

Cognitive Science Based Scheduling in Grid Environment

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Abstract : Grid is infrastructure that allows the deployment of distributed data in large size from multiple locations to reach a common goal. Scheduling data intensive applications becomes challenging as the size of data sets are very huge in size. Only two solutions exist in order to tackle this challenging issue. First, computation which requires huge data sets to be processed can be transferred to the data site. Second, the required data sets can be transferred to the computation site. In the former scenario, the computation cannot be transferred since the servers are storage/data servers with little or no computational capability. Hence, the second scenario can be considered for further exploration. During scheduling, transferring huge data sets from one site to another site requires more network bandwidth. In order to mitigate this issue, this work focuses on incorporating cognitive science in scheduling. Cognitive Science is the study of human brain and its related activities. Current researches are mainly focused on to incorporate cognitive science in various computational modeling techniques. In this work, the problem solving approach of human brain is studied and incorporated during the data intensive scheduling in grid environments. Here, a cognitive engine is designed and deployed in various grid sites. The intelligent agents present in CE will help in analyzing the request and creating the knowledge base. Depending upon the link capacity, decision will be taken whether to transfer data sets or to partition the data sets. Prediction of next request is made by the agents to serve the requesting site with data sets in advance. This will reduce the data availability time and data transfer time. Replica catalog and Meta data catalog created by the agents assist in decision making process.

Keywords : data grid, grid workflow scheduling, cognitive artificial intelligence

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