

# Infrastructure of Cooperative and Incremental Verification Systems

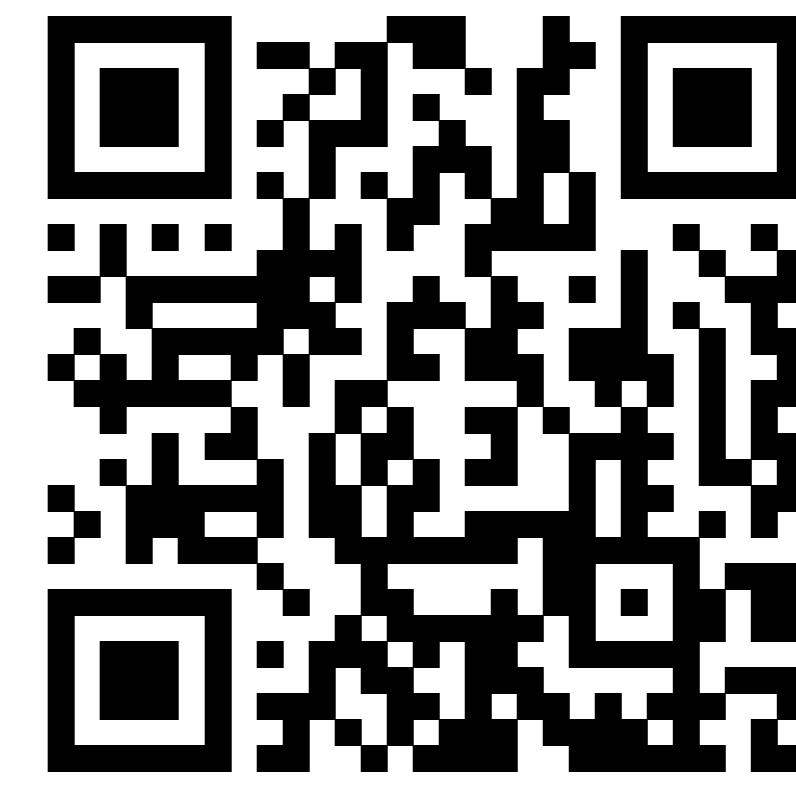


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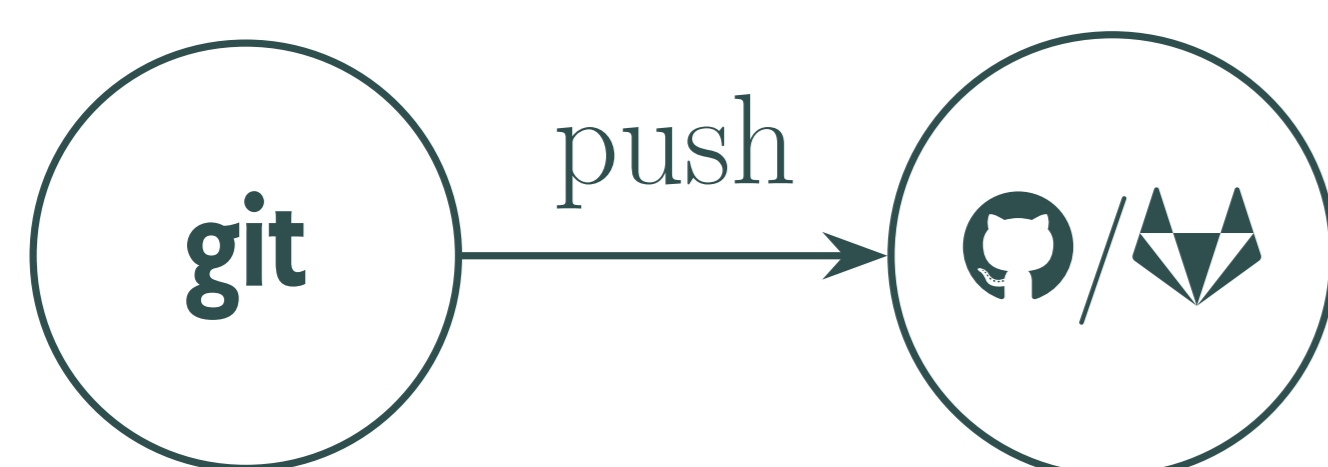


CONVEY



## Overview

Running verification tools in modern toolchains still poses challenges.



