

ANNUAL REPORT 2016



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**OH-TECH provides
efficiencies that
support the critical
knowledge-economy
missions of Ohio's
statewide technology
and information
organizations."**

— John Carey, Chancellor, Ohio Department of Higher Education

oh-tech.org/leadership

Ohio Technology Consortium: Governed by the Chancellor of the Department of Higher Education, OH-TECH serves as the technology and information division of the Ohio Department of Higher Education. The consortium comprises a suite of widely respected member organizations unsurpassed in any other state: OSC, OARnet, OhioLINK and eStudent Services.

WELCOME TO OH-TECH

Under a single roof, the member organizations and administrative divisions of the Ohio Technology Consortium (OH-TECH) deliver world-class technologies, information and expertise to provide Ohioans with a strong foundation for education and workforce, scientific research and business innovation.

A division of the Ohio Department of Higher Education, OH-TECH functions as an umbrella organization for Ohio's statewide technology and information infrastructure organizations: the Ohio Academic Resources Network (OARnet), Ohio Supercomputer Center (OSC), Ohio Library and Information Network (OhioLINK) and eStudent Services. The consortium seeks out and fosters synergies among the member organizations and provides common services to each through its Shared Infrastructure and Consortia Services units.

Each OH-TECH group is staffed by experts, and the accolades garnered over the years are a testament to their skill and dedication. OhioLINK negotiates for content shared among its 120 academic libraries, saving Ohio and its universities millions of dollars each year. Unique among supercomputer centers, a state-funded OSC provides high performance computing and storage services to researchers and engineers at campuses and businesses across the state. OARnet provides more miles of high-speed connectivity—a blistering 100 Gigabits per second—across Ohio to a broader geographic footprint than any other state in the country. eStudent Services initiatives, such as eTutoring, are leveraging the latest technology to deliver vital educational support services.

Within OH-TECH, the Shared Infrastructure division provides centralized technology services, tackling significant technological projects, such as coordinating a major rewrite of the department's Higher Education Information system. The Consortia Services division addresses essential services such as coordinating the public launch and dedication of OSC's latest supercomputer.

In the pages that follow, you can learn far more about how OH-TECH addresses its mission to "propel Ohio's knowledge economy through the creation and adoption of next-generation technology and information solutions."

WHO WE ARE

- Vast collections of books and electronic journals.
- Thousands of miles of high-speed, fiber-optic cable.
- Lightning-fast supercomputers and vast data storage.
- Millions of lines of code and rows of virtual servers.
- Web sites, case studies, video clips and publications.





SHARED INFRASTRUCTURE

The Ohio Technology Consortium's Shared Infrastructure team provides information technology and software support to all of the consortium's business units, as well as the Ohio Department of Higher Education. This covers everything from large-scale projects such as database overhauls and application development to local desktop support.

SI manages and supports the consortium's use of ServiceNow, a workflow software and ticketing

system that ensures client and internal needs are met in an efficient, timely manner. The team provides ongoing updates and development for the system as well as troubleshooting support.

The SI team also provides technical support in conjunction with the State of Ohio Computer Center for the OSC's high performance computing resources as well as OARnet's data storage and servers.

2016–17 HIGHLIGHTS

Higher Education Information (HEI) System Rewrite:

The HEI system is a comprehensive relational database that includes student, course and personnel data submitted by Ohio's colleges and universities. OH-TECH SI rewrote the HEI secure file exchange for the Ohio Department of Higher Education and plans to integrate HEI distance learning processes in the coming year.

OSC Backup Server Installation:

OSC collaborated with SI to install an IBM Tivoli Storage Manager (TSM) backup server at a remote data center in Athens, Ohio. This will provide OSC with critical data protection from equipment failure and environmental factors.

OhioLINK Electronic Journal Center:

SI worked closely with OhioLINK to launch the new and improved Electronic Journal Center, which included full text indexing. This improves the user experience dramatically, allowing Ohio researchers ease of access to critical journals and articles.

