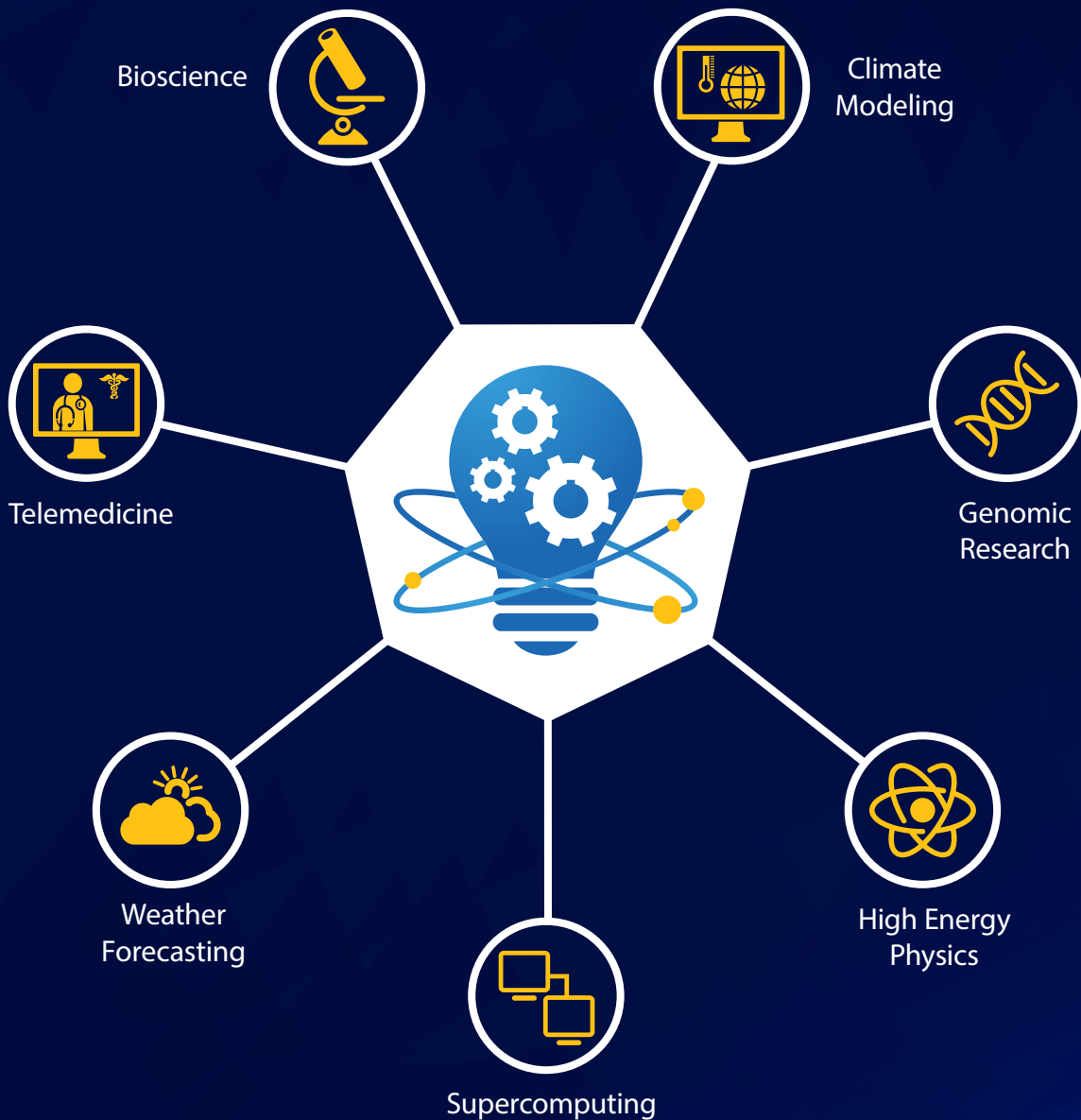


# OKLAHOMA'S PARTNER IN RESEARCH & SCIENTIFIC DISCOVERY

Climate Science | High-Energy Physics | Genomic Research



## OKLAHOMA'S PARTNER IN RESEARCH AND DISCOVERY

Scientific discoveries at Oklahoma's research institutions are advancing innovation in global research initiatives from high-energy physics to bioscience to climate modeling. These initiatives require high-capacity bandwidth to support big data movement in real-time across the country and around the globe. OneNet is Oklahoma's partner in providing the high-speed connectivity required for innovation and scientific discovery. As a division of the Oklahoma State Regents for Higher Education, OneNet serves as Oklahoma's research and education network and is strategically positioned within higher education, like many research and education networks across the country, to support research computing and networking at Oklahoma's colleges and universities.



