DEVELOPMENT OF A JOB COORDINATION

MODEL FOR GRID COMPUTING

ARCHITECTURE

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ABSTRACT

This research work developed and simulated a homogeneous architecture for job coordination on a high throughput grid computing system in order to allow for platform independent and decentralized programming of all categories of jobs in grid computing environment.

A job coordination model using a shared memory data structure based on Objective Linda coordination language was formulated. The scheme worked by posting data from the worker nodes to this memory using templates and retrieving it using associative pattern matching. The model was analyzed theoretically and simulated using Java programming language. Performance analyses were carried out using the following parameters: delay time and effectiveness.

The results showed that delay times changed in a predictable pattern for all events. As the number of nodes used for processing jobs increased from 100 to 700, delay time reduced from 7.425 ms/node to 5.724 ms/node and increased from 17.930 ms/node to 18.095 ms/node for migration and checkpointing events respectively. Also, as the number of nodes on the grid for migration with checkpointing events increased from 200 to 900, the delay time reduced from 38.240 ms/node to 34.640 ms/node. The results further showed that the introduction of a memory management scheme reduced the overall delay time over the conventional memory scheme by 24.64%.

This study concluded that the developed model has decentralized, interoperable and homogeneous capabilities and utilized shared memory data structure concept. The simulated model proved to be effective and efficient for running different categories of jobs on grid. The scheme will attract developers of high throughput grid.