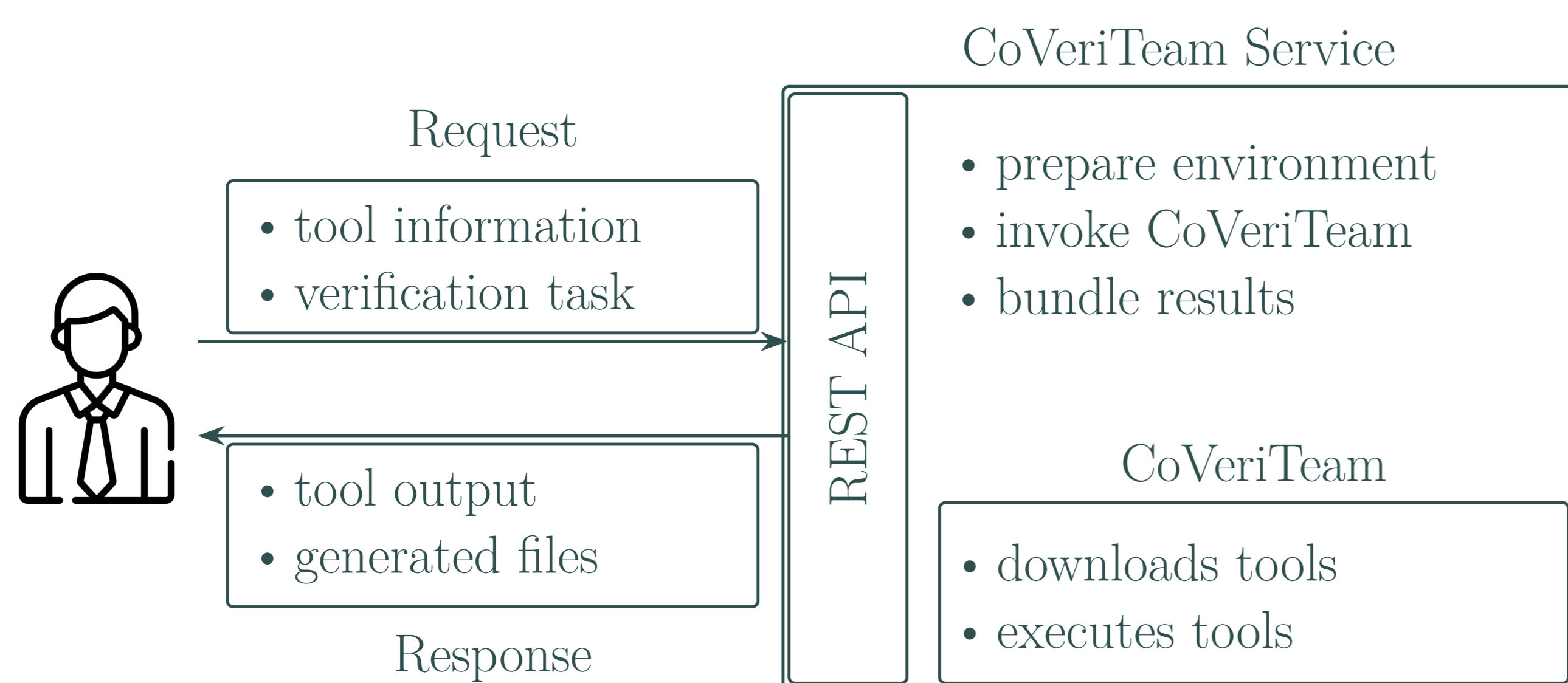
- ✓ Build
- ✓ Test
- ✗ Verify?

⚡ Challenge: Special requirements on **environment**.

📁 Challenge: **Machine friendly** interaction.

