

Multi-Agent Systems for Adaptive and Efficient Job Scheduling Service in Grids

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ABSTRACT

In this paper we propose an adaptive efficient job scheduling service model on Grids using multi agent systems and a market like Service level Agreement (SLA) negotiation protocol based on the Contract Net model. This job scheduling service model involves four types of agents: service user agents, service provider agents, local scheduler agents and inter-grid agents. Service provider agents provide services to service user agents by allocating resources using local scheduler agents. Service provider agents provide services to service user agents by allocating resources using local scheduler agents. The service provider agents may contact the inter-grid agents if enough resources are not available in their own grid. Inter-grid agents provide resources from the neighboring grid. The service provider agent may adapt the dedicated service according to its interactions with service user agent.

The SLA negotiation protocol is a hierarchical bidding mechanism involving negotiations between the four agents. In this protocol, the agents exchange SLA announcements, SLA-bid, and SLA-awards to negotiate the schedule of jobs on Grid Compute resources. To deal with the presence of uncertainties, re-negotiation is used to allow the agents to re-negotiate the SLA in failure.

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