



## Internet2 ION™: How to Connect

[www.internet2.edu/ion](http://www.internet2.edu/ion)

**Internet2 ION** (Interoperable On-demand Network) is a revolutionary network service that allows researchers and engineers alike to create dedicated, point-to-point optical circuits—for immediate or future use—through a simple, secure web interface. Here’s how your organization can connect to Internet2 ION.

**Internet2 Connectors.** Current Internet2 IP Connectors interested in using the Internet2 ION service should send a request to [network@internet2.edu](mailto:network@internet2.edu). An Internet2 project manager will be assigned to the request and will work with the Connector and the Internet2 Network Operations Center (NOC) to implement the required network connections to ensure successful service delivery.

**Internet2 higher education members.** Researchers at Internet2 higher education member institutions who wish to collaborate using ION should first contact their campus network organization for support. The campus network team can then determine if their institution has an “enabled” link to an Internet2 Connector or other regional network. If their Internet2 Connector does not yet have a physical connection to ION, the Connector can submit a request using the process outlined above.

**Initial connections**  
The first step to take advantage of ION service is to interconnect with the Internet2 ION infrastructure via a 1GigE or 10GigE Ethernet connection. The logistics of that connection will be handled as part of the turnup process.

After the physical interconnect is established, Internet2 Connectors have two primary methods of providing ION services to downstream Network Participants. The simplest approach

involves a static configuration of Ethernet VLANs between the Internet2 ION infrastructure and the Connector’s Participants. The second approach involves the implementation of a dynamically controlled network at the Connector that provides on-demand provisioning of the Connector’s equipment. An Internet2 Connector is free to choose the methodology that best serves its user community.

The Internet2 NOC and Internet2 staff will provide one-on-one consultation to help make a successful connection. Through partnership with regional networks and members, Internet2 has also created a series of workshops to help educate its members on ION setup processes, best practices, and associated technologies.

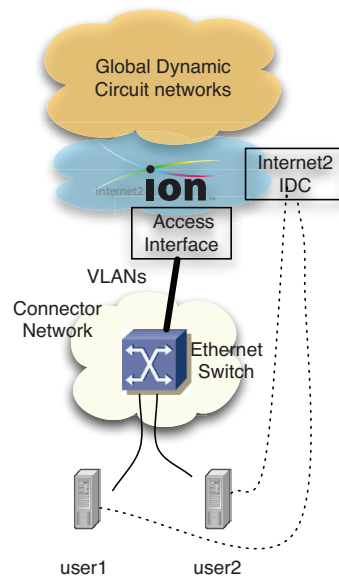
### FOR MORE INFORMATION

ION web page  
[internet2.edu/ion](http://internet2.edu/ion)

Check Connector ION-enabled status at  
[internet2.edu/dcresearch/connector-status.html](http://internet2.edu/dcresearch/connector-status.html)

Interested members should contact [network@internet2.edu](mailto:network@internet2.edu)

Try the ION demo at  
[iondemo.net.internet2.edu](http://iondemo.net.internet2.edu)  
(log in using **guest** for username and password)



**Figure 1.** Connecting to Internet2 ION: Static method Connector creates a VLAN connection.

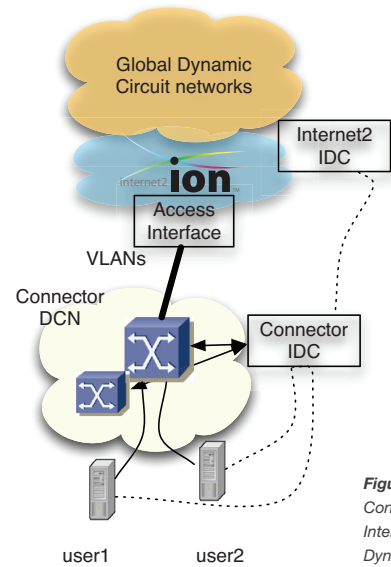
### Connecting to Internet2 ION: Static method

For Connectors wishing to provide static services on their local equipment, Connectors must generally have an Ethernet switch that

connects to the ION infrastructure in the Internet2 point of presence (PoP). The Ethernet switch is used by the Connector to create a virtual local area network (VLAN) connection from the user on campus to the Internet2 ION Access Interface. The user requests a dynamic circuit on the Internet2 ION infrastructure, and the dynamic circuit starts at the edge of the Internet2 Network. As demand for the ION service grows, the Connector adds users by establishing additional VLAN connections through the Ethernet switch from each user to ION.

