard movements due to delays caused by network bottlenecks could result in physical damage to instruments that are prohibitively expensive to repair."

OSC, with assistance from the Center for Advanced Maturation of Materials at The Ohio State University, has modeled several objective and subjective measurements in remote access sessions. These tests have been conducted under different network conditions - in LAN environments and across OSCnet, Ohio's statewide, fiber-optic research and education network. Based on user needs and the modeling experience, OSC engineers developed the Remote Instrumentation Collaboration Environment (RICE) software. RICE is a remote access application that features multi-user session support, user-control management, live video feeds between labs, and collaboration tools such as Voice-over IP and chat. This technology also can support image archival/retrieval for managing image datasets collected during remote instrumentation sessions.

"The ultimate goal is to integrate RICE into existing cyberinfrastructure for a remote instrumentation service that is easy to use and maintain," said Mr. Calyam. "Such a service can foster research and training activities that drastically shorten the development process involved in innovations related to materials modeling, cancer research, and the like."

This type of service also will improve user convenience, significantly reduce costs and, ultimately, decrease duplication of instrumentation investments across the state, he said.

RICE
Remote Instrumentation Collaboration Environment
an initiative of the Ohio Supercomputer Center

OSC Partners:
- The Ohio State University
- Miami University
- Ohio University

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Principal Investigator:
Hamish Fraser, Ph.D., Center for the Accelerated Maturation of Materials, The Ohio State University

Co-Principal Investigator:
Ashok Krishnamurthy, Ph.D., Ohio Supercomputer Center

For more information:
www.osc.edu/research/networking/projects/telemicroscopy