

University of Cincinnati

Facilities, Equipment and Other Resources

University of Cincinnati

The University of Cincinnati is a major, comprehensive, state-supported public research and teaching university with an enrollment of more than 42,000 students. The University, classified as a “very high” research university by the Carnegie Commission and ranked as one of America’s top public research universities, is an institution with a rich history in discovery and innovation. Last year, UC and its research affiliates received \$418 million in research funding, and the university is the largest employer in the Cincinnati region, with an economic impact of more than \$3 billion.

University of Cincinnati Office of Information Technology (UCIT)

The UC Office of Information Technology (UCIT) is the university’s centralized IT services provider. UCIT partners with students, faculty, and staff to deliver innovative and efficient real-world solutions that support the academic and research priorities of the university. UCIT operates as an interdependent organization aligned to partner with IT colleagues across campus, and provides services in strategic areas of focus including Business Operations, Client Services, E-Learning, Enterprise Shared Services, and IT Innovations & Partnerships.

UC Commodity Network

The University of Cincinnati Campus Core Network (UCNet) provides IPv4 and experimental IPv6 network connectivity for the main UC campus and three regional campuses. The core of the campus network is built on twenty one Cisco 6500 series routers with dual gigabit fiber links providing interconnect between redundant core routers. UC has one external peer provided by OARnet, which is a shared connection for commodity Internet and Internet2 traffic. Current provisioning is 3.5 GB for commodity Internet and 800mb for Internet2.

UCNet serves approximately 80 buildings throughout campus. Each floor of a building, serviced by its own vlan, is connected back to a distribution core router via dual fiber uplinks. UCNet currently supports over 1000 vlans, each a /24 IPv4 network and one /48 IPv6 network, which is still in an experimental stage.

UCNet is a centrally managed network, and the network infrastructure is designed to provide 100Mbps Ethernet ports to the community and 100/1000 Mbps Ethernet ports to devices servicing the community at large, such as centrally located servers providing resources to the entire community.

UC Data Center

The UC Data Center, managed by UCIT Enterprise Shared Services, provides 6700 square feet of space for enterprise shared services, research systems, and UC co-locators. A Data Center Infrastructure Management (DCIM) system was recently added, bringing state-of-the-art management and monitoring to the data center. Plans are also underway to upgrade the data center’s internal network capacity, providing high-speed data transfers between enterprise storage and the university’s core systems.

UCIT Compute and Storage

The UCIT Enterprise Shared Services division offers a variety of compute and storage resources to the UC community. Compute services include managed physical and virtual servers, data center hosting for co-locators, and hosting for applications and web services. Service administrators work with requestors to develop solutions to optimize the use of resources based on project requirements. Highly scalable, world-class enterprise storage

University of Cincinnati *Facilities, Equipment and Other Resources*

includes 513 TB of total capacity disk storage, with various performance and backup levels offered based on the needs of the individual, group, or application.

Compute Resources of Collaborators

Ohio Supercomputer Center (OSC) partnership

UC researchers connect to the OSC via the Ohio OARNet network. The unique partnership between UC and OSC/OARNet has been established as an excellent resource for high performance computing cycles. UC will be one of the first universities in Ohio to utilize the new 'condo' model for compute resources that OSC will be offering. In fact, UC is part of the RFP evaluation team for the newest cluster at OSC which has been funded for \$12M by the State of Ohio. The education team from OSC offers an introductory workshop each term for new OSC users at the University of Cincinnati and has begun offering a second workshop which is more in-depth for the power users. These workshops have been well attended and continue to form a community of computational researchers, integrating UCIT into the development of researcher's skills.

OSC currently operates three major systems which are available for UC researchers:

- Ruby Cluster, a 4800 core Intel Xeon machine
 - 20 nodes have Intel Xeon Phi accelerators
 - 20 nodes have Nvidia Tesla K40 GPUs
 - One node has 1 TB of RAM and 32 cores, for large SMP style jobs

- Oakley Cluster, an 8,300+ core HP Intel Xeon machine
 - One in every 10 nodes has 2 Nvidia Tesla GPU accelerators
 - One node has 1 TB of RAM and 32 cores, for large SMP style jobs

- Glenn Cluster, a 3,500+ core IBM AMD Opteron machine

UCIT Research & Development Office

The UCIT Research & Development strategic focus is to facilitate IT-enabled research and knowledge creation by connecting researchers with technical expertise, resources, training, and state-of-the-art IT services.

