

ABSTRACT

As computational cluster become viable alternative platforms for solving large computational problems, the research community acknowledges that the cluster environment can be used effectively when adaptive resource management is employed. This requires the ability to estimate the resource requirements of applications before scheduling decisions are made. We proposed a resource estimation model for applications executed in the parallel-pipeline model of execution. We study the use of the M/G/1 and M/M/1 queueing theory when applies to the communication models on the parallel-pipeline model. We propose the communication model that estimates the amount of time used to transfer the data through the cluster network. The proposed models were used to predict the communication time in the parallel-pipeline model. We compared the predicted time to the measured time from the experiments. An analysis of the average error in the prediction vs. actual execution time reveals that the proposed communication models were accurate with in 20% error. The result shows that the performances of the M/G/1 and M/M/1 communication models were nearly identical.