

A Fuzzy Neural Network Based Scheduling Algorithm for Job Assignment on Computational Grids

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Abstract

Grid computing is an emerging computing architecture that can solve massive computational problems by making use of large numbers of heterogeneous computers. Job scheduling is an important issue in the high performance Grid computing environment. An appropriate scheduling algorithm can efficiently reduce the response time, turnaround time and further increase the throughput. However, finding an optimal grid scheduling algorithm is intractable. In this paper, we propose a high performance scheduling algorithm based on Fuzzy Neural Networks to resolve this problem. In the proposed algorithm, we apply the Fuzzy Logic technique to evaluate the grid system load status, and adopt the Neural Networks to automatically tune the membership functions. Since there are many factors that influence the system's load circumstances; as the number of factors increase, it becomes very difficult to set up the system using general experience. We implemented a Fuzzy Neural Network scheduler based on Globus Toolkit 4 to verify the proposed scheduling algorithm performance. NAS Grid Benchmarks (NGB) was utilized to validate the performance of our scheduling approach. The experimental results show that our proposed algorithm can reduce the turnaround time and has better speed-up ratio than previous methods.

Keyword : grid, fuzzy logic, neural network, fuzzy neural network, grid benchmark