

Everything You Always Wanted to Know About Synchronization but Were Afraid to Ask

Summary:

The objective of this paper is to present a theory related to synchronization. The paper claims that, from the numerous experiments performed, it is the hardware specifications that mainly determines the scalability of a software system. By spanning numerous layers of abstraction that define the software system, it is reported that properties of the hardware affect the synchronization issues.

Strengths and Weaknesses:

The paper takes extensive measures to prove its hypothesis. It is mentioned that the proposal dissects synchronization costs and studies its scalability along different directions. The analysis expands from basic hardware synchronization protocols and primitives all the way to complex concurrent software. Various representative hardware architectures were taken to account, and the experimental results can be indicators of evaluating the ability of cross-platform scaling and synchronization.

However, as the authors of this paper confess, scalability issues when using novel techniques such as lock-free schemes and critical section serialization have not been covered. In addition, it should be noted that power consumption issues were not considered, so applying the theory in this paper for maximum scalability of power-critical systems such as mobile devices may not be suitable.

Suggestions for Improvement:

As the authors suggest, experiments for the aforementioned mechanisms might strengthen the proof for their theory. Moreover, experimental results on scalability related to power consumption issues can enable researchers to delve deeply into such issue with little downsides when it comes to power-critical systems.