

## Abstract

The efficiency of a multi-core architecture is directly related to the mechanisms that map the threads (processes in execution) to the cores. Determining the CPU resource availability of a multi-core architecture based on the characteristics of the threads that are in execution is the art of system performance prediction. Prediction of CPU resource availability is important in the context of making process assignment, load balancing, and scheduling decisions. In distributed infrastructure, CPU resources are allocated on demand for a chosen set of compute nodes. In this paper, a prediction model is derived for multi-core architectures and empirical evaluations are performed with real-world benchmark programs in a heterogeneous environment to demonstrate the accuracy of the proposed model. This model can be utilized in various time-sensitive applications like resource allocation in a cloud environment, task distribution (determining the order for faster processing time) in distributed systems, and others.