OARnet | Annual Report FY2013-14
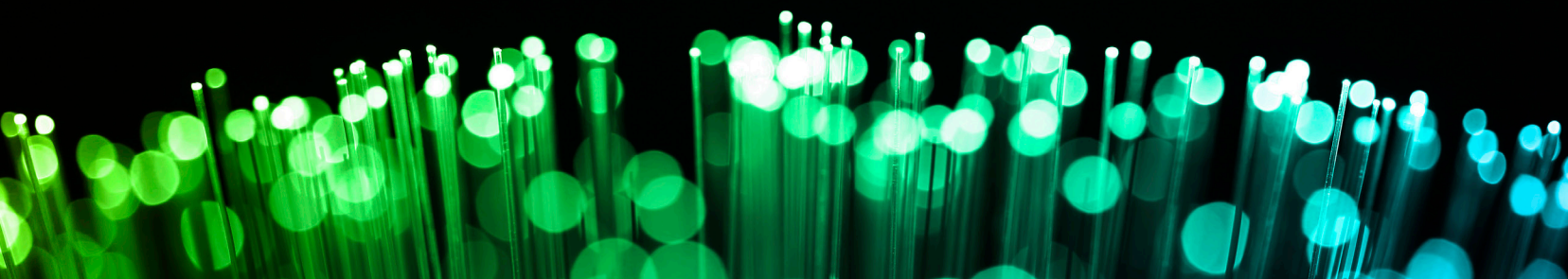
Connect.
Aggregate.
Collaborate.

Three words. Three actions. And, three driving principles that apply as much today as they did when OARnet was launched in 1987.

At OARnet, we **connect our communities** – education, health care, public broadcasting and government – by increasing access to affordable broadband service. We **reduce the cost of technology** for our members through aggregate purchasing. And we **collaborate with peers** locally, within Ohio, across the United States and around the globe.

The State of Ohio policymakers continue to show great confidence in the value of OARnet. This past April, Gov. John Kasich signed a two-year capital bill that included $7 million for OARnet, of which $4 million will fund infrastructure upgrades and $3 million for two allied projects.

OARnet operates as a member of the Ohio Technology Consortium (OH-TECH), a division of the Ohio Board of Regents. OARnet, the Ohio Supercomputer Center, OhioLINK, eStudent Services and the still-in-development Research and Innovation Center comprise the consortium's suite of technology and information member-organizations. Together, we **provide Ohioans a comprehensive technology infrastructure** unlike that found in any other state.

Connect. Aggregate. Collaborate. OARnet's powerful trilogy facilitates a prosperous economic future for Ohio and beyond.