---

OKLAHOMA STATE REGENTS  
FOR HIGHER EDUCATION

---

*Improving our future by degrees*



## ATLAS PROJECT

The Oklahoma Center for High Energy Physics (OCHEP) is a collaboration of researchers at the University of Oklahoma, Oklahoma State University and Langston University. OCHEP scientists are conducting research for the ATLAS project, a high-energy physics experiment at the Large Hadron Collider at the European Organization for Nuclear Research (CERN). ATLAS explores the fundamental nature of matter and the basic forces that shape our universe by examining head-on collisions of protons of enormously high energy. These particle physics experiments have large data transfer requirements supported by OneNet.



## SCIENTIFIC DISCOVERY

Oral Roberts University leverages OneNet's network for a variety of scientific research, including molecular modeling, subatomic physics modeling, computational fluid dynamics, seismic imaging, bioinformatics and molecular spectroscopy. Low-latency, high bandwidth data motion capabilities enable researchers to participate in large-scale collaborations, moving large datasets across the state and around the world. ORU undergraduate students are gaining substantial experience that greatly enhances their skill sets and scientific understanding, making them competitive for the next step beyond graduation.





## **NOAA FORECASTING TESTBEDS**

The Center for Analysis and Prediction of Storms (CAPS) at the University of Oklahoma periodically runs ensembles of high-resolution weather prediction forecasts covering the continental United States. These forecasts are produced on National Science Foundation High Performance Computing resources in collaboration with the National Oceanic and Atmospheric Administration (NOAA) National Weather Service testbeds, which test new forecast products in a quasi-operational setting. This work began with the Hazardous Weather Testbed in Norman and has expanded to include the Hydrometeorology Testbed experiments run in College Park, Maryland. CAPS utilizes OneNet's network to exchange forecasts across the country during each of these experiments.



## GENOMIC RESEARCH

Researchers at Oklahoma State University are utilizing high-performance supercomputers and OneNet's network to evaluate the use of fungi in biofuels, study pathogens that damage poultry populations, analyze the human genome for diseases and numerous other experiments that have real-life implications. OSU's participation in this research is making genome mapping to scan for genetic risks like cancer a routine health assessment for everyone. OSU collaborates with researchers across the country to advance these research initiatives and requires big data movement among research partners.



**\$55**  
**MILLION**

in research grants since 2009





## FUNDING RESEARCH COMPUTING

In addition to providing high-capacity broadband services, OneNet's partnership with Oklahoma's research institutions brings grant funding and jobs to the state. OneNet's network has helped Oklahoma higher education institutions bring \$55 million in research computing grants to the state since 2009. OneNet's connectivity also gives researchers the flexibility required to participate in emerging research initiatives, such as digital humanities, aerospace and STEM (Science, Technology, Engineering and Math) exploration.



