

Building Scientific Collaboratories

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The US Department of Energy has several high-end scientific instruments with user populations spread throughout the world. Collaboratories have the potential to allow scientists to remotely access instruments and collaborate with other scientists without leaving their home institutions. The capabilities provided by collaboratories are expected to increase the effectiveness of existing resources. Scientists and engineers will be able to interact as if they were physically collocated--sharing data, high-performance computing systems, and instrumentation independent of location.

We have been involved in building a prototype collaboratory testbed with the University of Wisconsin-Milwaukee that is allowing remote operation of a sophisticated synchrotron-radiation beamline in the Advanced Light Source (ALS) of Lawrence Berkeley National Laboratory (LBL); the Spectro-Microscopy Collaboratory allows several scientists to simultaneously access the experiment and collaborate on the experiment regardless of their locations. Through collaboratories we are changing the way scientific experiments are carried out.

This talk will describe the collaboratory and some of the research and development projects that are building the underlying distributed mechanisms and infrastructure required to make collaboratories a reality. A conference controller (confctrl) allows coordination and remote control of the MBone videoconferencing tools. The Collaboratory Interoperability Framework project will provide a consistent easy to use communication API that provides access to unicast and multicast messaging. Messages in the system can be sent requesting varying degrees of reliability. Through the use of a simple common communication model we are enabling scientists to more easily build collaboratories. Other tools under development for collaboratories such as electronic notebooks and a distributed security architecture will also be mentioned.