Communities

OARnet connects Ohio's education, health care, public broadcasting and government communities through more than 1,850 miles of high speed broadband fiber. These communities voluntarily choose to participate in OARnet's shared services programs because of the benefits and value-added services they receive. Highlights from the past year include:
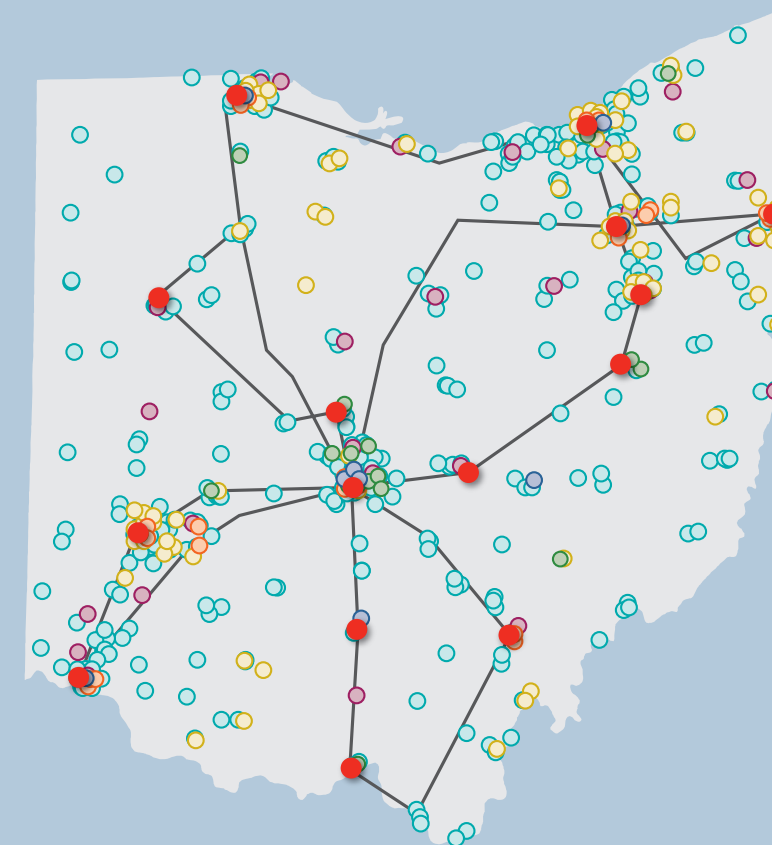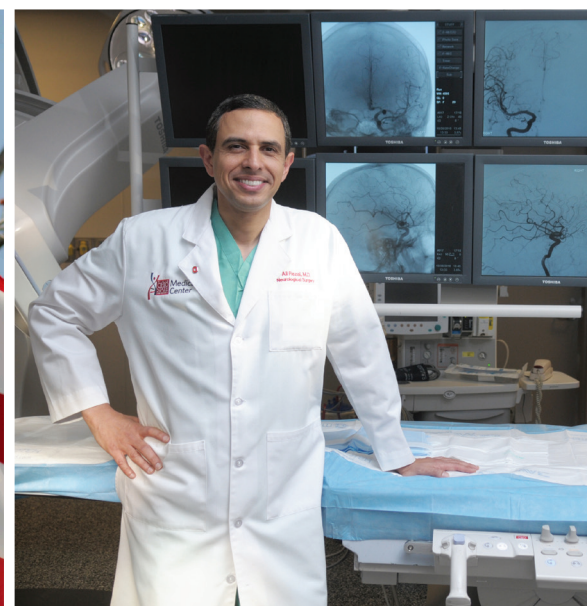
State Moving to OARnet Backbone

The State of Ohio and OARnet reached an agreement for OARnet to provide the network backbone for the State and its agencies. Over the next two years, we will add nearly 2,300 end-sites to the network for $3.2 million per year; several agencies have already been connected in 2013-2014 as part of a pilot program. Aggregate demand from the State, Ohio's higher education and K-12 sites will reduce the cost per megabit of Internet an average of 25 percent.

CIO Orientation

OARnet hosted new Chief Information Officers from Ohio universities in February to share information on OARnet services and give these new leaders an opportunity to network with their peers.

K-12 Upgrades

OARnet is upgrading the middle-mile networks for K-12 schools, via the state's 22 Information Technology Centers and seven large urban school districts. This will increase access from 1 Gigabit to 10 Gigabits/second, better enabling services such as online student assessment and blended learning.

OARnet Communities

- ○ 88 Higher Education Campuses & 314 Higher Education Regional Campuses & Sites
- ○ 32 K-12 Education Centers
- ○ 21 Local Government Agencies
- ○ 140 State of Ohio Sites
- ○ 9 Medical Centers & Research Institutions
- ○ 25 Broadcast Education Media Stations & Services
- ● OARnet Backbone PoP Locations

With the added operating funds from the State of Ohio agreement, OARnet was able to expand the Network Operations Center (NOC) so it is now staffed 24x7, 365 days a year.

Services

OARnet strives to provide exceptional service as part of its membership benefits and to develop shared programs that reduce the cost of technology through aggregate purchasing.

