

OmniPoP 2016-2021 Evaluation Report

April 2021

The Big Ten Academic Alliance (Alliance) OmniPoP Network is the fiber-optic network serving the 15 members of the Alliance. Created in 2006, the OmniPoP Network is a collection of fiber optics, network devices, and colocation facilities in Chicago. OmniPoP grew out of the earlier, collective purchase of a ring of fiber by the Alliance Chief Information Officers in 2004. [OmniPoP](#) is a

One TAC member aptly summarized sentiments heard repeatedly throughout the review process regarding the broader impact of the OmniPoP Network as follows:

“The OmniPoP approach to collaboration is not just valuable for networking solutions directly to our members, it is also a model that each of us can hold up proudly in national conversations where we have the opportunity to share our successes and be leaders in national strategy formulation. Being part of OmniPoP successes makes us better national and global contributors and brings positive attention back to our member institutions as a result. While collaboration is certainly a common theme across R&E communities, we have something special here that is not readily found elsewhere, and we look forward to helping it thrive well into the future.”

2015-20 strategic accomplishments

The 2010-2015 OmniPoP evaluation identified six strategic priorities to be pursued in 2016-2020. Those priorities are set forth in italics below, which are followed by the actions taken in pursuit of those goals since 2015.

1. *Promote use and improve visibility to our partners and users:* Created a description of the OmniPoP Network for researchers' use in grant proposals.
2. *Continue to explore strategic partnerships and opportunities:* Explored interest and feasibility of an OmniPoP East Network and began discussions to revisit the Great Plains Network partnership.
3. *Protect existing fiber:* Secured a 10-year extension of the network's fiber optic lease.
4. *Develop mitigation strategy for DDOS and other cyber-attacks:* Secured a license for a Distributed Denial of Service (DDOS) mitigation contract.
5. *Monitor and evaluate technologies that may impact future infrastructure:* Secured the NSF Global Environment Network Innovations (GENI) grant to connect OmniPoP to the Midwest OpenFlow Crossroads Initiative and partnered with WiscNet to provide the Wisconsin Regional Internet Peering Service.

In addition to the actions that occurred in response to the priority setting in the last evaluation, the following accomplishments occurred in the past five years:

6. Developed a new budget model that streamlines processes, reduces administrative effort and increases the accuracy of financial operations.
7. Built capital reserves and completed a planning process for a hardware refresh of the network.
8. Participated in Internet2's next generation infrastructure (NGI) planning and evaluated and made decisions about how OmniPoP will participate in the NGI.
9. Completed important operational improvements for the network.

2021-2026 strategic priorities:

The evaluation process, including insights from CIOs, TAC members, and key stakeholders, produced the following set of strategic priorities for the next five years:

1. Safeguard and steward the unique and highly valuable OmniPoP collaborative community;
2. Complete the hardware refresh of the OmniPoP Network;
3. Implement and strategically leverage Internet2's Next Generation Infrastructure;
4. Review and refresh business and operational resources with the goal of supporting the efficient, well-documented management of the network;
5. Increase TAC's and the Alliance staff's interactions with key partners in the form of more regular standing business meetings to support existing strong relationships and capture collaborative opportunities; and

6. Explore expanded services and other opportunities.

OmniPoP is a collaborative fiber-optic network operating shared resources for the mutual benefit of the participating Alliance institutions. Network infrastructure includes member owned fiber cabling throughout downtown Chicago which connects to a shared switching infrastructure located at a pair of redundant locations in the Chicago metropolitan area. This shared resource knits together the members' own regional optical networks and provides shared connectivity to national and international network infrastructure.

Currently, OmniPoP capabilities include 2x100Gbps connectivity to the national Internet2 research backbone, as well as direct 100Gbps connections to other higher education and research peers such as ESNet. The design of OmniPoP provides multiple access points and built-in redundancy that helps limit network downtime due to unforeseen fiber optic ca

WiscNet. The current annual affiliate fee is \$17,000, which has been unchanged since 2016.

- BOREAS-Net: The Broadband Optical Research, Education and Science Network is a collaboration of four major research institutions in the upper Midwestern United States: Iowa State University,

To serve OmniPoP's primary goal of supporting research efforts, the 2015 evaluation identified two goals: 1) create standard [language that can be used in grant proposals](#) that describes the network facilities and assets, which TAC did, and 2) continue outreach to campus research communities and other consortium collaborative activities. As a part of this evaluation process, TAC has identified the need to update this grant proposal language to reflect equipment upgrades and current peerings and network connections. With respect to the second outreach goal, a common observation is that because OmniPoP consistently performs as expected, it can be somewhat invisible to those that rely upon it. TAC does not typically engage in outreach to the university research communities beyond the maintenance and operation of the networking infrastructure. It remains an open matter whether additional intentional engagement with researchers and university research leadership should be pursued and, if so, how to approach that work.

