

**COMMISSION FOR HIGHER EDUCATION**

Friday March 12, 2010

**DISCUSSION ITEM A1-3:**            **Indiana University – Abilene Network Operations Center; I-Light Operations Network; GigaPop Project**

**Staff Recommendation**            For discussion only.

**Background**                            As part of the biennial budget process, the Commission makes recommendations on the so called higher education line items. The Commission is taking time during this off-budget year to take a closer look at the several line items in the budget than is typically possible during the busy budget session. This third group of line items to be reviewed by the Commission consists of three line items assigned to Indiana University: Abilene Network Operations Center; I-Light Operations Network; GigaPop Project

**Supporting Document**                *2009-2011 Biennial Budget Request from Indiana University.  
Additional documents to be distributed by Indiana University.*

**IU is the home of the Abilene Network Operations Center (NOC)**

In August of 1998, Indiana University was chosen as the home for the Abilene network operations center. The Abilene network operations center provides comprehensive network management services for all the physical and operational aspects of the Abilene network and plays a critical role in the deployment of the advanced networking initiatives and services that are the focus of the Internet2 project.

**The Abilene/Internet2 Network**

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 to Internet2 universities and research labs across the country. The network has become the most advanced native IP backbone network available to universities participating in Internet2.

The Abilene Network supports the development of applications such as virtual laboratories, digital libraries, distance education and tele-immersion, as well as the advanced networking capabilities that are the focus of Internet2. Abilene complements and peers with other high-performance research networks in the U.S. and internationally.

Created by the Internet2 community, Abilene connects regional network aggregation points—called gigaPoPs—to provide advanced network services to Internet2 university, corporate, and affiliate member institutions in all 50 states, the District of Columbia, and Puerto Rico. Today Abilene has 44 direct connectors including the Indiana GigaPop, 228 participants in all 50 states, 104 sponsored participants and 33 state education group partners (SEG-P) such as IHETS here in Indiana.

Abilene is a proving ground for high-bandwidth technologies. The cross-country backbone is a primarily OC-192c 10 (gigabits per second) backbone employing optical transport technology and advanced high-performance routers, with the goal of offering 100 megabits per second of connectivity between every Abilene connected desktop.

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

**Impact of IU's Role in the Abilene Network**

The Abilene network operations center is physically located on the IUPUI campus. The selection of IU as the home of the Abilene network operations center confirms the increasing importance of Indianapolis as a national networking center.

Strong support from the State of Indiana enabled Indiana University to be selected as home of the NOC. The State recognizes the importance of supporting the development of the new generation of high-speed Internet technologies that provide promise of major impacts in such diverse areas as distance and lifelong learning, healthcare and geographically distributed design and planning.

In large part due to the existence of ongoing State funding for the Indiana GigaPoP and the Abilene NOC, IU has been able to further leverage this investment with additional national and international responsibilities which bring great acclaim and prestige to IU and the State of Indiana.

**A. Global Networks**

Being the NOC for Abilene has enabled IU to develop the reputation and critical mass of expertise in managing the operations center of high performance networks and led to the establishment of the Indiana University Global Research Network Operations Center (Global NOC.)

The Global Research Network Operations Center is housed on the IUPUI (Indianapolis) campus, in the University Library building. Staffed by fifteen full-time technicians, the NOC operates on 24 hour, 7 day a week, 365 days a year schedule. The NOC has been awarded contracts to support not only the Abilene Internet2 network, but also the following Global Networks: TransPAC, STAR TAP, Euro-Link., MIRNet and AMPATH.

**TransPAC**

TransPAC provides high performance Internet2 network connectivity from the Asia Pacific Advanced Network to other global networks for the purpose of international collaborations in research and education.

**STAR TAP**

STAR TAP is the Science, Technology, And Research Transit Access Point -- which facilitates the long-term interconnection and interoperability of advanced international networking in support of applications, performance measuring, and technology evaluations. It enables traffic to flow to international collaborators from over 100 U.S. leading-edge research universities and supercomputer centers that are attached to high-performance global research networks.

**Euro-Link**

Euro-Link is a National Science Foundation-funded initiative that facilitates the connection of European and Israeli National Research Networks (NRNs) to the high-performance vBNS and Abilene networks.