OARnet Carahsoft Data Integration:

To better serve OARnet's government and academic clients, SI began analysis work for data integration with Carahsoft, an IT solutions provider that delivers solutions such as virtualization software. Actual data integration will continue into FY18 as well as a customer service database refresh for OARnet.

CONSORTIA SERVICES

The focus of the Ohio Technology Consortium's Consortia Services is on shared services and consolidation of similar functions, so that each business unit does not need to duplicate these functions.

Consortia Services operates as the Business and Communications Office for consortium members, which include eStudent Services, OARnet, OhioLINK and the OSC. The unit provides these organizations with financial, human resource, communications and facilities management services.

The Business Office is responsible for all things fiscal. Those functions include accounts receivable, accounts payable, asset management, budgeting and cost modeling, financial reporting, grants management, contract management and review, and procurement for all consortia members.

The Human Resources Office manages the human resource activities for all of OH-TECH, as well as for

the Ohio Department of Higher Education, making it necessary to understand both state and university policies and procedures. These staff members provide support for organizational planning, employee relations, and benefit and payroll issues for the consortium.

The Facilities Manager is the liaison to Ohio State Facilities and Operations, as well as the building landlord for the offices and the nearby storage facilities on Kinnear Road. This individual is responsible for building maintenance, vehicle and equipment preventative maintenance, storage and surplus activities and building safety and security.

The Communications Team is devoted to the development of print materials—annual reports, a research report, brochures, newsletters and related materials—and electronic media—press releases, web development, social media, blog posts, videos—to advance the efforts of all OH-TECH consortia members.

2016–17 HIGHLIGHTS

Human Resources:

Redefined the on-boarding procedures for new staff to make the orientation process more consistent and rewarding. The office has already seen notable results in the impact on staff awareness, morale and retention.

Facilities:

Increased the focus on office safety and security due to recent events elsewhere. Actions included updates to the Building Emergency Action Plan (BEAP) the Business Continuity Plan, and more stringent Building Access Procedures. Training opportunities related to the BEAP, First Aid, CPR and defibrillation were provided to staff, along with planned emergency drills.

Communications:

Orchestrated the naming, print and social media, and dedication event of OSC's newest supercomputer, aptly named after Ohio's Jesse Owens. The team worked with the Owens family, university archivists, hardware and software vendors, and supercomputer users and staff to host a mid-morning gala to rollout the new system.

Fiscal/Business Office:

In the face of declining state revenues, worked with consortia leadership to craft detailed budget requests for all consortia units for the FY18/19 Biennial Operating Budget. Based on strong documentation and quick response time, reductions to most OH-TECH department budgets were not as severe as originally anticipated. The staff members focused on core services to develop revised spending plans for FY18 based on final cuts.

ESTUDENT SERVICES

eStudent Services brought 21st-century technology into the classrooms and homes of Ohioans, providing access to knowledge without the barriers of distance and time. eStudent Services developed, promoted and deployed innovative online support services for all students, including those who take online, blended and face-to-face courses.

In 2016–17, eSS offered two incredible programs to Ohio's higher education students: eTutoring and OhioLearns.

eTutoring

Established in 2009, Ohio's higher education institutions created the Ohio eTutoring Collaborative to provide online academic assistance for students. By pooling resources, professionals support students from participating schools by offering synchronous and asynchronous tutoring.

This cost-saving measure allows students to receive free online tutoring when services may not be available on campus. Additionally, with the growing number of hybrid and distance courses offered, eTutoring institutions can provide support for online students. All students, regardless of where or how they receive instruction, are eligible to use eTutoring.

OhioLearns

OhioLearns is the one-stop site for anyone interested in college-level distance or eLearning in Ohio. OhioLearns is a searchable online catalog that enumerates distance-learning programs from Ohio's two-year and four-year, public and private colleges and universities.

The recently refreshed catalog features more than 550 degrees and certificate programs from 35 different colleges and universities, as well as more than 5,000 courses for summer and autumn 2017. OhioLearns lists degrees and courses in health care,

information technology, engineering and many of Ohio's other high-demand job areas.

