Impact

The Lincoln Laboratory Supercomputing Center (LLSC) was established to better address supercomputing needs across all Laboratory missions, develop new supercomputing capabilities and technologies, and spawn even closer collaborations with MIT campus supercomputing initiatives. The center has a unique focus on interactive supercomputing for high-performance data analysis, and is located in an extremely ‘green’ computing center in Holyoke, Massachusetts, allowing our computers to run 100% carbon free.

Make a Difference

For over 65 years, Lincoln Laboratory has been the part of MIT focusing on advanced technology for national security. We employ some of the nation’s best talent to develop solutions to hard problems that make a difference to the country and to the world.

Established in early 2016, the LLSC is used by more than 1,000 researchers across the Laboratory. With the addition of the petascale system, the center is enabling new research in machine learning, advanced physical devices, cybersecurity, bioinformatics, and autonomous systems.

Jeremy Kepner
MIT Lincoln Laboratory Fellow,
Lincoln Laboratory
Supercomputing Center

APPRAOCH

The Lincoln Laboratory Supercomputing Center (LLSC) is an interactive, on-demand parallel computing system that uses large computing clusters to enable Laboratory researchers to augment the power of desktop systems to process large sets of sensor data, create high-fidelity simulations, and develop entirely new algorithms.

LLSC develops and deploys unique, energy-efficient high performance computing that provides

- Integrated HPC and Big Data capabilities
- Data centers, hardware, software, and user support
- 100 times more productivity than standard HPC
- 100 times better performance than standard Cloud providers

Carbon-free Power
The LLSC integrates the user's desktop computer through high-productivity environments, tools, and interfaces. By augmenting the processing power of desktop systems with high performance computational clusters, the LLSC enables researchers to develop and enhance algorithms for sensor data processing, high-fidelity simulations, and Big Data science.

- High performance computing, networking, and storage
- Tools for interactive parallel application development
- High productivity scalable parallel and distributed software environments
- Unified platform for simulation, linear algebra modeling, data analytics and benchmarking

The LLSC merges traditional HPC and Big Data technologies in an interactive on-demand parallel computing environment. Users can quickly develop Big Data and machine learning models and processing chains since all of the software and computing resources are available through interactive tools that are accessible on-demand through their desktop.

**Big Data Technologies**
- Big Data architectures, high performance databases, and graph processing integrated into a supercomputing platform
- Dynamic database infrastructure, federated interfaces, and data processing pipelines
- Research in architecture analysis, benchmarking, and advanced mathematics

**Machine Learning**
Every aspect of High Performance Machine Learning system optimized to enable
- Truly interactive high-productivity machine learning
- Launching hundreds of machine learning models in seconds
- Full machine learning software stack support for all major frameworks

**Dynamic Databases**
- High performance computing, networking, and storage
- Tools for interactive parallel application development
- High productivity scalable parallel and distributed software environments
- Unified platform for simulation, linear algebra modeling, data analytics and benchmarking

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**ON-DEMAND INTERACTIVE SUPERCOMPUTING**

**BIG DATA AND MACHINE LEARNING**

*High Performance Machine Learning Interactive Launch on 32,000+ Cores*
LLx combines a learning platform with HPC and database resources to create a unified educational environment to support learning at scale. The LLx environment provides a testbed for active exploration of mathematical, algorithmic, and parallel concepts through courses that highlight Lincoln Laboratory technologies and expertise.

Green Supercomputing Center
The LLSC connects to a data center situated 90 miles away in Holyoke, a Massachusetts city on the Connecticut River. The center is powered by a combination of hydroelectric, wind, solar, and nuclear sources, allowing the LLSC systems to run 100 percent carbon free.
Due to the unique nature of our work, we require U.S. citizenship.

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MIT Lincoln Laboratory’s fundamental mission is to apply science and advanced technology to critical problems of national security. As an Equal Opportunity Employer, we are committed to realizing our vision of diversity and inclusion in every aspect of our enterprise.