As an example, the Center for Simulations & Virtual Environments Research (UCSIM) provides technical and hardware expertise, programming, and modeling support for virtual and augmented reality research collaborations with the Cincinnati Children's Hospital Medical Center TEAM VR Lab, the Air Force Research Lab Discovery Center, and the UC Center for Cognition, Action, and Perception.

The Research and Development office director actively collaborates with researchers, administration and industry partners by leading the IT Governance Research and Development topical committee.

IT Governance – Research and Development Topical Committee

The Research and Development (R&D) topical committee is one of five committees that make up the IT Governance structure. All five committee chairs sit on the IT Council which is made up of major leadership of the university. The IT Governance structure is a part of the UC

University of Cincinnati *Facilities, Equipment and Other Resources*

Integrated Decision making process which is responsible for the identification and prioritization and funding recommendations for all UC initiatives.

The R&D committee membership includes the Office of Research's AVP of Strategic Initiatives and Implementation, the UC Research Institute's (UCRI) Chief Executive Officer (represents industry partnerships with UC researchers), Associate Deans of Research from major research colleges, computational researchers and faculty from UC's College of Medicine, College of Engineering, College of Arts and Sciences, and Digital Humanities. Research IT staff who support HPC in the division of Biomedical Informatics, Cincinnati Children's Medical Center High Performance Computing (HPC) center, and the College of Engineering Mechanical and Aerospace HPC clusters represent their research partners' cyberinfrastructure needs on the committee. Undergraduate and graduate student researchers from the STEM disciplines are important members as well, identifying and recommending the potential use of emerging technologies and trends.

Office of Information Security

The UCIT Office of Information Security (UCIT OIS) partners with the university community to foster a culture that supports the confidentiality, integrity, availability and accountability of the university's academic and research objectives through the application of unified information security architecture with the necessary policies and procedures to ensure its viability.

Relevant Core Security functions include:

- Cybersecurity Education & Awareness
- Risk Management and Consulting

UC Simulation Center

The UC Simulation Center is providing meaningful outcomes by solving real design problems in a virtual world. It is a collaborative effort between Procter & Gamble and the University of Cincinnati has developed a center of expertise in computer simulation. The center provides P&G with cost-effective, high-value virtual modeling and simulation capacity and capability while developing a talent pipeline for future recruitment.

Intelligent Maintenance Systems (IMS) Center

IMS is internationally recognized as the leader in predictive analytics and industrial big data modeling for life cycle performance of industrial systems. As the world pre-eminent NSF Industry/University Cooperative Research Center, IMS is often the first to introduce new concepts and technologies to the research and industry communities. It is also a leader in the discovery of new methods to assess machine degradation and predict the health of industrial systems including e-manufacturing, e-maintenance, cyber machine systems, cloud-based machine monitoring and manufacturing, intelligent cyber machine systems, etc. These discoveries translate into a useful methodology and tools for the development and deployment of prognostics and health management of industrial systems. The center is located in Baldwin Hall at the University of Cincinnati with outposts around the world.

OARnet

The Ohio Academic Resources Network (OARnet) was created in 1987 by the Ohio Board of Regents, through legislation by the Ohio General Assembly. OARnet was founded to provide Ohio researchers "online" access to the high performance computing resources of the Ohio

University of Cincinnati *Facilities, Equipment and Other Resources*

Supercomputer Center, established in Columbus earlier that same year. Today, the OARnet network consists of more than 1,850 miles of fiber-optic backbone, with more than 1,500 miles of it operating at ultrafast 100 Gbps speeds. The network blankets the state, providing connectivity to Ohio's colleges and universities, K-12 schools, public broadcasting stations, academic medical centers, government agencies, and partnering research organizations. Beyond being a nationally recognized statewide infrastructure, OARnet specializes in promoting efficiencies and shared services throughout Ohio's public institutions, providing worldwide connectivity through Internet2 tie-ins, and bridging dozens of international sites with high-definition telepresence.