## EXCLUSIVE ACCESS TO INTERNET2

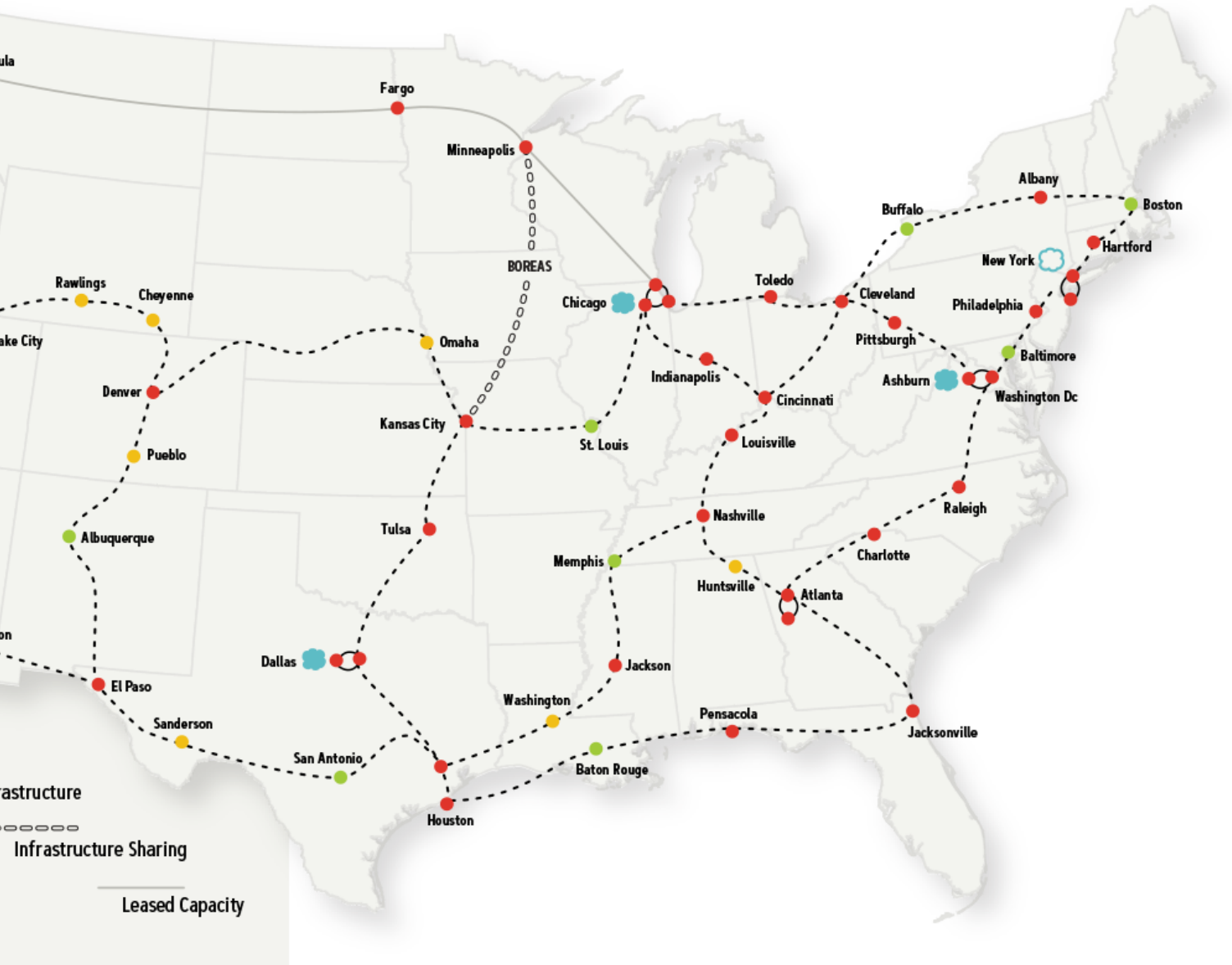
OneNet offers exclusive access to Internet2's research and education network. Internet2 operates the nation's largest and fastest coast-to-coast, 400 Gbps network that was built to deliver advanced, customized services. Internet2 creates a collaborative environment where U.S. research and education organizations can solve common technology challenges and develop innovative solutions in support of their educational, research and community service missions. OneNet's connection to Internet2 equips Oklahoma's scientists with the high capacity they need on a network dedicated to moving big data across the country for national and global research.



- I2PX/RPI/Cloud Connect Peering Site
- I2PX/RPI Peering Site
- AL1S/AL2S/AL3S Add-Drop Site
- AL1S Add-Drop Site
- AL1S Regeneration Site

--- Fiber Infra

# Network Infrastructure Topology



National topology as of March 2022.

