Synthesizing Semantic Checkers for Runtime Verification of Production Distributed Systems

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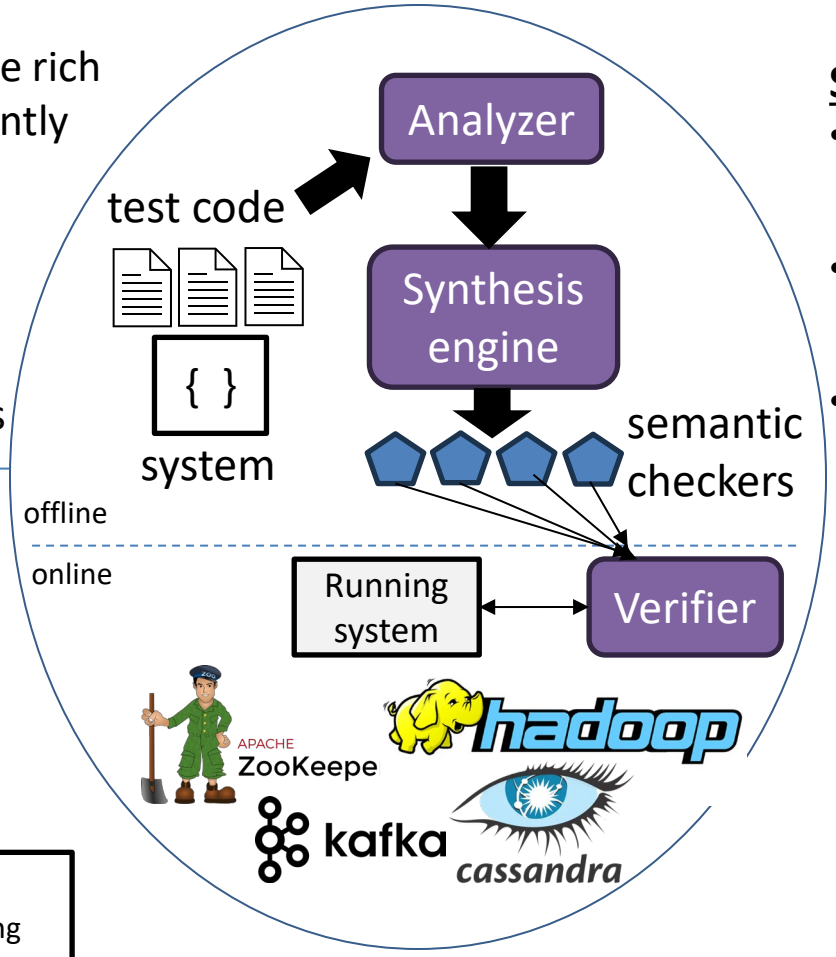
Challenge:

- Distributed systems have rich features but can fail silently
- Runtime verification promising but lacking semantic checkers
- Difficult and tedious to manually write checkers

Solution:

- Automatically generate semantic checkers
- Use program synthesis techniques and leverage existing test cases



Scientific Impact:

- New static and dynamic analysis techniques for distributed system code
- New domain-specific language for expressing semantic checkers
- New synthesis algorithms for checker generation

Broader Impact and Broader Participation:

- Provide strong resilience for large-scale distributed systems
- Practical toolchains
- Help students develop skills in distributed systems and FM

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