

A Bridge Between A Personal Computer And A Cluster Using Gridsolve

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The adoption of Grid infrastructures as a major platform for supercomputing holds great promise for accelerating scientific discovery. However, the use of Grid infrastructures has, for the most part, been restricted to the largest and most resource intensive projects. For Grid computing to become a true success story, it must become an infrastructure that can be easily used by the general community of scientist and engineers. Within this community of practitioners, the use of scientific computing environments (SCEs) such as Matlab or Mathematica is pervasive. These domain specialists are accustomed to the flexible computing environment provided by an SCE, which gives them with the tools and libraries that they need to be productive and enables them to go from computation to visualization in an natural fashion.

The purpose of GridSolve is to create the middleware necessary to provide a seamless bridge between the simple, standard programming interfaces and desktop systems that dominate the work of computational scientists and the rich supply of services supported by the emerging GridSolve employs NetSolve as one of its primary enabling technologies. NetSolve is a client-agent-server system which provides remote access to hardware and software resources through a variety of client interfaces. A NetSolve system consists of three entities. The Client, which needs to execute some remote procedure call. In addition to C and Fortran programs, the NetSolve client may be an interactive problem solving environment such as Matlab or Mathematica. The Server executes functions on behalf of the clients. The server hardware can range in complexity from a uniprocessor to a MPP system and the functions executed by the server can be arbitrarily complex. Server administrators can straightforwardly add their own function services without affecting the rest of the NetSolve system. The Agent is the focal point of the Net- Solve system. It maintains a list of all available servers and performs resource selection for client requests as well as ensuring load balancing of the servers. A GridSolve user is relieved of many of the details that make using Grid resources awkward: finding the appropriate resources, ensuring that the needed libraries are installed. submitting the application to the resources, monitoring the execution of the application and transferring results back to their SCE for further viewing and analysis.