

EINLADUNG

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Thema: Symbolic Execution of Distributed Systems

Automatism and high coverage are the core challenges in testing distributed systems in their early development phase. Ideally, the testing process should cope with a large input space, non-determinism, and heterogeneous operating environments to effectively explore the behavior of unmodified software. In practice, however, missing tool support imposes a huge amount of manual effort to perform high coverage and integrated testing.

Recent advances in symbolic execution have proposed a number of effective solutions to automatically achieve high code coverage and detect bugs in complex systems software. Still, these approaches target at sequential programs and not their concurrent execution which forms the core of distributed systems. Applying symbolic execution to distributed systems is difficult, posing two core challenges: (1) scalability with network size and (2) state inter-dependencies resulting from communication involving symbolic data.

In this talk, we present symbolic distributed execution (SDE)—a novel approach enabling symbolic execution of distributed systems. First, we generalize the problem space of SDE and present methods to enhance symbolic execution for distributed software analysis. Second, we significantly optimize the basic execution model of SDE by eliminating redundant execution paths. The key idea is to benefit from the nodes' local communication and, thus, to minimize the number of states that represent a distributed execution. Third, we demonstrate the practical applicability and effectiveness of SDE with two integrated testing environments for real-world networked software.

Es laden ein: Die Dozenten der Informatik