Cornell Theory Center, Cornell National Supercomputer Facility

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Description

The Cornell Theory Center at Cornell University is one of four National Advanced Scientific Computing Centers supported by the National Science Foundation. The Theory Center's resources have been used by more than 5,000 researchers in fields as diverse as aerospace engineering, economics, and epidemiology. Its staff offers technical expertise in software, visualization, vectorization, and parallel processing to its users, and investigates new, highly parallel processing resources for the scientific community in order to increase the usability of these computers through systems development and through examination of techniques to improve performance. A variety of education and training programs are also offered to high school, undergraduate, and graduate students, and their professors.

The Theory Center, through its Cornell National Supercomputer Facility (CNSF), provides a world-class supercomputing environment that includes traditional vector-scalar supercomputing resources, in addition to scalable, parallel systems. Theory Center resources were recently upgraded to include a single six-way IBM ES/9000-900 supercomputer (with 2.66 Gflops peak aggregate performance, 9 Gbytes shared memory). An important feature for many users who now access 1 Gbyte of virtual memory is that each user process may access up to 2 Gbytes of virtual memory on the ES/9000. Parallel resources at the Theory Center include a 32-processor KSR1, the 32-processor Parallel Visualization Server (PVS) and a Scalable Cluster of RISC Systems. The KSR1 is a scalable parallel system manufactured by Kendall Square Research and offers 1.28 Gflops peak aggregate performance, and a 1 Gbyte shared memory and 1000 Gbyte address space per processor.

The Theory Center is a national center of expertise for IBM's PVS and the visual programming interface Data Explorer (DX). The PVS is a parallel computer that implements DX across 32 processors using a large global memory, and performing up to 2.5 Gflops. This processing speed combined with the portable, user-friendly DX software allows an enormous range of performance levels with no change in function for the user. The same DX is available, for example, on the Center's Scalable Cluster of RISC Systems (SCRS), which consists of multiple RS/6000 workstations connected via high speed networking.

This RISC Cluster is being used for multiprocessing and parallel computing. The cluster presently consists of eight model 550s, each with at least 128Mb of memory and all running AFS (Andrew File System). PVM is available to affect a message- passing parallelism. For those with X-capable devices, the Center has a PVM workbench to facilitate use of the cluster. Express will also be available in the near future.

In addition to the production operating environments, full support for communications across the NSFNET is provided via TCP/IP. Interprocess communications, including remote logins, FTP file transfer, and X Window System, are supported. FORTRAN is the primary language, and is supported in scalar, vector, and parallel modes, with interactive debug and execution analysis. Scientific subroutine libraries are available, including vectorized and parallelized versions. Online HELP facilities, UNIX man pages, and a Cornell set of TUTOR examples assist users. Graphics software supports both local hardware and remote facilities. Several well-known application packages and a list of software are available upon request.

Network Access

The Theory Center's resources can be reached via the Internet (supporting remote login, file transfer, electronic mail, and graphics). Users can access the CNSF via direct dialups: 607-255-4141 provides 300, 1200, and 2400 baud service; 607-254-5454 provides 9600 baud service.

Who Can Use the Center

All proposals for time on the Theory Center's resources are subject to peer review through the Theory Center's National Allocations Committee; researchers must submit an application for supercomputer time directly to the Theory Center. Corporations interested in using the Theory Center through the Center's Corporate Research Institute may contact Linda Callahan at the address and phone number above.