

# A Dynamic Resource Broker and Fuzzy Logic Based Scheduling Algorithm in Grid Environment

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## Abstract

Grid computing is a loosely couple distributed system, and it can solve complex problem with large-scale computing and storage resources. Middleware plays important role to integrate heterogeneous computing nodes. Globus Toolkit (GT) is a popular open source middleware to build grid environment. However, a job submission has lots of complicate operations in GT especially in a large scale grid. Moreover, the information discovery component of Globus Toolkit can only provide the summarized information from Grid Head instead of each computing node. Furthermore, job scheduling is another important issue in the high performance Grid computing. An appropriate scheduling algorithm can efficiently reduce the response time, turnaround time and increase the throughput. In this paper, we develop a resource broker module for GT infrastructure, which can dynamically describe and discover the resource information of computing nodes. Moreover, we design an adaptive fuzzy logic scheduler, which utilizes the fuzzy logic control technology to select the most suitable computing node in the Grid environment. For verifying the performance of the proposed scheduling algorithm, we also implement a resource broker as well as fuzzy logic scheduler based on Globus Toolkit 4. The experimental results show our algorithm can reduce the turnaround time compared with round-robin and random dispatching methods. The experiments also show that our algorithm has better speed-up ratio than round-robin and random dispatching when number of computing nodes increasing.

Keyword :