RESEARCH DISTANCE LEARNING ENGINEERING CHEMISTRY
HIGH PERFORMANCE COMPUTING EDUCATION CYBER SECURITY
IDENTITY ARTS & HUMANITIES ECOLOGY performing arts STEM
physics ADVANCED NETWORKS eduroam cloud computing
astronomy BOTANY GEOLOGY OCEANOGRAPHY
INCOMMON BIG DATA GENOMICS
VIRTUAL REALITY LOLA mathematics
science meteorology CLIMATOLOGY
TECHNOLOGY BIOLOGY K-12 IoT

INTERNET2

Internet2 Network For Advanced Research

Why Internet2?

More than a network, Internet2 represents a resource that enables scientific discovery through collegial collaboration and advanced technological resources. The advantages of engaging with Internet2 are twofold: membership and access to a network optimized for big data collaborations.

Membership allows the use of the network and provides access to a community of researchers who are focused on solving the challenges of distributed computational science, as well as access to national and global academic collaboration engagement.
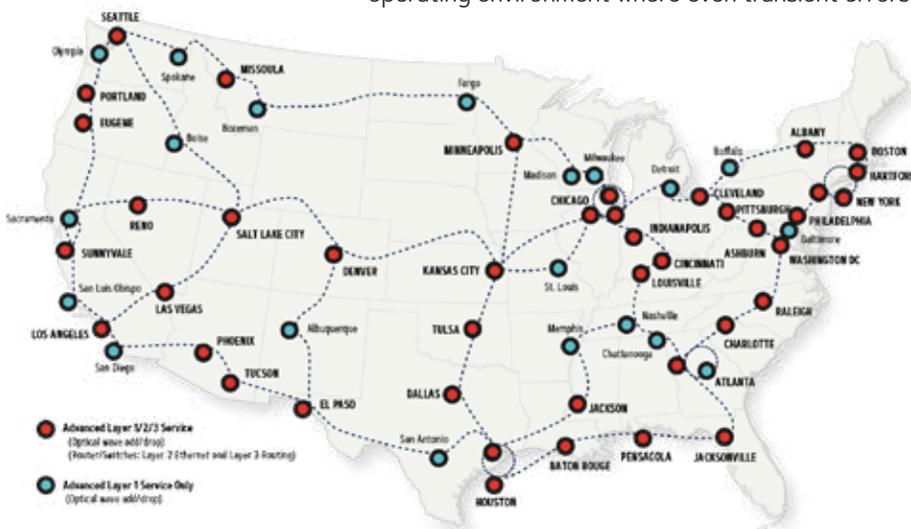
This community of peers represent a diverse set of disciplines, expertise and experience, providing members an invaluable resource to discuss current challenges and solutions that cross boundaries between applications, networking, security, and policy. For example, in addition to an advanced network, the Internet2 community developed and supports the InCommon Federation, a unique trust and identity framework that provides single sign-on convenience to a variety of services (both in the enterprise and external) in a secure, privacy-preserving way. This community-led federated identity management system of over 6 million users is further enhanced by advanced collaboration tools that provide group and role-based access (Grouper, COmanage)—all combining to solve everyday challenges confronted by scientists and researchers.

Internet2 owns and operates a dark-fiber based network that is designed specifically to support the demands of high-performance applications and distributed computational science, providing support for 100Gigabit per second connectivity on a 17.6Terabit per second optical transport system covering over 18,000 network miles.

Additionally, the network is monitored and maintained to preserve a pristine operating environment where even transient errors or loss are pursued and eliminated, because at the very high data rates at which Internet2 operates, even a loss of one packet in every 10,000 could dramatically impact performance experienced by the Internet2 user community.

The capabilities of the Internet2 network do not stop at performance; the network has become a critical infrastructure for its member community and as such, network availability is equally important. Internet2 operates as a production network with 24x7x365 operations support, industry leading response and repair times, utilizes carrier-class

ADVANCED NETWORKS

The Internet2 network, as compared to the commercial Internet, is engineered to ensure maximum performance for data-intensive applications and high-bandwidth data-transfers over the wide-area network—the kinds of application performance that Big Science demands.

Advanced Layer 1/2/3 Service
(Optical wave add/drop)
(Router/Switches: Layer 2 Ethernet and Layer 3 Routing)

Advanced Layer 1 Service Only
(Optical wave add/drop)

equipment and industry standard colocation facilities for all the network nodes. Performance and availability ensure that the Internet2 network is poised to handle the most demanding real-time applications.

To take full advantage of Internet2's commitment to supporting advanced applications and high-performance networking, members have connected to Internet2 with high-performance links of their own. This means that a connection to Internet2 provides its members with superior access to major scientific and research facilities across the nation and globe. These research facilities include major HPC centers, US national laboratories and major scientific data repositories.

Connectivity to these important facilities as well as major research universities form a unique, easily-accessible ecosystem for scientists and researchers, with high-performance Internet2 networking as its nexus. The scope and scale of interconnectivity to important scientific facilities and resources as represented by Internet2 are simply unmatched by any commercial network solution.

Features of Internet2 Connection Types

Advanced Layer 3 Service (AL3S) Connection - leading edge network characteristics to meet the constantly evolving needs of high-speed research and collaboration.
AL3S is a port-based connection with full access by the entire connecting organization to all offered Internet2 services including: full access to all Internet2 routes and its domestic and international peer networks; full access to the Content Peering Service (CPS) (direct peering with the largest content providers on the Internet) these connections equate to about 50-70% of a typical user's Internet utilization; access to large public cloud providers, e.g., Amazon AWS/EC2, Microsoft Azure, Google, etc.; and, access to Internet2's Advanced Layer 2 Service (AL2S).
Available as 10G/100G connection. One price for the port (10G and 100G are the same)

Select Research IP Connection
Similar to AL3s, Select Research IP is port-based connection providing partial access by the connecting organization (limited to /22 IP address block or about 1000 hosts) to a select set of offered Internet2 services: full access to Internet2 and its domestic and international peer networks; access to CPS; access to six member-selected public cloud providers; access to AL2S.
Available as 10G connection only

Advanced Layer 2 Service (AL2S) Connection - improves performance, programmability, reliability, and predictability for distributed big data science applications
AL2S is a port-based service that enables user provisioning of private Ethernet VLANs across the Internet2 national backbone and to select domestic and international networks, utilizing MPLS as the underlying transport method. The AL2S network will do VLAN translation, eliminating the need to coordinate VLAN tags among end-sites. Users can select primary and backup paths through the Internet2 network to ensure continuity of connectivity. AL2S can be combined with AL3S and AL1S (Layer 1 or optical wave services) to create a custom, layered topology that supports differentiated service networks for members.
Available as 10G and 100G

Advanced Layer 1 Service (AL1S) - the most specialized and cost-effective way to build a custom, high-capacity network.
AL1S is a point-to-point optical wave service providing dedicated bandwidth across the Internet2 network. Optical waves provide the most deterministic service of all of the Internet2 network services as the member's traffic is riding in a dedicated connection that has no other traffic on it. AL1S is the preferred service for those that want a high degree of separation from other traffic, have very specific performance or capacity requirements, or want to use unique forwarding protocols.
Available as 10G, 40G, 100G, 4x 10G, 10x 10G, 2x 100G and 4x 100G

CONTACT US

To learn more about ...

internet2.edu