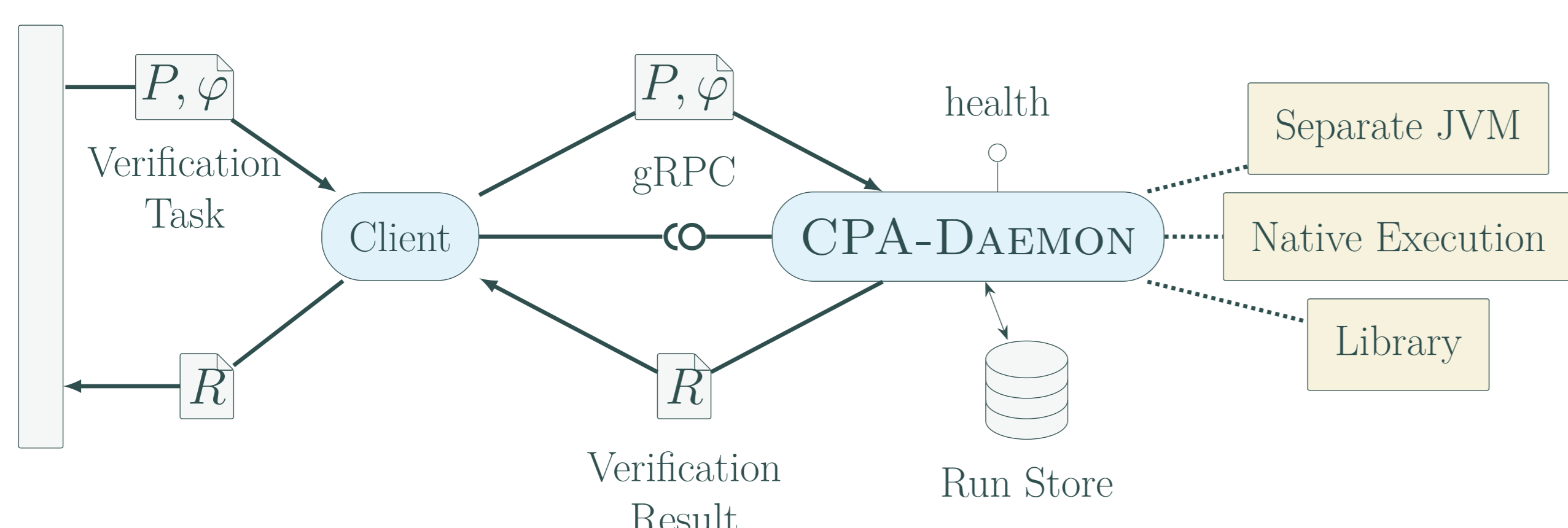
⌚ Challenge: Fast **response time**.

## Remote: CoVeriTeam Service

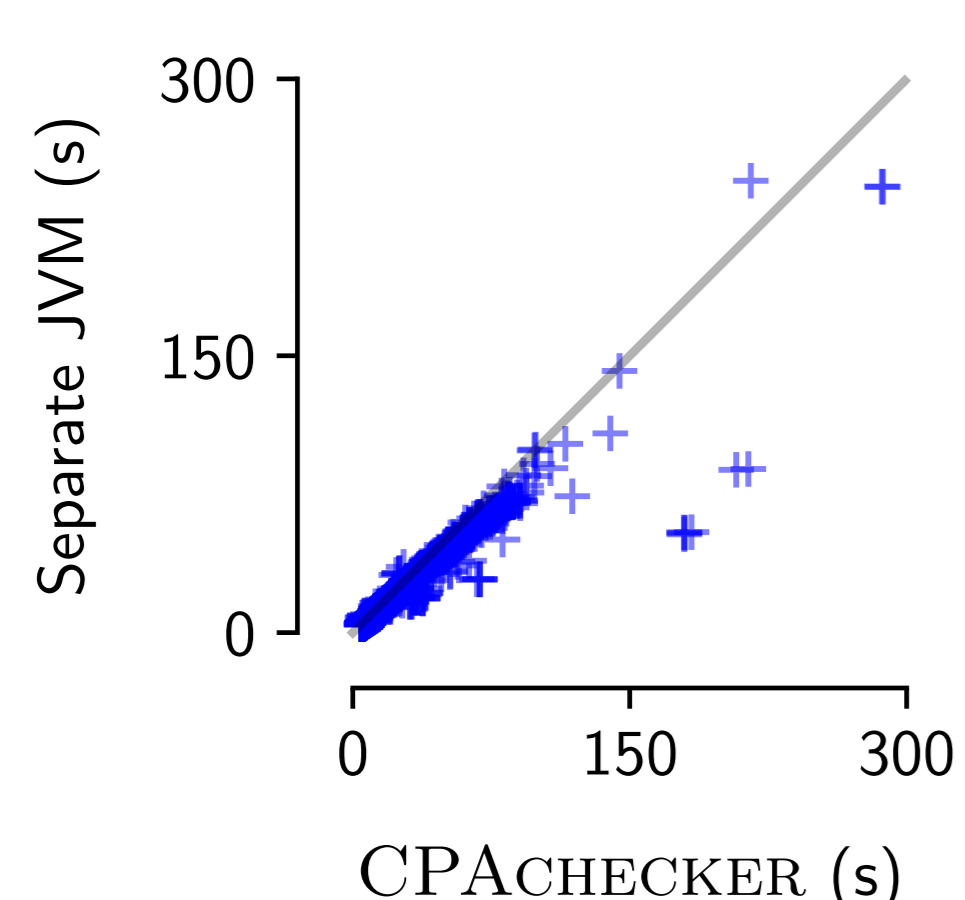


CoVeriTeam Service [3] is a web service building on CoVeriTeam [1]. It provides a *decoupled* ⚡ and *machine friendly* 📁 interface to formal methods tools.