Beginning in summer 2017, the eTutoring and OhioLearns programs are transitioning to OhioLINK in OH-TECH's ongoing effort to streamline services in a synergistic approach to higher education technology and information services. A new initiative that will arise from this integration is Affordable Learning.

Affordable Learning

OhioLINK is spearheading an Affordable Learning initiative in partnership with the Ohio Department of Higher Education. The initiative will have three parts:

- OhioLINK has acquired a system-wide membership with the Open Textbook Network (OTN) to promote awareness and advocacy for affordable learning assets. OTN provides education and networking opportunities for faculty to incorporate open educational resources (OER) in their courses and learn about where to find the best resources.
- OhioLINK is designing an affordable learning website with a searchable A–Z guide of open educational resources and affordable learning assets that faculty and students can use at no cost. This LibGuides site will organize and catalog OER and affordable learning assets so they are easy to search and access for use within courses.
- Finally, OhioLINK is creating an OER Commons site where Ohio faculty can place the resources they create so other faculty can find them easily. The Ohio Department of Higher Education has given out \$1.3 million in grants to three different faculty teams in order to create open educational resources for the state. These resources will be located in the Open Ohio/OER Commons site.



I really like the attitude and approach of OARnet... They have a willingness to look at the alternatives, discuss and find ways to work out solutions.”

— Stephen Hedges, Director, Ohio Public Library Network

OARNET

OARnet promotes community and economic growth by expanding access to affordable technology.

A new subscription-based, intra-Ohio content service model for higher education allows our college and university customers an affordable way to meet the increasing demand for internet and content bandwidth—which rose by 67 percent overall in FY17.

Clients experienced \$1.2 million in total dollar savings this year, with a \$900,000 savings for higher education alone. K–12 schools saw a massive 79 percent bandwidth increase over the past year and more than \$273,000 in savings.

2016–17 HIGHLIGHTS

Reduced Internet Fees

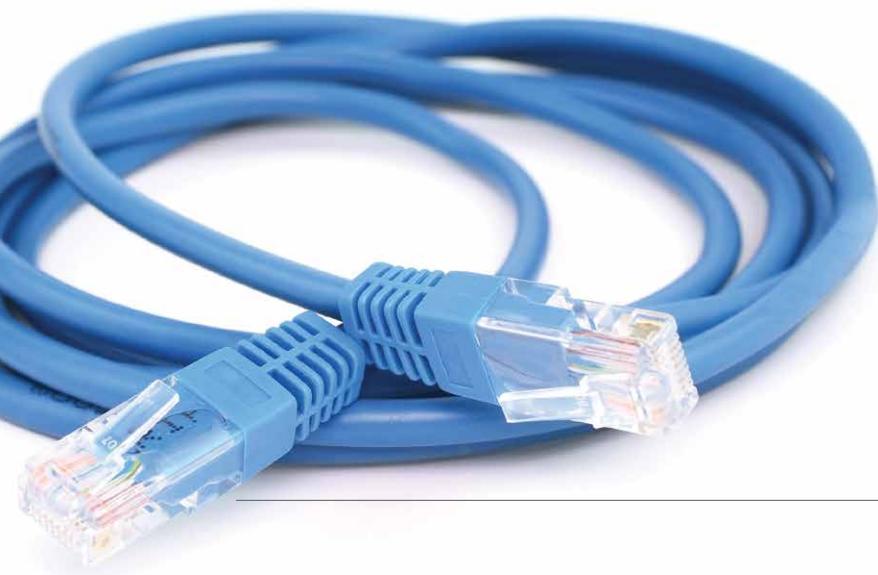
OARnet’s new fiscal model reduced internet rates across the state and aligned user tiers with current usage and demand, with the addition of a 10-gigabit tier. Commodity internet rates are expected to drop by 15 percent in the coming year, and rates will include even more services than before.

