

The Evaluation of Grid Resource Trading Middleware Services

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ABSTRACT

The growing popularity of the Internet and the availability of powerful computers and high-speed networks as low-cost commodity components are changing the way we do computing and use computers today. The interest in coupling geographically distributed resources is also growing (leading to what is popularly called as Computational Grids) for solving large-scale problems. The management of resources in the grid environment becomes complex, as they are (geographically) distributed, heterogeneous in nature, owned by different individuals/organizations each having their own resource management policies and different access-and-cost models. This introduces a number of challenging issues including site autonomy, heterogeneous substrate, policy extensibility, resource allocation or co-allocation, online control, and “economy of computations” that the grid resource management systems need to be addressed. A number of grid middleware systems such as Globus offer services for managing these issues are available, however they currently do not support computational economy.

The Nimrod/G resource broker, a global resource management and scheduling system for computational grids, built using Globus services and supports deadline and cost-based scheduling mechanism. The Globus metacomputing toolkit does not offer services for trading resources dynamically. This limitation is overcome by our GRid Architecture for Computational Economy (GRACE) middleware infrastructure that can co-exist with Globus services, and Nimrod/G can use them for trading resources to support dynamic deadline vs. cost trade-off during scheduling. This talk/paper aims to present the usage of GRACE services in Nimrod/G and its evaluation through experimentation on GUSTO computational grid test bed.

References

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