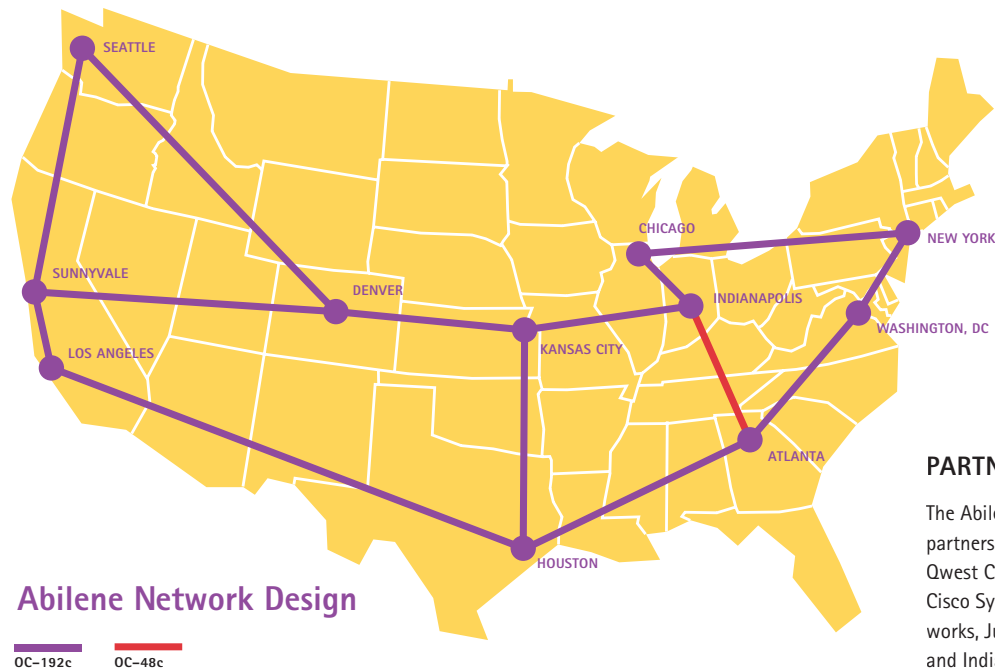




The Abilene Network is an Internet2 high-performance backbone network that enables the development of advanced Internet applications and the deployment of leading-edge network services by Internet2 universities and research laboratories across the country. Created by the Internet2 community, Abilene connects regional network aggregation points—known as gigaPoPs—to provide advanced network capabilities to over 220 Internet2 university, corporate, and affiliate member institutions in all 50 states, the District of Columbia, and Puerto Rico. The current network is a primarily OC-192c (10 Gbps) backbone employing optical transport technology and advanced high-performance routers.



PARTNERSHIPS

The Abilene Network is a partnership of Internet2, Qwest Communications, Cisco Systems, Nortel Networks, Juniper Networks, and Indiana University.

Abilene Goals

Abilene Community

Global Research Interconnectivity

Abilene Observatory

Advanced Network Applications

Abilene Goals

The goals of the Abilene Network are to provide an advanced backbone in support of:

- Cutting-edge applications developed using innovative, experimental techniques and requiring high-performance network services not available on existing commercial networks.
- The deployment and testing of advanced services, including multicast, IPv6, measurement, and security, which are generally not possible on the commodity Internet.
- Connectivity to other research and education networks throughout the world, including the U.S. federal research networks, thus enabling the international research community to collaborate in new ways.
- Access for researchers to a rich set of network characterization data collected in a high-performance networking environment supporting new and innovative applications.

ADVANCED SERVICES AND CAPABILITIES

Advanced Internet services are an important aspect of the Abilene Network, and include:

- Multicast
- Native IPv6 Support
- Measurement
- Security
- Raw HDTV Streaming – 1.5 Gbps/sec
- Bulk Data Transfer
- Interactive Collaboration
- Grid Computing

Abilene Community

The Abilene community includes three general levels of participation:

- **Primary Participants** – Internet2 members, including research universities and collaborating federal and corporate research laboratories located in the U.S.
- **Sponsored Participants** – Collaborating partners of Internet2 university members (e.g., small laboratories, museums, clinical research centers) requiring access to advanced networking.
- **Sponsored Educational Group Participants (SEGP)** – Aggregations of state education networks connecting the K-12 community, baccalaureate and community college networks, and libraries.

Global Research Interconnectivity

The Abilene Network provides connectivity for participating institutions to over 40 other research and education networks, both within the United States and internationally. Abilene also serves as an International Transit Network so that two international peers can transit Abilene for interconnectivity when required.

The Abilene Observatory

<http://abilene.internet2.edu/observatory>

The Abilene Observatory supports the network research and advanced network engineering communities through the collaborative sharing of the vast amounts of network performance information gathered within the Abilene Network and the facilitation of innovative network experiments deep within the core of a national backbone network. The Observatory effort has two essential components:

- an accessible, correlated archive of data collected by the Abilene project team using dedicated measurement servers in each of the Abilene router nodes; and
- the support of affiliated research projects through the placement of experimental servers and other measurement equipment in these nodes.

Advanced Network Applications

The development of advanced applications is an essential component of Internet2. The Abilene Network provides a platform for the deployment of such applications.

Remote Media Immersion

<http://imsc.usc.edu/rmi/>



Tremendous network resources are required to capture, stream, and render the high-resolution, big-screen digital video and high-fidelity, multichannel audio needed to create a seamless, teleimmersive presence.

Researchers at the NSF-funded University of Southern California Integrated Media Systems Center are using Remote Media Immersion (RMI), which combines several breakthrough Internet technologies, as a test bed to deliver immersive experiences over the Abilene Network. Their experiments have yielded the error-free transmission of multiple synchronized data streams with sustained data rates as high as 60 Mbps.

NEESgrid Multi-Site Simulation

<http://www.neesgrid.org/most/>



NEESgrid links participants in the NSF-supported George E. Brown, Jr. Network for

Earthquake Engineering Simulation (NEES) project to create a national virtual earthquake engineering laboratory. NEESgrid provides a scalable, extensible system by integrating experimental, archival, and numerical simulation sites that are connected to each other through the Abilene Network. Several NEESgrid participants staged a multi-site simulation of a large-scale experiment combining physical measurements with computational simulation. Simulation participants used the Abilene Network to demonstrate NEESgrid's capabilities, including data management services, teleobservation, teleoperation, and computation and simulation services.