Reactive DDoS Roll Out

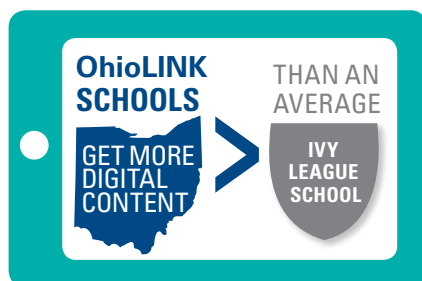
The new reactive DDoS service is now bundled with commodity internet at no additional cost to clients. This service has unlimited capacity by offloading filtering to upstream carriers at the expense of all impacted services for the victim IP address.

IntraOhio Content Subscription Service a Success

In its initial year, the new IntraOhio content subscription service was a huge success in 2016–17. Over 30 gigabits were subscribed across 33 schools participating in the service. Due to its success, OARnet will be adding more servers in Cleveland and Columbus for current content. This will continue to be the standard service in years to come.



\$44 MILLION
IN AVOIDED COSTS
OVER THE PAST 5 YEARS



 **45,653,720**
items in Central Catalog
as of April 2017

AVERAGE COST
STATEWIDE
\$70
PER STUDENT



OHIOLINK

Collective buying power and expert negotiation skills go a long way; OhioLINK is proof of that. Since 1992, OhioLINK has delivered a wealth of valuable resources to Ohio's academic libraries while saving millions of dollars. How? By using the collective buying power of our 120 member libraries, OhioLINK negotiates better prices for resources than individual institutions or other library associations can. In one subscription alone, OhioLINK institutions collectively saved \$6 million when compared to what institutions would have paid negotiating individually.

Annually, OhioLINK negotiates, invoices and manages published digital content worth \$42 million on behalf of its member libraries, a fraction of the multi-millions that institutions would pay individually. Central management and negotiation also represent cost avoidances in staffing and administrative costs on individual campuses.

2016–17 HIGHLIGHTS

Affordable Learning

OhioLINK staked out a leading role in efforts to promote Affordable Learning and Open Educational Resources occurring in higher education in Ohio. OhioLINK joined the Open Textbook Network to promote adoption of Open Educational Resources, planning a dedicated website for Ohio faculty to find OER and licensed resources, and contracting with OER Commons for the development of an authoring/hosting site to serve as an OER repository for OhioLINK institutions. A coalition of OhioLINK institutions received an ODHE grant of \$1.3 million dollars to generate OER awareness and creation across the state with OhioLINK support.

DPLA Membership

OhioLINK joined the "Ohio Digital Network," a statewide Digital Public Library of America (DPLA) Service Hub. The network serves as the on-ramp to DPLA for the state's library, archives and cultural heritage organizations, ensuring that local digital collections can be accessed nationally.

New Content

OhioLINK added valuable new content from Sage, including a substantial backfile and a statistical package, as well as e-books from the American Psychological Association, providing expanded access to scholarly content in psychology, medicine, psychiatry, nursing, sociology, education, pharmacology, neuroscience and physiology.

OHIO SUPERCOMPUTER CENTER



As a unique resource to the state, Ohio's academic, healthcare and industrial researchers continue to turn to OSC as a key partner for scientific discovery. OSC provides statewide high performance computing and storage services to assist researchers making discoveries in a vast array of scientific disciplines and engineers seeking innovations for businesses small and large. OSC works to create a user-focused, user-friendly environment for our clients. Through shared software licensing programs and state-funded resources, OSC clients experience huge savings that they can put toward what's most important—research and innovation in Ohio.

This year, OSC served 1,358 distinct students, faculty and staff members across 26 Ohio universities. As part of our expanding training programs, we had 218 people attend eight individual training opportunities throughout the year. We also saw a huge increase in classroom use of our resources.

2016–17 HIGHLIGHTS

Owens Cluster Deployment and Dedication

OSC's most powerful system ever officially deployed this year, offering not only greater performance and shorter queue times for clients, but also greatly increased system storage and memory. All spinning storage has been replaced and an infinite memory engine installed. OSC has over five petabytes (PB) of disk storage capacity distributed over several file systems, plus more than 5.5 PB of backup tape storage.

Facilities Transformation

OSC facilities and resources saw huge upgrades in 2016–17. These included liquid cooling for the new Owens Cluster, plexiglass containment around cabinets, reducing noise and energy costs and an informational vestibule for visitors to the State of Ohio Computer Center.