This shared-services approach reduces the cost of service delivery by centralizing the technology hardware, software and networking required to support the overall community. Read on for a snapshot of our highlights this past year.
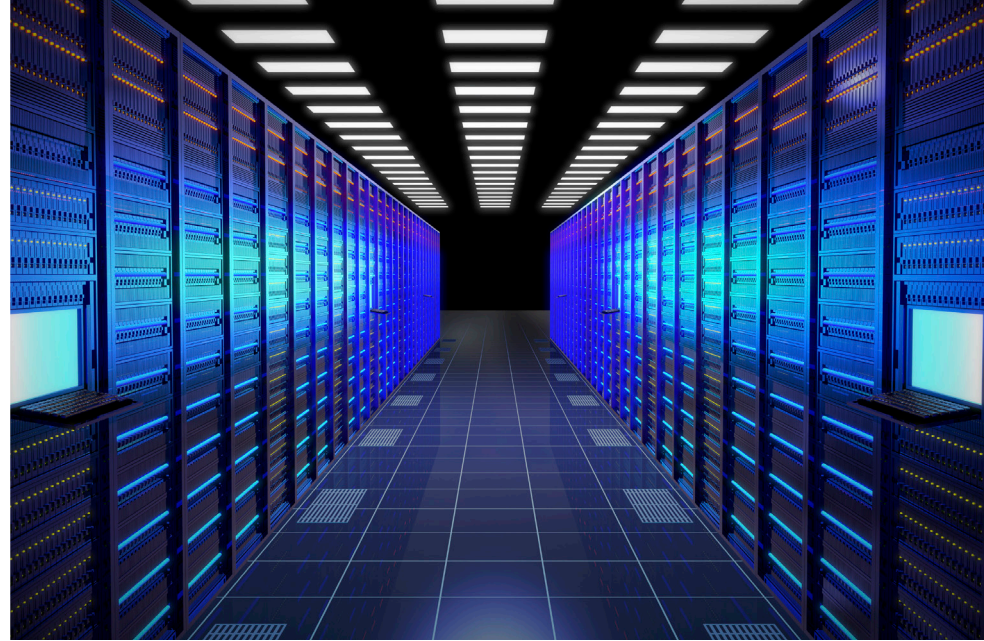
Aggregation

Internet. OARnet negotiated highly competitive, aggregate pricing on Internet rates for all stakeholders in FY2015. This shared approach secures Internet access at a price that would not be attainable on an individual basis. OARnet works with multiple service providers to ensure reliability and implements diverse routing plans to support the service level.

Internet2. OARnet serves as the regional optical network connector for all Internet2 connections in Ohio. By way of a consortium of Internet2 member schools, OARnet routinely can offer a higher-speed connection to Internet2 at a cost below that available to any single university.

IntraOhio. OARnet reduces the cost of Internet services for its communities by offering this in-state service. IntraOhio, which only connects to other locations that are connected to OARnet's network, lowers the cost of dedicated bandwidth between schools by provisioning service over existing connections and the in-state backbone.

Network access. OARnet connects its communities using a circuit aggregation model. With consolidation hubs throughout the state, this reduces our clients' last-mile circuit cost.

Multiple data centers across Ohio are connected via the OARnet 100 Gig network backbone. This allows for OARnet members to easily implement disaster recovery plans or install secondary connections for their networks.

"We have virtualized 33 percent of our servers over the past two years. This equals more efficient management and maintenance, power and space savings and quicker provisioning of environments."

- Stu Davis, CIO and Assistant Director of the Department of Administrative Services, State of Ohio

"The price savings from the VMware program allows us to stretch our limited budget, so we can use more virtualization products."

- James Cheng, Sr. Systems Developer, The Ohio State University College of Arts and Sciences

"In four months, VMware has allowed us to consolidate our physical servers into a virtual server that is 1/8th the rack space of our old system, reduce our data center energy consumption by 92 percent, and simplify server administration by .5 FTE."

- Dave Bender, Executive Director of Information and Technology Services, Otterbein University

