Fact Sheet

The Role of Research Computing

- Each year, research institutions in the Commonwealth of Massachusetts attract billions of dollars in funding, creating thousands of jobs while spinning out new products and companies.

- That research relies on a massive computational infrastructure, which has become as essential to knowledge discovery as theory or real-world experiment. Today, virtually no breakthrough or advance — from health care to geophysics to urban planning — takes place without trillions of computations.

The Role of the MGHPCC

- The MGHPCC was created to support the state's innovation-based economy by providing computational infrastructure to its founding institutions – Boston University, Harvard University, the Massachusetts Institute of Technology, Northeastern University and the University of Massachusetts — and other academic and commercial research organizations.

- One of the founding goals of the MGHPCC was to facilitate collaboration across research institutions, allowing them to take on challenges too big to be addressed by a single entity.   Since it opened in 2013, the MGHPCC has enabled numerous collaborative projects among academic, government and commercial enterprises:

  o The Northeast Cyberteam, sponsored by a National Science Foundation (NSF) grant, is a joint effort by the MGHPCC, University of Maine, University of New Hampshire, and University of Vermont to accelerate computationally intensive research at small and mid-sized colleges and universities while creating work experience opportunities for students interested in computationally intensive research.

  o In partnership with XSEDE Campus Champions and a coalition of university research computing organizations across the US, the Northeast Cyberteam has developed ASK.CI, a national crowd-sourced Q&A platform for academic researchers and the people who support them.

  o The MGHPCC houses the Northeast Tier 2 (NET2) center for the ATLAS experiment at the Large Hadron Collider. Operated as a collaboration between Boston University and Harvard University, NET2 is one of six sites in the U.S. that serve scientists around the world who are using data from the ATLAS experiment to expand the frontiers of fundamental physics.

  o The MGHPCC houses the Commonwealth Computational Cloud for Data Driven Biology (C3DDB), a computer system funded by the Massachusetts Life Sciences Center that supports research connecting life science research with emerging, innovative big data analytics.

- o The MGHPCC hosts a large computer system for the Center for Data Science at UMass Amherst, an interdisciplinary hub for data science education, research, and industry collaboration.

- o The MGHPCC hosts computer systems for the Massachusetts Open Cloud, an industry/academic partnership that is exploring the Open Cloud Exchange model, a new approach to delivering cloud services.

- o The MGHPCC Supercloud, an extension of the MIT Supercloud, grew out of a desire to strengthen collaboration between Lincoln Laboratory, a federally funded research and development center managed by MIT, and members of the MGHPCC consortium. Originally developed for engineers at Lincoln Laboratory, the Supercloud makes it easier for researchers to solve larger and more complex problems by presenting a more user-friendly human interface.

- o The MGHPCC houses the Northeast Storage Exchange, a shared storage infrastructure for research institutions in the Northeast region of the U.S. The Northeast Storage Exchange is being developed with funding from the NSF and is being operated as a long-term partnership among the MGHPCC founding universities.

The MGHPCC in the Community

- The MGHPCC and its member universities support education and workforce development initiatives aimed particularly at young women, under-represented minorities, lower-income communities, and others who historically have had limited or less representative access to STEM careers. The MGHPCC partners with Holyoke Public Schools, Holyoke Community College, Springfield Technical Community College, and local community service organizations to host internships, robotics competitions, teacher workshops, after school classes, programming courses, career awareness days, summer camp, and other programs. The MGHPCC:

  - o Has funded more than $50,000 in scholarships for Holyoke Public School students attending one of the MGHPCC's founding institutions.

  - o Sponsors and hosts an internship program designed to provide hands-on experience for students who are interested in computers and computer science. Students from Springfield Technical Community College, Holyoke Community College, and Tech Foundry have learned to apply existing skills and new knowledge to tasks that are vital to the operation of the thousands of computer systems installed at the MGHPCC.

  - o Sponsors and hosts Holyoke Codes, a fun and engaging introduction to science and technology available to middle school students in Holyoke and surrounding towns. Since 2014, more than 2,000 students have attended over 150 workshops.

  - o Hosts community meetings that engage more than 10,000 participants each year.

- The MGHPCC generates more than $4 million annually in local economic activity in the form of payroll and purchased goods and services associated with the operation of the facility.

- The MGHPCC teamed with several State and the Federal agencies to invest more than $9 million in new power and fiber optic infrastructure in the City of Holyoke.

Environmental Leadership

- The MGHPCC was the first university research data center to receive Leed Platinum Certification, the highest level possible. Certification recognizes the MGHPCC's use of energy-efficient power distribution, advanced cooling techniques, low impact storm water management, and recycled building materials, among other measures.

- The MGHPCC is among the top 10 percent of data centers in the world in energy efficiency, with a year-round Power Usage Effectiveness (PUE) of 1.2.

- The MGHPCC is powered by electricity from Holyoke Gas & Electric, a municipal utility that derives more than 90 percent of its energy from carbon-free resources, principally local hydroelectric and solar.

MGHPCC Funding

- The ongoing operation of the MGHPCC is funded by its member universities. Construction of the data center was funded by its members, the Commonwealth of Massachusetts, the federal New Markets Tax Credit Program, EMC Corporation (now Dell EMC) and Cisco.