In 2015, TAC identified exploring the extension of the network to the east coast as a possible strategic opportunity to facilitate connection with consortium members Rutgers University, University of Maryland and Pennsylvania State University. Specifically, TAC expressed an interest in "reaching out to other regional aggregation points, such as MAX to determine if there are mutually beneficial opportunities for collaboration in support of these institutions. Similar to the direct connections to ESNet that we have established, we should continue to look for other interconnection opportunities that will help support and improve opportunities for our researchers and other campus community members." These conversations occurred and ultimately this extension is not being actively pursued based on the east coast Alliance universities' ability to get to the OmniPoP through other regional networks.

Recently, OmniPoP's partnership agreement with the Great Plains Network (GPN) has begun to be re-examined. Members of the TAC chairs group are in the process of discussing the reciprocal agreement between the two networks with representatives from GPN and the University of Nebraska-Lincoln (UNL). UNL gains access to the Big Ten Network (BTN) through the 10G port that connects GPN to OmniPoP. The parties are evaluating whether the 10G port will be decommissioned and the related question of how UNL's access to BTN would be preserved, as well as exploring whether there are other mutually beneficial strategic opportunities for the two regional networks to pursue. Those conversations are ongoing at this time.

In 2017, Level3 presented a proposal for a 10-year expansion of the fiber optic network lease held by OmniPoP. On October 13, 2017, a contract with Level3 was executed, providing OmniPoP with an IRU lease through 2034. Level3 was subsequently purchased by CenturyLink, which was later renamed Lumen.

In 2017, four member universities obtained an elective Distributed Denial of Service (DDOS) mitigation service through a contract with Internet 2. The original DDOS provider was Zenedge (subsequently purchased by Oracle). Because of dissatisfaction with that Zenedge/Oracle, Internet2 contracted with Radware to provide this service. OmniPoP is a subscriber of the Radware DDOS service, with three OmniPoP members participating in this service (University of Illinois, University of Chicago,

Pr2s19 Nm3TJk3hl.80.07-3()-81 a3 Tw -.80.001 d-6.6t3eq: 3(Un).80.0th p47 46330.10JhTJ- hf14a6(5-3i6U35(.38.s1rHhi

additional \$160,000 in port maintenance costs, which displaces current total maintenance costs, resulting in lower port maintenance fees. A competitive bid process was used to identify the hardware supplier. The PIER Group was the successful vendor with a total bid of \$998,749.07. The overall project cost was \$1,142,917 million, inclusive of services, power, additional equipment, and a port maintenance service agreement. The refresh was completed in early spring 2021.

Internet2 Next Generation Infrastructure planning:

After an extensive planning process, Internet2 announced its Next Generation Infrastructure Platform (NGI) and accompanying NGI Service Model. Upon the recommendation of its Technical Advisory Council (TAC), the OmniPoP Executive Board chose the Large Platform option (up to 2 x 400GE). With fees of 400K/YRC, the Large Platform will offer four times the capacity for the same price OmniPoP currently pays for 2 x 100 GE.

To benefit from the increased 400GE capacity OmniPoP will purchase equipment that is compatible with that infrastructure, specifically 400GE line cards. The 400G line card is likely to cost double the 100G line cards, approximately \$495,000. It is likely that OmniPoP would only need a single card initially. TAC anticipates that there will be a “pay as you go” model for the 400G card which would allow OmniPoP to pay for a lesser number of usable ports instead of activating all 24 ports at once.

In April 2020, the OmniPoP Executive Board approved continuation of an annual capital reserves call in FY21 and FY 22

of its members and regional and national partners.

3. Although the OmniPoP Network saves its members money, that is not the primary reason or benefit of participation. The responsiveness of the network and community is critically important and would be worth a premium.
4. OmniPoP provides important service benefits, through peering opportunities and elective services, and is a critical enabler of collaboration and consultation across the member network and with regional and national partners.
5. Important accomplishments since 2015 include securing the fiber lease extension, planning and preparing for the equipment refresh, and adopting a new budget model.
6. Priorities and goals for 2021-2026 include implementing the equipment refresh; strategic leveraging of Internet2's Next Generation Infrastructure; sustaining and protecting the existing value of the network and OmniPoP community; and evaluating opportunities related to the national research networking landscape.

TAC representatives from all but one OmniPoP member and all affiliate members completed an evaluation survey seeking feedback on the network. The survey asked respondents to identify significant strategic accomplishments of the past five years, strategic goals for the next five years, and feedback on the operation, business support, and value of the OmniPoP to their universities. The following summarizes the TAC survey results and full responses can be found [here](#).

Significant strategic accomplishments of past five years:

- IRU lease extension – 93%
- Building of capital reserves for hardware refresh – 80%
- New budget model – 67%
- DDOS mitigation software – 27%

Notably, 94% of TAC respondents indicated (u)2. (i)1.5 (U)2.7 (l)2.7 (ea)2.7 (s)12.6 (e e)10.9 (xten)5.2 (s)1.7 (i)13.6 (o)-3.2.7

high speeds. Through the OmniPoP's colocation space offering, we are able host our own

community participation and trusted peer network. Careful stewardship and protection of these

