EPFL-Inria
INTERNATIONAL LAB

ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE

Inria
INVENTEURS DU MONDE NUMÉRIQUE

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Baptiste Lepers

Title: « Verifying high level properties on multicore schedulers »

Abstract:
Multi-core schedulers are complex, and notoriously hard to get right. For instance, the Linux scheduler is more than 40K lines of code long, and tries to combine multiple heuristics to schedule threads efficiently. These heuristics may interact in unexpected ways, and result into suboptimal thread placement and wasted resources: for instance cores might stay idle for seconds while ready threads are waiting in runqueues. Such issues have been shown to cause many-fold performance degradation in scientific applications and server workloads.

In this talk I will address the question of designing schedulers with provable performance properties such as maximizing the usage of a machine's cores. This is a significant difference with earlier work on verified schedulers that has focused on automated proofs for low-level properties, such as absence of buffer overflows, crash, or deadlocks. I will also present the challenges associated with proving these high level properties in a highly concurrent environment, while previous attempts at verification were designed for single-core systems, or serialized operations.

To that goal I will present a Domain Specific Language (DSL) for multicore schedulers and explain how prove scheduling policies written using this DSL.