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MTTDFR-SJFR: A Combinatorial Rule Approach To Balance Tradeoff Between Flowtime, Makespan, Delayed Jobs, Total Tardiness And Utilization

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In order to fully utilize the Grid resources, implementing a good scheduling algorithm is really important. Currently, some of the well-known researches and enterprise schedulers have applied Priority Rule (PR) schedulers to manage the Grid jobs because they are simple and easy to implement. To date, there is no strong performance justification or proof given on why these specific PR algorithms are preferred compared to other PR algorithms. For example, five PR algorithms; First Come First Serve (FCFS), Longest Job First (LJF), Shortest Job First (SJF), Earliest Deadline First (EDF) and Minimum Time To Deadline (MTTD) have been proposed. However, none of these algorithms perform well in every metrics of performance. An attempt to improve their performance has been made using Combinatorial Rule (CR) which is the combination of more than one PR. Unfortunately, the current implementation of CR only focuses on two performance metrics which are flowtime and makespan, while sacrificing the others. In order to tackle the aforementioned problem, this paper introduces Minimum Time To Deadline to Fastest Resource - Shortest Job to Fastest Resource (MTTDFR-SJFR), a new CR scheduler that performs better than other CR algorithms tested within the scope. To achieve high performance, a combination of PR with Fastest Resource (FR) resource selection scheme that further improve the performance is proposed. Graphical results obtained from experimental simulation showed the superiority of the proposed CR algorithm in term of overall performance, compared to other CR as well as the original PR.

Keywords: Priority Rule, Combinatorial Rule, Grid Scheduling, Performance, Computational Intelligence