New Version of OnDemand

OSC launched OnDemand 3.0, a vastly upgraded version of its "one-stop shop" for access to High Performance Computing services. The new version provides a better experience for clients, including many more programs supported and greater compatibility with internet browsers. Additionally, users can upload and share their own web apps with other users.

“OSC is allowing us to assemble and annotate our genomes... and it's led to discovery. To actually do it on a PC would be impossible, it would take somebody an entire career.

— *Katrina Cornish, Ph.D., Endowed Chair at The Ohio State University*



UNITS COLLABORATE TO SUPPORT A HEALTHIER LAKE ERIE ECOSYSTEM

In recent years, various federal, state and private initiatives have been formed to help protect and restore the Great Lakes—the largest system of fresh surface water in the world. Some of those projects target safeguarding the Lake Erie ecosystem for water supply, fishing, boating and other important uses. Several units of the Ohio Technology Consortium have been supporting these efforts.

Late last summer, OARnet turned up a new Ethernet circuit that more than doubled the bandwidth available to Ohio State's F.T. Stone Laboratory on Gibraltar Island in western Lake Erie. The lab serves as the research station for the Ohio Sea Grant College Program, and the staff there has educated thousands of visitors on field-based biological science and supported the work of scores of researchers. The faster, more-reliable network connection enhances research and administrative capabilities at the lab and provides a more robust transmission of online classes and workshops.

In 2015, Ohio Department of Higher Education Chancellor John Carey organized the Lake Erie R&D Initiative to help counter the harmful algae blooms plaguing Ohio lakes. The initiative brought together OSC, a variety of research labs from Ohio colleges and universities, and several state and federal agencies. Researchers are leveraging storage systems at the center to archive, process and retrieve terabytes of data on the algal bloom phenomenon; they also use the center's supercomputers to conduct original, regional research on Lake Erie issues.

Finally, through its Electronic Journal Center, OhioLINK provides researchers at member institutions with access to a vast repository of scientific journals vital to the work of researchers focusing on Lake Erie topics. Additional sources of information on this topic are made available to researchers at member institutions and non-member organizations through OhioLINK's Electronic Theses & Dissertations Center. ◀

EXAMPLES OF OH-TECH SUPPORTING LAKE ERIE

Stone Lab Workshops via OARnet:

"Dealing with Cyanobacteria, Algal Toxins and Taste & Odor Compounds" by Heather A. Raymond of the Ohio Environmental Protection Agency and Richard Carl Lorenz of the City of Westerville.

"Aquatic Invasive Species - Hazard Analysis and Critical Control Point" by Tory A. Gabriel of Ohio State's Ohio Sea Grant College Program, Eugene Charles Braig IV of Ohio State's School of Environment & Natural Resources and Jenny Roar of the Ohio Department of Natural Resources.

Research Using OSC's Owens Cluster:

"Integrating the Cropland and Wildlife Components of the Conservation Effects Assessment Project to Assess and Forecast Benefits of Agricultural Best Management Practices to Biological Endpoints Across the Western Lake Erie Basin Watershed" by Stuart Ludsins at The Ohio State University.

