Topic 6
Grid Computing and Middleware Systems

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Grid computing is originated from supercomputing in the mid nineties. The grand challenge problems were not solvable even the largest supercomputers. A natural idea was to run these high-end applications on several supercomputer resources in parallel. This concept led to the new direction of supercomputing, called metacomputing. The success of the first experiments in metacomputing initiated a more general view of metacomputing whereby not only supercomputers but any kind of computational, storage and other types of resources should be connected and exploited on demand. Even the objectives of metacomputing were widened and goals like supporting high-throughput computing, collaborative computing, tele-immersion, etc. became impor-tant aspects of this kind of generic view of metacomputing that was called later Grid computing.

Grid computing, streamlined by the successful Global Grid Forum (GGF), has become a major new research area over the past few years, with strong involvement from both academia and the computing industry. Although much progress has been made in the deployment of grid infrastructures, many challenges still lie ahead of us before the ultimate goal of the grid can be realized. Recognizing the importance and potential impact of Grid computing on the whole society we decided to organize a workshop in the framework of Euro-Par where researchers could report their recent advances in Grid middleware design.

The workshop received 28 submitted papers dealing with all possible aspects of Grid middleware research. Finally, after a careful review procedure we selected 6 regular and 4 short papers.

The regular papers cover the following main issues: An RPC system called GrAD-Solve that supports execution of parallel applications over Grid resources; A Grid enabled computational toolkit that provides transparent and stable access to Grid compute resources from Matlab; An opportunistic job migration scheme to decide if job migration is feasible and worthwhile when a new Grid resource appears; Introducing semantic access control to improve security in medical applications over the Grid; An automated negotiation engine that identifies mutually acceptable terms and could be used in the Grid Notification Service; A Grid monitoring system for grid job and re-source monitoring.

The short papers deal with the following problems: The design and implementation of a database toolkit for engineers, which has been incorporated into the Matlab environment; a resource accounting and charging system for a Condor-based Grid environment; a plug-in for the gSOAP Toolkit that allows development of Web Services exploiting the Globus Security Infrastructure; Optimisations of Java RMI for Grid applications.