## Incremental: CPA-Daemon



CPA-DAEMON is a daemon that provides a gRPC interface to CPACHECKER [2]. The framework enables stateful and incremental verification.



Our experiments compare CPACHECKER executed standalone and called through the gRPC wrapper (Separate JVM). There is no observable performance degradation resulting from the daemon.

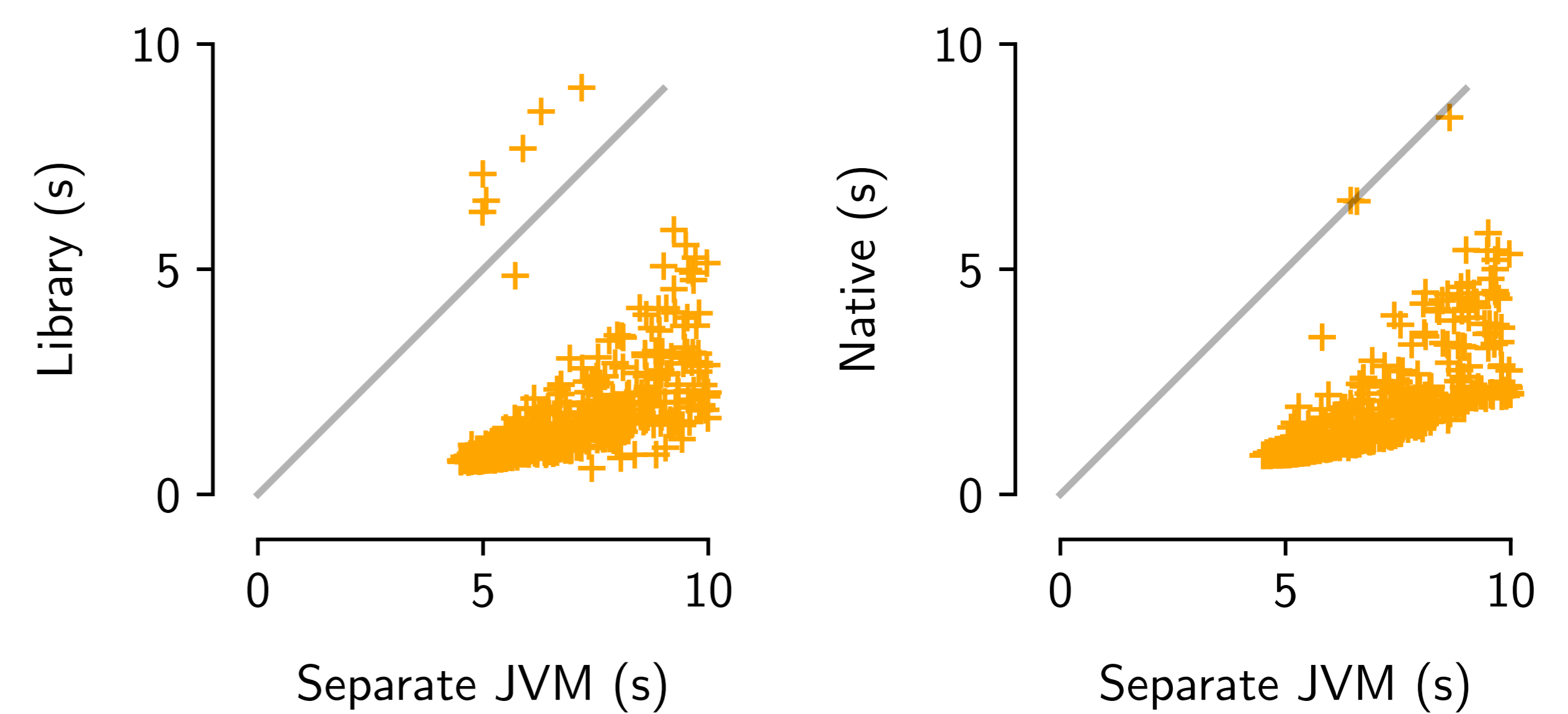
## CPA-Daemon: Backends

CPA-DAEMON ships several backends:

**Separate JVM** Just wraps CPACHECKER

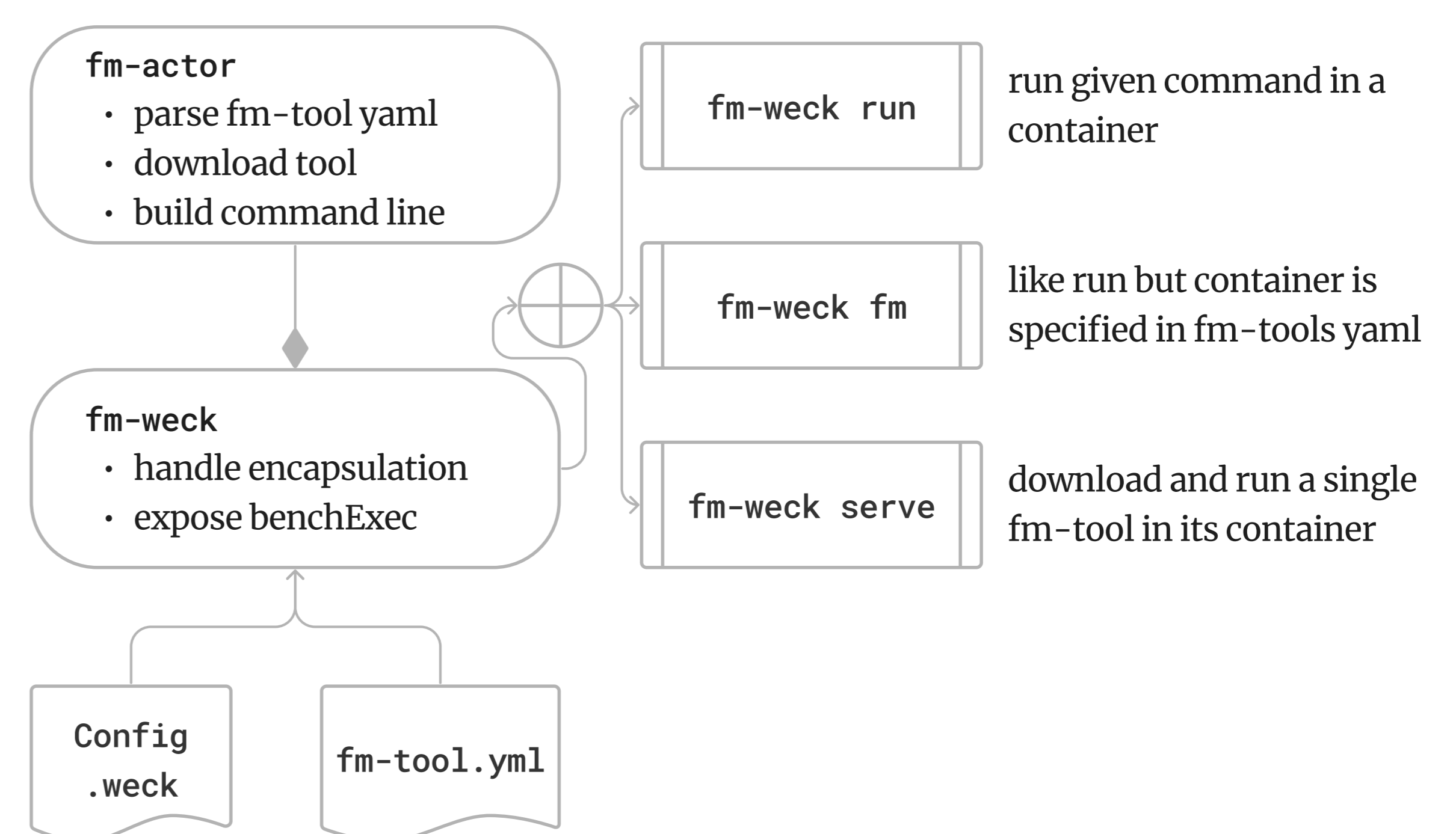
**Native Execution** Runs a Graal native image

**Library** Integrates CPACHECKER as a library



Both Library and Native Execution show a performance improvement ⌚ over Separate JVM on short running verification tasks.

## fm-universe: Run and Conserve fm-tools



**fm-weck**, built on top of **fm-actor** 📁, is a tool that runs formal methods tools in container environments ⚡.

## Explore!



CoVeriTeam Service



CPA-DAEMON



fm-weck

## References

- [1] D. Beyer and S. Kanav. "CoVeriTeam: On-Demand Composition of Cooperative Verification Systems". In: *Proc. TACAS*. LNCS 13243. Springer, 2022, pp. 561–579.
- [2] D. Beyer and M. E. Keremoglu. "CPACHECKER: A Tool for Configurable Software Verification". In: *Proc. CAV*. LNCS 6806. Springer, 2011, pp. 184–190.
- [3] D. Beyer, S. Kanav, and H. Wachowitz. "CoVeriTeam Service: Verification as a Service". In: *Comp. Proc. ICSE*. IEEE, 2023.