Data Centers

Connectivity. OARnet offers its members access to more than 10 geographically diverse data centers around the state, from Wright State University and Ohio University to carrier-neutral data centers in central Ohio, Cincinnati, Cleveland and Youngstown.
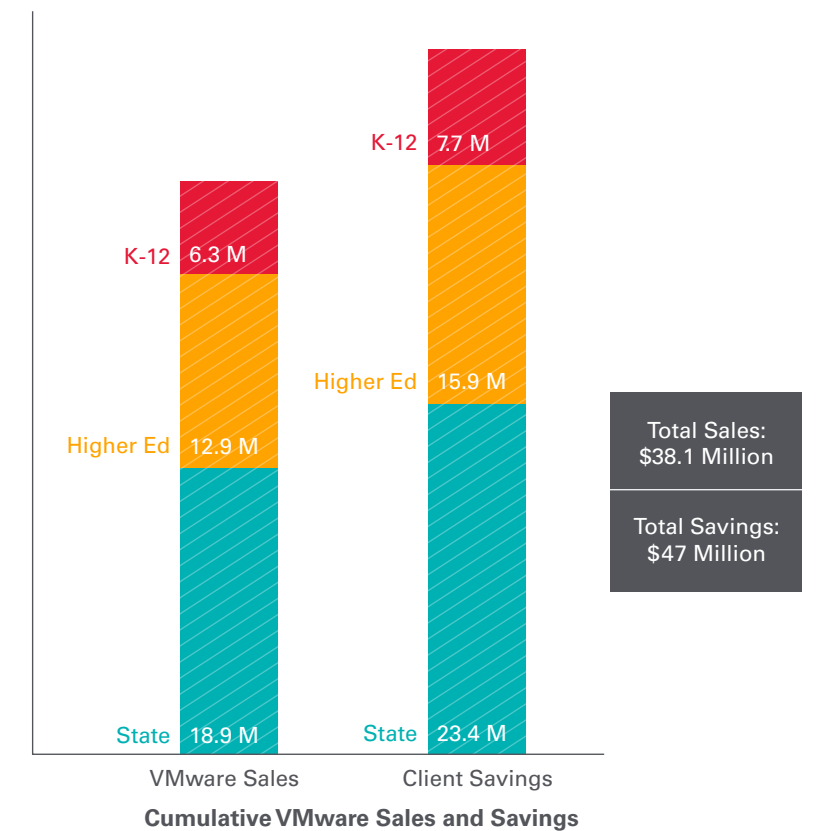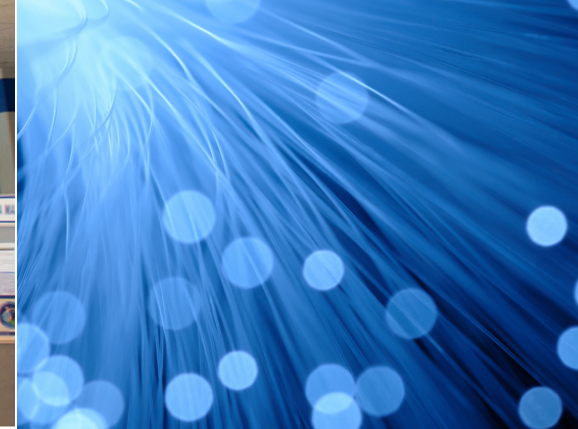
Co-Location services. OARnet collaborates with Ohio universities to offer co-location services, which include rack space, power and access to Internet, Internet2, and IntraOhio. Members are taking advantage of these data centers to expand cabinet space or implement disaster recovery plans.

Virtualization

Virtualization allows IT departments to create a virtual environment at the workstation, server or data-center level. With this technology, organizations need to buy less hardware and software, use less energy and require less staffing to maintain it.

VMware program. OARnet, the Ohio Board of Regents and VMware renewed a partnership that enables OARnet clients to license VMware virtualization software and maintenance at significantly reduced prices. This is the third virtualization-licensing program; the first was offered from 2009-2011, and the second from 2011-2013. The 2013-2017 contract already has generated more than $7 million in direct savings for all clients.

New distributor option. OARnet contracted with Carahsoft Technology Corp. to resell VMware through certified distributors. This enables members to purchase VMware at the same cost from partners, with Carahsoft managing the relationship. Because resellers can combine VMware with other hardware, training, consulting or software purchases, this can simplify our customers' ordering process.

Cumulative VMware Sales and Savings

	VMware Sales	Client Savings
K-12	6.3 M	7.7 M
Higher Ed	12.9 M	15.9 M
State	18.9 M	23.4 M

Total Sales: $38.1 Million

Total Savings: $47 Million

Transport Services

OARnet provides high-speed transport service throughout Ohio via its 100 Gigabit backbone. Transport service connects eligible members to other OARnet sites via IntraOhio, to resources provided by the Ohio Supercomputer Center and OhioLINK, as well as to services such as Voice-over-IP, business continuity and high-speed data transfers.

Technical Expertise

Managed Services. Our clients received a variety of network management services. OARnet operated campus switches and routers to supplement an institution's technical staff, and the engineering team configured and remotely managed the environment, when necessary, to provide onsite support.

Engineering Consulting. OARnet engineers provided technical input on areas including fiber and access circuit planning, optical support, routing design including developing Border Gateway Protocol or failover plans, multicasting, and Multiprotocol Label Switching.