**MIRnet**

MIRnet is a joint US-Russian project to provide next generation Internet services to collaborating US-Russian scientists and educators. Its goals include assisting meritorious scientific collaborations requiring advanced, high performance Internet services; connecting the Russian next generation Internet network to the US and other next generation networks in the US and elsewhere; and, more broadly, encouraging and supporting productive cooperation between the US and Russian scientific communities.

**AMPATH**

The AmericasPATH (AMPATH) network is a project that interconnects the R&E networks in South and Central America, the Caribbean and Mexico to US and non-US Research and Education (R&E) networks via Internet2's Abilene network.

**B. Other National Networks**

**National Lambda Rail (NLR)**

In addition to being awarded the NOC for the global research networks listed above, IU has responsibility for providing similar services to the newest advanced high performance network, **National LambdaRail**

(NLR). IU was selected in 2003 to provide both Network Operations Center and Network Engineering services to NLR, which will in FY 2007-08 add almost \$700,000 in additional annual contract income. This would not have been possible without the base level of support provided by the appropriation for the Abilene NOC and the Indiana GigaPoP. IU is also positioned to further increase its involvement in several other national networking initiatives, including the **TeraGrid project**. And the IU Global Research Network Operations Center has proposed to service the international high performance networking community, which will bring even more prestige and external funding to the University and the State.

### **Impact of the Indiana GigaPop**

The Indiana GigaPoP continues to play an expanding role in Indiana's linkage to the developing national cyberinfrastructure. As a key infrastructure component of I-Light and now I-Light2, the GigaPoP has become one of a very few premier network interface points in the nation. The GigaPoP now services not only IU and Purdue, but also the rest of the State through the connectivity of IHETS and the rest of the Indiana Telecommunications Network. The GigaPoP is now the single interface point for the State's entire higher education sector to not only Internet2 and other advanced networks, but also the commodity Internet. Its placement and use have enabled Indiana's K-20 community to take advantage of tremendous reductions in rates for internet connectivity, which in turn has allowed the State to dramatically increase its connectivity without a single dollar increase in the funding required to provide that service. And in the future, we expect to see costs actually decrease, while capacity continues to increase significantly. The Indiana GigaPoP is the State's main point of presence on the national internet infrastructure, and is helping Indiana secure a place in the lead nationally.

### **Ilight**

Ilight has become an integral part of keeping Indiana's status as a leader in networking. Well-developed, integrated networking connectivity and capacity statewide is vital to the strategy of promoting Indiana's research and collaboration requirements. Ilight has the capability to provide all higher education institutions across the state with access to other state, regional, and national networks. In addition, Ilight will allow new and deeper partnerships with neighboring states, by allowing interconnections between Ilight and similar networks in those states.

### **Committee on Institutional Cooperation (CIC) OmniPoP**

In 2007, the Committee on Institutional Cooperation selected IU in a competitive bid to be the operator of the new CIC OmniPoP network in Chicago. This network provides access to all CIC schools, including all Big Ten schools and the University of Chicago, to each other, NLR, and Internet2. It promotes the rich connectivity that is required for the Big Ten schools to play a critical role in the networking serving cutting edge research and education. IU beat several qualified regional entities to be selected, and our success was a testament to the reputation and track record we've built and continue building using the state's investment.

### **Connecticut Education Network (CEN)**

In 2008, IU was selected to provide Networks Operations Center and Network Monitoring services for the Connecticut Education Network, which provides networking services for Connecticut's school districts, libraries, and higher education institutions with high-speed access to the Internet, next-generation Internet2, and iCONN - Connecticut's research engine. This positions IU well in a new arena - provider

of networking operations support for other state and regional networks, and cements Indiana's place as a leader in the field. This would not be possible without the investment made by the state in the 24x7 Network Operations Center that many other states struggle to provide.

**Maintenance of Operations**

Maintenance of the base is a key factor in the institution's ongoing delivery of high-quality services. Higher education in general must address a highly competitive market for talented faculty and the cost of unfunded mandates. These factors must then be considered within the context of the rate of inflation in determining an appropriate maintenance increase for the base budget. Our request follows the instructions of the Commission for Higher Education and the State Budget Agency and therefore makes no specific request; it assumes that adequate price inflation funding will be recommended by the Commission and funded by the General Assembly.