Dynamic replica replacement strategy in data grid

ABSTRACT

Data replication strategy is widely adopted for large scale data-intensive applications in distributed network such as data grid. Replication approach can shorten the time of fetching the files by creating many replicas stored in appropriate sites. However, due to the limited storage capacity of each node, replicas that are beneficial for future jobs can be wastefully removed and replaced with less valuable ones. Therefore, it is important to have efficient replication optimization that can dynamically choose the replicas for replacement while satisfying Quality of Service (QoS) requirements and storage capacity constraints. In this paper, we present a dynamic replica replacement strategy, named Least Value Replacement (LVR), which can ascertain the importance of valuable replicas in a grid site. The LVR algorithms can automatically decide on which replica to be replaced whenever the storage element of the grid site is full based on information such as access frequency and files future value. The performance evaluation of LVR and other replication algorithms are carried out by simulation. The result shows that LVR performs better than other replication strategies. Thus, the contribution of this paper provides another aspect of replication strategy by minimizing the job execution time for overall data grid performance.

Keyword: Grid computing; Data grid; Replica; Replica replacement; Dynamic replication