
Introduction to I-Light

I-Light is a very high-speed optical fiber network connecting Indiana University Bloomington, Indiana University–Purdue University Indianapolis, and Purdue University West Lafayette to each other. I-Light also connects all three campuses to the national Internet infrastructure, including Internet2.

Discussion for the optical fiber network began in 1998. With the support of the Governor's Office, a \$5.3 million state appropriation to IU and Purdue was approved by the Indiana General Assembly in 1999. Following a period of planning, design, and contract negotiations, construction of the network began in the spring of 2001. Network installation concluded in November 2001. In December 2001, Governor Frank O'Bannon symbolically launched I-Light and Indiana became the first state in the nation to have such a network fully operational.

Indiana University (IU) and Purdue University manage the optical fiber network and are responsible for their respective connections to Indiana University–Purdue University Indianapolis (IUPUI). A steering committee with representatives from Indiana's Intelenet Commission, IU, and Purdue led the implementation of I-Light.

University ownership of the optical fiber infrastructure is a key advantage of I-Light. It represents a long-term investment by the State in research infrastructure which should easily provide enough networking capacity for the next 10 to 20 years between IU and Purdue's three main research campuses and the national optical fiber infrastructure. This investment—made by the state in good economic times—will help retain and strengthen the state's advantages in information technology in the future.

Because it significantly reduces the barriers to digital collaboration, I-Light is ushering in a new age of collaboration between the universities. Moreover, with I-Light, IU and Purdue will have greater leverage and potential for federal grants and can help Indiana become a more substantial player in the information economy.

I-Light has allowed its partner universities to pool their high-end computational resources in such new research initiatives as the creation of a distributed supercomputing grid with an aggregate theoretical peak capacity of 1.5 TFLOPS (trillions of mathematical operations per second).

The aim of I-Light is principally to support research applications. However, it also supports voice communications, e-mail, and videoconferencing between the campuses and is the primary artery for communications between IU Bloomington, IUPUI, and Purdue University West Lafayette. I-Light presents countless possibilities for collaborative research and an unparalleled platform for distance education.

I-Light acts as a digital on-ramp, extending the access to Internet2 and other high-speed research networks out further into the heart of the State to IU Bloomington and Purdue University West Lafayette. Indianapolis is home to the Internet2 Abilene Network Operations Center, managed by IU on the IUPUI campus, as well as the site

of the Indiana GigaPoP, one of Internet2's regional network aggregation points. IU and Purdue are charter partners in Internet2.

Before I-Light, Purdue and IU were limited in network capacity. The previous data access speed between Purdue and IU was 30 million bits per second. I-Light increases access speed initially to 1 billion bits per second and is expandable to 100s of billions of bits per second.

Data travel along copper—the conductor originally used by telephone companies to transmit voice messages—at a rate of 100s of millions of bits per second. Fiber optic cable can transmit at rates well over 100s of billions of bits per second. The multiple strands of fiber in I-Light available to the universities increase their capacity by many orders of magnitude.

While the I-Light system is faster than existing Internet access methods, a bigger issue is the increased volume of information that scientists and researchers will now be able to exchange. I-Light is capable of moving the entire written contents of either university's library from one campus to the other in seconds or to other universities nationwide through Internet2.

Few other states have Indiana's geographical advantage when it comes to tapping into existing fiber pathways/crossroads. The result will be an optical fiber network fabric that will allow the institutions to engage in computing grids, share resources, and position IU and Purdue faculty more competitively for federal research grants and other opportunities.