The first wide-area distributed collaborative simulation realized by NISAC and its collaborators was achieved by linking the Sandia NISAC Agent Based Laboratory for Economics (N-ABLE) with the Argonne Electricity Markets Complex Adaptive Systems Model. These two models communicate via Web Services in a time-step synchronized manner, as illustrated below.

Researchers at MIT and NISAC investigated using the Open Grid Services Architecture to coordinate disparate agent-based models. This communication method layers Grid functionality on top of SOAP.

DTRA MIDAS

NISAC and Defense Threat Reduction Agency’s (DTRA) MIDAS Engineers established a SOAP-based channel for the exchange of geospatially referenced critical infrastructure data.

MIT Center for Grid Computing

Researchers at MIT and NISAC tested secure hardware-level resource sharing using the Globus Toolkit Version 2.2.

UNM HPCERC

Researchers at the University of New Mexico’s strategic High Performance Computing, Education and Research Center (HPCERC) and NISAC tested secure hardware-level resource sharing using the Globus Toolkit Version 2.2.

Further Challenges

Security components must assuage a range of concerns across governmental, commercial, university, and individual resources, including accommodating local security and access control policies, and combining both Public Key Infrastructure (PKI) and Kerberos authentication infrastructures.

Scaling to very large data sets, simulation archive management, and visualization will also be addressed.

Networking issues (firewalls, proxies, protocol mismatches) and model integration issues (time management, semantic API interoperability) will continue to provide opportunities for deeper and more complex solutions.