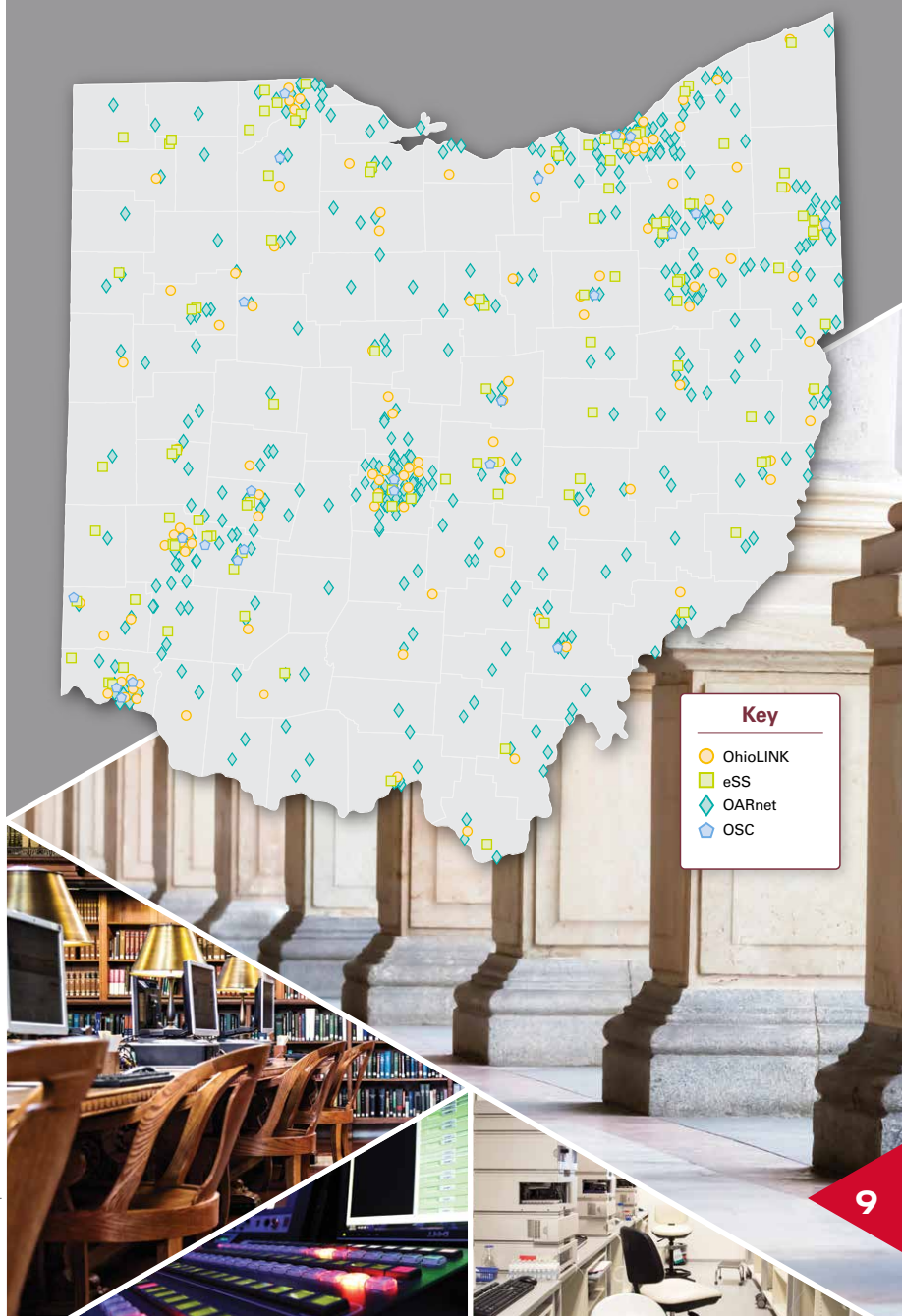
Journals Found in OhioLINK's EJC Touch on Lake Erie Studies:

Journal of Great Lakes Research, Agricultural Water Management, Journal of Paleolimnology, Hydrobiologia and Ecological Modeling.







Some examples of studies listed in OhioLINK's ETC include: "Forecasting Harmful Algal Blooms for Western Lake Erie Using Data Driven Machine Learning Techniques" by Nicholas Reinoso at Cleveland State University, and "The Economic and Environmental Impacts the U.S. Farm Bills Have on the State of Ohio" by Lori Lee Kelly at Miami University.

INSTITUTIONS

Organizations within the Ohio Technology Consortium (OH-TECH) connect the state's research and technology infrastructure in a myriad of incredible ways. OARnet's 2,240-mile, 100-gigabit per second backbone connects Ohio's education, health care, public broadcasting and government communities. Those communities include OhioLINK's 120-member academic library consortium, eStudent Services' many distance-learning opportunities and the abundance of academic and industrial researchers tapping into the Ohio Supercomputer Center's high performance computing services.





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