# The HeNCE Project

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## HeNCE Overview

HeNCE (Heterogeneous Network Computing Environment) is an X-window based software environment designed to assist scientists in developing parallel programs that run on a network of computers. HeNCE provides the programmer with a high level abstraction for specifying parallelism. HeNCE is based on a parallel programming paradigm where an application program can be described by a graph. HeNCE graphs are variants of directed acyclic graphs, or DAGS. Nodes of the graph represent subroutines and the arcs represent data dependencies. Individual nodes are executed under PVM. HeNCE is composed of integrated graphical tools for creating, compiling, executing, and analyzing HeNCE programs. HeNCE relies on the PVM system for process initialization and communication. The HeNCE programmer, however, will never explicitly write PVM code. During or after execution, HeNCE displays an event-ordered animation of application execution, enabling the visualization of relative computational speeds, processor utilization, and load imbalances.

Through HeNCE a scientist can easily decompose existing C or Fortran source code into pieces which can be executed in parallel over an existing collection of workstations or supercomputers. This approach allows the programmer to reuse existing programs and extract unused performance out of existing computers.

HeNCE also supports the graphical configuration of PVM hosts, assists in the generation of architecture-dependent object modules, and contains provisions for task scheduling based on user supplied cost matrices.

### Status and Availability

The HeNCE interface also available by sending electronic mail to netlib@ornl.gov with the message "send index from hence". Further questions or problems regrading HeNCE send email to hence@msr.epm.ornl.gov.

### Futures

The HeNCE project is ongoing, and support at levels appropriate to research projects may be reasonably expected. Over the next several months, newer releases of HeNCE are planned, with enhancements including fault tolerance, process migration, and shadow execution facilities, toolkits for the graphical assembly of concurrent applications from skeleton templates, hierarchical visualization of application execution, and concurrent debugging facilities.