Software verification framework Klever

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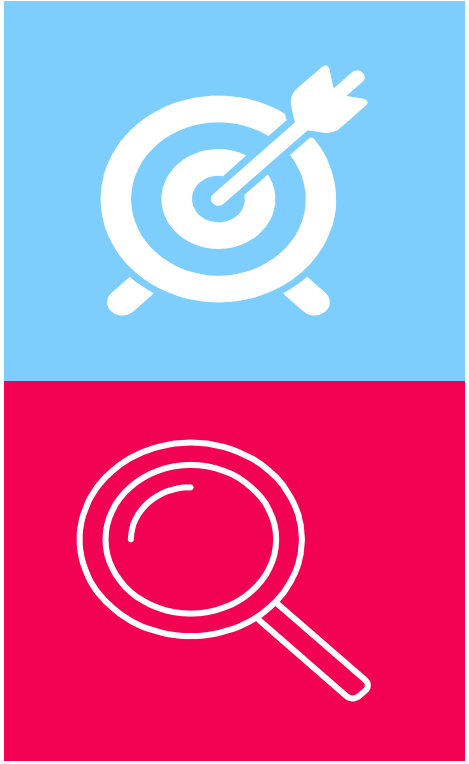
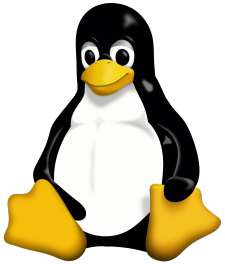


