ARGUmentation as a foundation for the semantic Grid

ArguGrid

Grid computing is concerned with the development of tools for the sharing, selection, and aggregation of distributed, ubiquitous, heterogeneous resources and services, as required by a wide range of applications, from e-science to e-commerce. ArguGrid aims to develop a new model for programming the Grid at a ‘semantic’, knowledge-rich level, enabling the fulfilment of requirements from requestors and providers, thus better supporting and enabling applications.

In order to provide this semantic, knowledge-rich Grid, ArguGrid aims at using argumentative agents technology. Agents are associated with service and resource requestors and service providers on the Grid. They are responsible for decision-making and are equipped with methods for negotiation with other agents. With the support of argumentation processes, they decide which services can be used for fulfilling the demands of users and the constraints posed by providers, taking into account their preferences and the utilities they assign to situations, and evolving and using a notion of trust to ‘filter’ their interactions with other entities. Argumentation is also used to support ‘virtual organisations’, understood as societies of agents, to compose individual services into more complex ones and return executable workflows. The project focuses on e-business application scenarios.

ArguGrid’s objectives are:

• to provide a grid-based model for argumentative agents, controlling and requiring access to services/resources, capable of deciding rational plans of actions and negotiating and arguing with other agents;
• to provide a new model and methodology for the specification, creation, operation and dissolution of virtual organisations, formed by individuals or institutions controlling resources/services in the Grid and represented in ArguGrid as agent societies;
• to design an architecture for the Grid based on the use of communicating agents and built on top of standard Grid middleware and web service standards, to support the evolution of virtual organisations and the operation of argumentative agents;
• to develop a grid-based platform to support the implementation of the models, and allowing to study the viability and usefulness of the proposed ArguGrid formal approach;
• to experiment with and evaluate the models, methodology, service-oriented architecture and platform in the context of concrete application scenarios for e-business.

ArguGrid plans to achieve these objectives by using:

• logic-based argumentation techniques for agents and interaction amongst them, extended with decision-theoretic techniques;
• contracts and workflows as part of the representation of virtual organisations; welfare economics for the evolution of virtual organisations as agent societies;
• web service architectures to provide a semantic services composition environment;

Contract number
035200

Type of project
Specific targeted research project

Project coordinator
Imperial College London, UK

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Project web site URL
www.argugrid.org

Maximum Community contribution to project
EUR 1 999 000

Project start date
1 June 2006

Duration
36 months
- peer-to-peer computing and overlay networks for the Grid infrastructure.

**Projects Partners**  
*Organisation name and country*

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<th>Organisation Name and Location</th>
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