### MAP KEY

OFFN



MORE-OFFN



EVER-MORE-OFFN



SI-MORE-OFFN



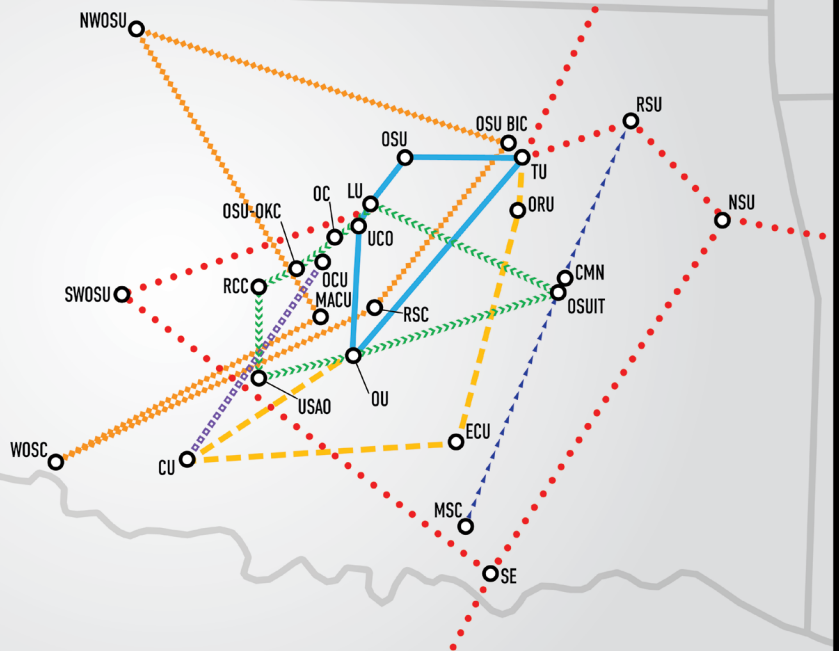
ESI-MORE-OFFN



CaRE-MORE-OFFN



SURF-MORE-OFFN







## OFFN: FAST LANE FOR BIG DATA TRANSFER

OneNet connects the OneOklahoma Friction Free Network, a 10 Gbps and 100 Gbps network that provides participants with a dedicated internet route that is much faster than traditional internet highways. This alternative pathway makes big data transfer, an often slow and painful task, a frictionless process. OFFN is funded by a series of National Science Foundation grant awards targeted at expanding cyberinfrastructure resources to higher education campuses. When the current projects are complete, OneNet will connect 26 college and university locations to the OFFN network. OFFN supports a variety of research and education drivers at these campuses, including biosciences, cybersecurity, chemistry, manufacturing, food science, data analytics, nursing, biomedical imaging, library science and STEM initiatives.

## **OFFN SUCCESS: ADVANCING PHARMACEUTICAL RESEARCH**

**The University of Science and Arts of Oklahoma leverages its connection to the OneOklahoma Friction Free Network to advance chemical and pharmaceutical research. Science & Arts utilizes supercomputers available on the network throughout the state to quickly transfer and run molecular dynamics configurations. This research is positioned to change pharmaceutical industry processes and open up exciting possibilities for the future. Prior to the connection to OFFN, Science & Arts did not have the computing resources to process the advanced computations required for this research. The OFFN connection facilitates collaborations like this one between Science & Arts and the larger research institutions and has been a game-changer for faculty and students at Science & Arts.**







## **OFFN SUCCESS: TEACHING SUPERCOMPUTING**

**For Oklahoma Christian University, the connection to the OneOklahoma Friction Free Network facilitates new collaborations across the state for faculty and students to access supercomputing resources. Students in OC's big data management course leverage the campus OFFN connection to access and utilize the University of Oklahoma's supercomputing cluster, Schooner, to perform course assignments. This course work provides OC students experience working with large data sets. OU's partnership with sharing access to software on Schooner teaches OC students about big data and how to best manage data in their careers. OC is extending this success to other data science projects for faculty and students.**



# NATIONWIDE RESEARCH & EDUCATION NETWORKS

OneNet is part of a fabric of research and education networks across the country and a member of The Quilt, a national coalition of advanced regional networks for research and education. Representing 43 networks across the country, The Quilt members help to accelerate research discovery, advance national and global education, and improve the delivery of public services.

## REGIONAL RESEARCH & EDUCATION NETWORKS IN THE UNITED STATES

### SOUTH CENTRAL COLLABORATION



655 Research Parkway, Suite 200, Oklahoma City, OK 73104  
[info@onenet.net](mailto:info@onenet.net) | [www.OneNet.net](http://www.OneNet.net) | 405-225-9444 | Toll-Free 888-5-OneNet

The Oklahoma State Regents for Higher Education, in compliance with Titles VI and VII of the Civil Rights Act of 1964, Executive Order 11246 as amended, Title IX of the Education Amendments of 1972, Americans with Disabilities Act of 1990 and other federal laws and regulations, do not discriminate on the basis of race, color, national origin, sex, age, religion, handicap or status as a veteran in any of its policies, practices or procedures. This includes, but is not limited to, admissions, employment, financial aid and educational services. This publication, printed by Classic Printing, is issued by the Oklahoma State Regents for Higher Education, as authorized by 70 O.S. 2001, Section 3206. 250 copies have been printed at a cost of approximately \$2,230. Copies have been deposited with the Publications Clearinghouse of the Oklahoma Department of Libraries. This publication was produced in November 2023.