Evaluation of an economy-based file replication strategy for Malaysian Research and Education Network (MYREN) Data Grid model

ABSTRACT

This paper discusses a simulation based file replication for Malaysian Research and Education Network (MYREN) Data Grid topology. This simulation evaluates a novel replication strategy, based on an economic model, which optimizes both the selection of replicas for running jobs and the dynamic creation of replicas in MYREN Grid sites. The optimization agents are located on MYREN Grid sites and use an auction protocol for selecting the optimal replica of a data file and a prediction function to make informed decisions about local data replication. Our primary objective of this study is to determine the optimal replication needs to be selecting when given a request by a job for a particular file in MYREN Data Grid implementation. The second objective is to trigger both replication and deletion of data files in MYREN Grid sites by analyzing the pattern of previous file requests; thereby affecting the migration of files toward sites that show a corresponding increased frequency of file-access requests.

In MYREN topology, the major issue is data latency. In order to solve this issue, data replication is considered to be an important technique in reducing jobs execution. Replication involves the creation of identical copies of data files and their distribution over MYREN sites. We evaluate the replication strategy using a Data Grid simulator called OptorSim. Our simulation results showed that the technique can significantly reduce data access latency and increase the robustness of Grid application.