State Expansion with Federal Grants

OARnet received about $7 million as a subrecipient to grants awarded to OneCommunity, Horizon Telecom and ComNet through the Broadband Technology Opportunities Program (BTOP) of the Department of Commerce, as provided by the American Recovery and Reinvestment Act (ARRA). As part of the projects, which were completed in 2013, OARnet exchanged 10 Gig waves for fiber with BTOP partners for 10 years. Additionally, OARnet purchased $3.2 million of equipment with the grant monies.

Support for Future Research

In preparation for Unmanned Aerial Systems activities in Ohio, OARnet completed a Point of Presence (PoP) at the Ohio headquarters at Avetec/ATIC in Springfield.

NASA & DREN

OARnet completed 10 Gig connections to NASA Glenn Research Center and to Wright-Patterson Air Force Base/Defense and Research Engineering Network (DREN). These connections provide Ohio researchers direct access to NASA and DREN sites across the United States, and facilitates research collaborations.

At left, NASA's MQ-9 unmanned aircraft system supports advanced aeronautical technology development. It also acts as a test bed to develop capabilities and technologies to improve the utility of unmanned aircraft systems.

OARnet hosted a variety of dignitaries and networking peers during 2013-2014, most notably engineers from the Bangladesh Research and Education Network, shown in the top photo with OARnet engineers, and a delegation from the International Community Forum, shown in the bottom photo with leadership from OARnet, the Ohio Supercomputer Center, The Ohio State University, the Ohio Board of Regents and the City of Columbus.

Beyond Ohio

OARnet has earned a reputation as a leader because of our forward-thinking strategies and our willingness to share lessons learned and best practices. We're proud of our involvement in national and international projects and the benefits they bring to others. A sampling of our projects that reach across the world and our backyard include:

Global Broadband Economy

Columbus — named a Top 7 Intelligent Community of the year by the International Community Forum — sought the assistance of OARnet leadership in its bid for the No. 1 spot. The international award honors cities with the best practices in broadband deployment and use, workforce development, innovation, digital inclusion and advocacy. OARnet shared how the organization furthers the city's technology capabilities during the evaluators' two-day site visit to Columbus.

Expertise Shared Internationally

OARnet is one of several technology organizations partnering to build the Bangladesh Research and Education Network. OARnet provided architecture design, expertise and technical consultation to the network's implementation team, which spent two weeks with OARnet engineers for hands-on training. The program is funded through the World Bank.

National Leadership

Members of OARnet staff served in a variety of leadership roles for Internet2, The Quilt, and The Quilt CEO Roundtable. Additionally, Executive Director Pankaj Shah served as the keynote speaker at the annual meeting of KINBER, a young networking organization based in Pennsylvania that is similar to OARnet. The presentation focused on how OARnet has built communities during its 25-plus year history.

Advocacy

OARnet testified before the Federal Communications Commission (FCC) regarding the modernization and reform of the E-Rate program, as part of a presentation by The Quilt. The testimony focused on priorities and data points to consider as the FCC looks at enhancing broadband connectivity of schools and libraries.

Sharing Our Story

OARnet Social Media

Members of the OARnet staff are nationally known for their subject-matter expertise on a variety of issues. The OH-TECH blog, launched last year, provides a platform for these talented staff members to share their knowledge. Topics ranged from observations at national meetings, such as Internet2, to four simple rules for Internet safety, to the challenges for new higher education CIOs — just to name a few.

The site also includes blogs from our OH-TECH counterparts at the Ohio Supercomputer Center, OhioLINK and eStudent Services. We encourage you to bookmark the page (oh-tech.org/blog) and check it often.

Links to the blog posts and other messages are shared via OARnet's Facebook, Twitter and LinkedIn accounts, generating further buzz about the organization. The addresses for these sites are listed on the opposite page.

Meetings, Conferences and Events

OARnet both organizes and participates in a wide variety of meetings throughout the year. The thrice-yearly OARnet member meetings provide higher education CIOs and senior staff with operational updates and peer presentations. We also coordinate technical meetings, called OARtech, that focus on nuts-and-bolts issues for front-line staff.

In partnership with VMware and Carahsoft, OARnet hosted two meetings for higher education, K-12 and public sector members on the virtualization software.

OARnet participates in events such as the Ohio Digital Summit and the Ohio Higher Education Computing Conference. Additionally, we joined our OH-TECH partners to showcase the consortium's role as an education and research leader. The events included the Ohio Educational Technology Conference and SC13, the premier international conference for high performance computing, networking, storage and analysis.

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