

Marquette University connection to Abilene/Internet2:

Proposal Summary

This proposal has been funded by National Science Foundation as of September 1, 2003. In order to accomplish this, we need to provide a high speed network connection between Marquette University and WiscNet/WiscREN Point of Presence in Milwaukee, Wisconsin. Such a connection will gain Marquette University an entry into the Abilene/Internet2 community, which currently has 204 members across United States. Such a high-speed access to Abilene/Internet2 is needed to support current research efforts and expand the university's presence within the research and education community. Researchers at Marquette are associated with other high performance centers such as University of Wisconsin, Milwaukee and Madison Campuses, Medical College of Wisconsin, University of California, Berkeley, Internet2 Technology Evaluation Center of Ohio/Ohio Supercomputer Center, and 32 American Dental Education Association member schools. Current bandwidth limitations made it necessary for Marquette University to upgrade its backbone to state of the art Gigabit Ethernet in the past year. However, bandwidth off-campus continues to be a bottleneck to successful and efficient collaborations with partners locally, regionally, nationally and internationally.

Intellectual Merit

The intellectual merit of the proposed projects is reflected in the diverse areas of research and applications that Marquette University is involved in collaboration with other Internet2 member schools nationally and outreach efforts within the K-20 community at state and local levels. Four meritorious applications that are highlights of this proposal include:

1. The "Chemical Proteomics Facility at Marquette" (CPFM):

This will be a shared resource open to researchers throughout Marquette and the greater Milwaukee area, with the mission to provide resources to assist in characterizing protein-ligand interactions more broadly, studying pathways or families of enzymes in parallel. Initially, an NMR (Nuclear Magnetic Resonance) spectrometer (*NIH application pending*) will serve as a cornerstone for the facility, as well as access they are offering to a Beowulf cluster to assist users in computational docking studies.

2. Universal Imaging System/Case Based Learning/TeleDentistry:

This project comes out of Marquette's Dental School and includes a case-based learning amongst 64 US and Canadian Dental Schools, while aggregating dental images in a database for future research archival. Provide Marquette based centralized application hosting and storage for 34 Internet2 partners.

3. Rehabilitation Engineering Research Center on Accessible Medical Instrumentation:

This project will enhance collaborative research and real-time activities between teams of researchers at University of California, Berkeley and Marquette. Both sites will simultaneously be able to perform shared computer simulations, videoconference and synchronously share high-quality video and sensor editing capabilities.

4. H.323 Ping Collaboration:

This is the Phase2 part of the H.323 Beacon project researched out of the Internet2 Technology Evaluation Center of Ohio (ITEC-Ohio). Marquette University's Information Technology Services group will be partnering with the ITEC-Ohio research team to design and develop this tool using the high performance connectivity between the two laboratories. Internet2's End-to-End performance initiative group is also a collaborative partner in this project.

Broader Impact

Broader impacts from successful research and implementation of the above projects are:

1. A fully enabled high performance network connectivity can leverage a significant NIH investment in the NMRFAM (NMR Facility at Madison), since that facility is best used for follow-on experiments at higher magnetic field strength after routine optimization and experimental setup at Marquette's CPFM. This ultimately would result in greater usage of the more expensive high field instruments at the NMRFAM, because it will produce more labs in the greater Milwaukee area that have an involvement in NMR technology and in near term save travel time between Marquette University and UWM.
2. Provide a real-time case-based learning model throughout US and Canada. It also involves organized archiving of the dental images that can be used in future for population studies and oral health research.
3. Provide expert supervisory consultation or remote evaluation during a data collection session, i.e. enhance access of researchers to subjects and field-based staff to specialized expertise.
4. Provide an effective, low cost tool to authenticate end-to-end connectivity, specifically to validate and H.323 based video conferencing without manual intervention while avoiding necessity of expensive videoconferencing equipment at the remote ends.

Marquette University plans to disseminate results from the above projects in various Internet2 working groups and research initiatives. Funding from this grant will also enable Marquette's faculty, engineers and staff to get exposure at a national level through various Internet2 events, meetings and workshops.