

Task Scheduling and Resource Allocation in Cloud-based on AHP Method

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Abstract : Scheduling of tasks and the optimal allocation of resources in the cloud are based on the dynamic nature of tasks and the heterogeneity of resources. Applications that are based on the scientific workflow are among the most widely used applications in this field, which are characterized by high processing power and storage capacity. In order to increase their efficiency, it is necessary to plan the tasks properly and select the best virtual machine in the cloud. The goals of the system are effective factors in scheduling tasks and resource selection, which depend on various criteria such as time, cost, current workload and processing power. Multi-criteria decision-making methods are a good choice in this field. In this research, a new method of work planning and resource allocation in a heterogeneous environment based on the modified AHP algorithm is proposed. In this method, the scheduling of input tasks is based on two criteria of execution time and size. Resource allocation is also a combination of the AHP algorithm and the first-input method of the first client. Resource prioritization is done with the criteria of main memory size, processor speed and bandwidth. What is considered in this system to modify the AHP algorithm Linear Max-Min and Linear Max normalization methods are the best choice for the mentioned algorithm, which have a great impact on the ranking. The simulation results show a decrease in the average response time, return time and execution time of input tasks in the proposed method compared to similar methods (basic methods).

Keywords : hierarchical analytical process, work prioritization, normalization, heterogeneous resource allocation, scientific workflow

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