**Connecting to Internet2 ION: Dynamic method**

As the population in a single region or campus expands, regional networks or campuses may consider establishing local or regional dynamic circuit networks. This allows the Connector to provide dynamic control of its infrastructure between end users and the Internet2 ION infrastructure. The open-source dynamic circuit network software suite provides the necessary tools to initiate this process. Connectors install an Inter-Domain Controller (IDC) that dynamically controls the Connector’s local equipment and provides the necessary signaling to the Internet2 ION infrastructure. Figure 2 shows a Connector that has created its own dynamic circuit network and is a full participant in the Global Dynamic Circuit community. In this case, the data connections are the same as in the static method, but now the user requests dynamic circuits from the Connector IDC rather than the Internet2 IDC.

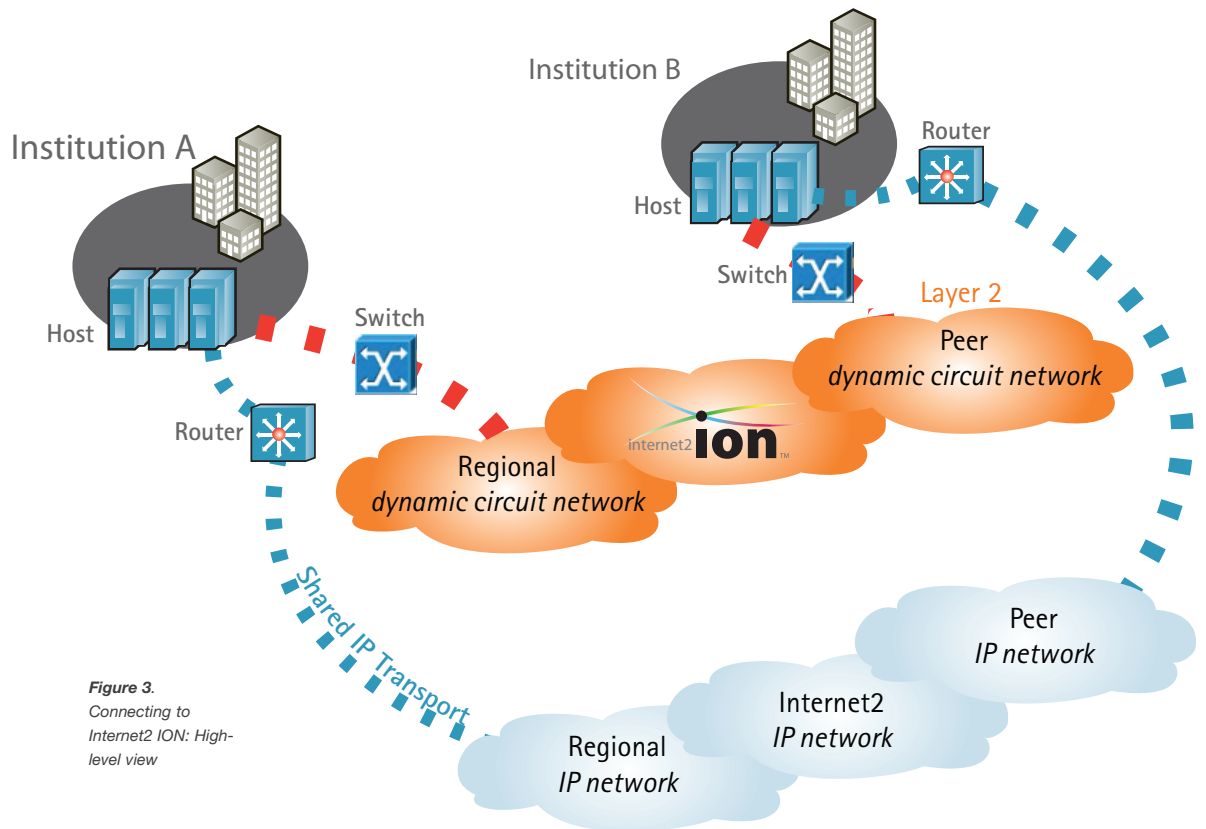


*Figure 2. Connecting to Internet2 ION: Dynamic method. Establishing a local or regional dynamic circuit network.*

**Connecting to Internet2 ION: An example**

Here’s a high-level view of how an Internet2 ION connection might be made between two sites in the United States. Figure 3 demonstrates how regional networks connect users on campuses to Internet2 ION and to partner dynamic circuit networks like ESnet Science Data Network or GÉANT AutoBAHN. In this scenario, a researcher at Institution A does high-bandwidth (multi-Gbps) transfers to and from Institution B.

Rather than congesting the IP network between Institutions A and B with these large, periodic data flows, a short-term, dedicated, dynamic circuit is established across the dynamic circuit network domains to handle this specific traffic. The data is dynamically switched from the shared IP path onto the dedicated circuit, a multi-Gbps path devoted to this application.



*Figure 3. Connecting to Internet2 ION: High-level view*

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