High Performance Computing

Mio.Mines.Edu

Your Supercomputer

You have access to a 72 Tflop HPC cluster for Student and Faculty Research use

Want to get started with supercomputing?

Supercomputing is an increasingly important part of engineering and scientific research. Mines provides an advanced supercomputing cluster called "Mio" for the use of students and faculty who wish to take advantage of this extraordinary high-performance computing resource.

For Students

Students have already purchased some access to Mio with Tech Fee funds—usable for general research, class projects, and learning HPC techniques. Students may also at times use Mio nodes purchased by their academic advisor or other professors. The HPC Group offers assistance to students (and faculty) to get up and running on Mio. Individual consultations and workshops are available.

For Faculty

Mio holds many advantages for professors:

- There's no need to manage their own HPC resources
- Professors can access other professor's resources when allowed
- Mines supplies high-quality Infiniband network infrastructure, which greatly improves the scalability of multinode applications
- Cost is a reasonable $5,800 per node

Hardware Description

Compute Nodes

- 8 -24 compute cores per node
- 24-192 GB/Node
- 2 GPU nodes - 7.23 Tflops
- 240 TB parallel file system (NEW!)
- 2.5GHz - 3.06GHz
- Infiniband Interconnect
- 8 Phi/MIC cards - 16.0 Tflops

What's in a name?

The name "Mio" is a play on words. It is a Spanish translation of the word "mine," as in "belongs to me." The phrase "The computer is mine" can be translated as "El ordenador es mío."

BlueM.Mines.Edu

Mines' Big Iron Supercomputer

154 Tflops 17.4Tbytes 10,496 Cores 85KW

BlueM is Mines' newest HPC platform (in addition to the "Mio" cluster). It is a unique machine, composed of two distinct compute platforms or partitions that share a common file system. Both platforms, as well as the file system, were purchased from IBM as a package. The common file system shared between the partitions can hold 480 TB. It has efficient support for parallel operation (that is, multiple cores accessing it at the same time). The two compute platforms are optimized for different purposes.

The smaller compute platform, in terms of capability, is AuN ("Golden"). It is a traditional HPC platform using standard Intel processors. It contains 144 compute nodes connected by a high-speed network. Each node contains 16 Intel SandyBridge compute cores and 64 GB of memory for a total 2,304 cores and 9,216 GB of memory. AuN is rated at 50 Tflops. It is housed in two double-wide racks with 72 nodes in each rack. AuN is designed to run jobs that require more memory per core.

Mc2 ("Energy") is an IBM BlueGene. Mc2 is housed in a single large 4' x 4' rack, currently half full with room for expansion. The BlueGene computer is designed from the ground up as an HPC platform. It has a very-high-speed network connecting the nodes so applications can scale well. Each node has a processor dedicated to systems operations in addition to the 16 cores that are available for users. The processors on Mc2 are IBM "Power" processors. Mc2 has 512 compute nodes, each with 16 GB of memory for a total core count of 8,912 user cores and 8,912 GB of memory. Mc2 is rated at 104 Tflops. Mc2 is designed for jobs that can make use of a large number of cores.

The total power consumption of the system is about 85 kW with only 35 kW used by Mc2.

Mc2 is water cooled. AuN is currently running with rear door heat exchangers but could be run using air cooling only. BlueM is housed at the NCAR Mesa Lab facility, in Boulder, CO.

Want to know more?

http://hpc.mines.edu
http://inside.mines.edu/HPC-MachineStat

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