

## Abstract

Techniques for predicting the availability of CPU resources associated with the execution of multiple concurrent Java threads on a multi-core architecture are introduced. Prediction of CPU availability is important in the context of making thread assignment and scheduling decisions. Theoretically derived upper and lower bound formulas for estimating CPU availability are introduced. Input parameters to the formulas include: number of cores; number of threads; and the unloaded CPU usage factor for each thread. Extensive experimental studies and statistical analysis are performed to validate the theoretical bounds and provide a basis for an empirical model for predicting CPU availability. To facilitate scientific and controlled empirical evaluation, synthetically generated threads are employed that are parameterized by their unloaded CPU usage factor, defined as the fraction of time a thread spends utilizing CPU resources on an unloaded system.