I. Klever

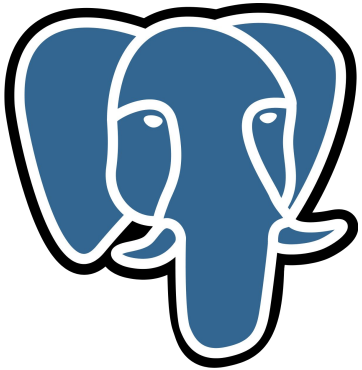
II. CPAchecker in Klever

Klever is a software verification framework for GNU C programs

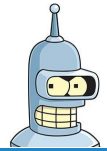
Variety of Software Projects



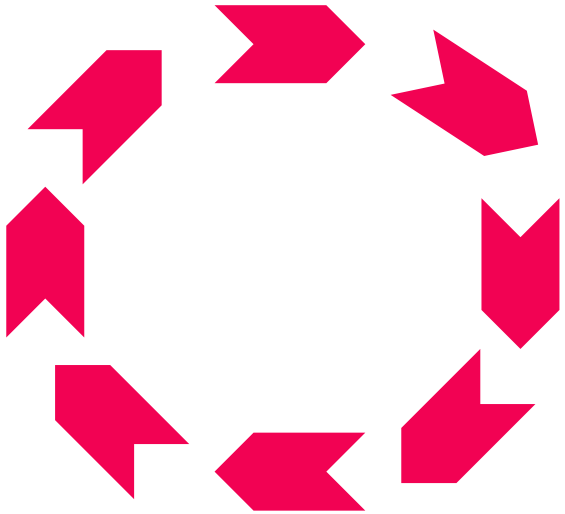
TM



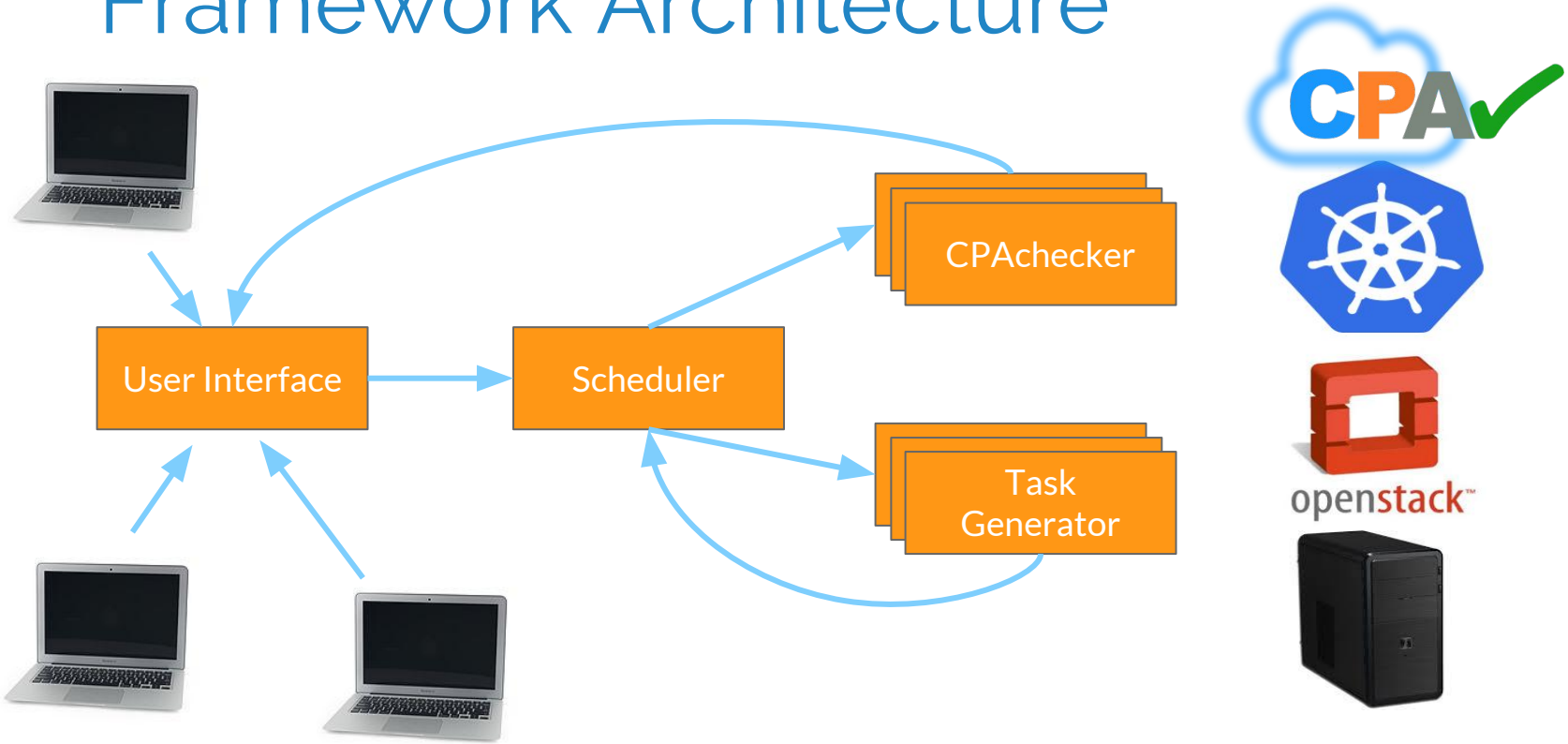
OpenSSL



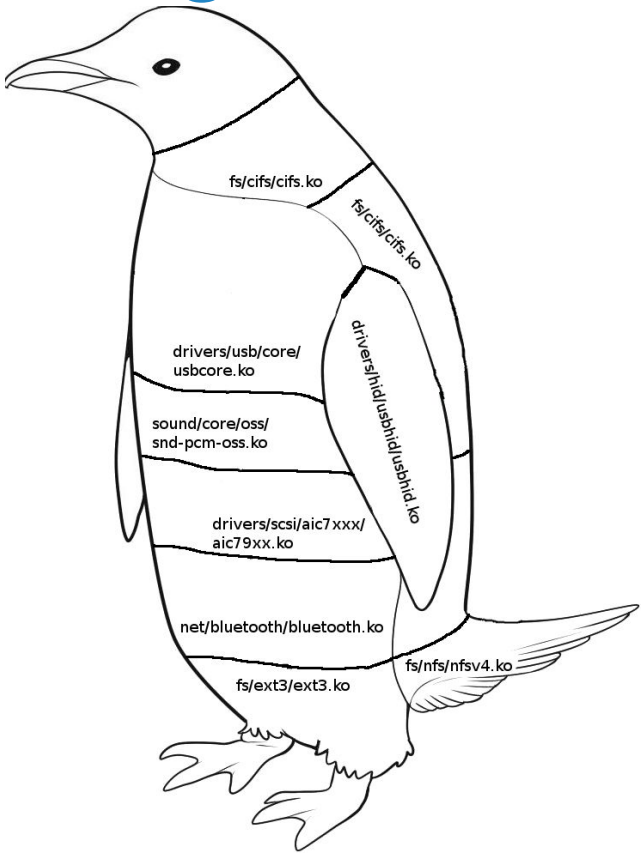
Verification Workflow



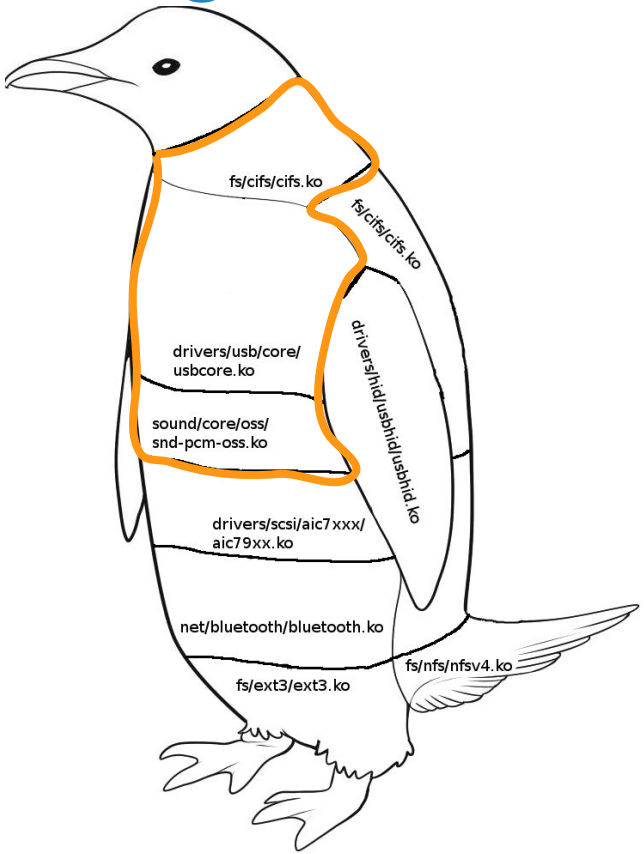
Framework Architecture

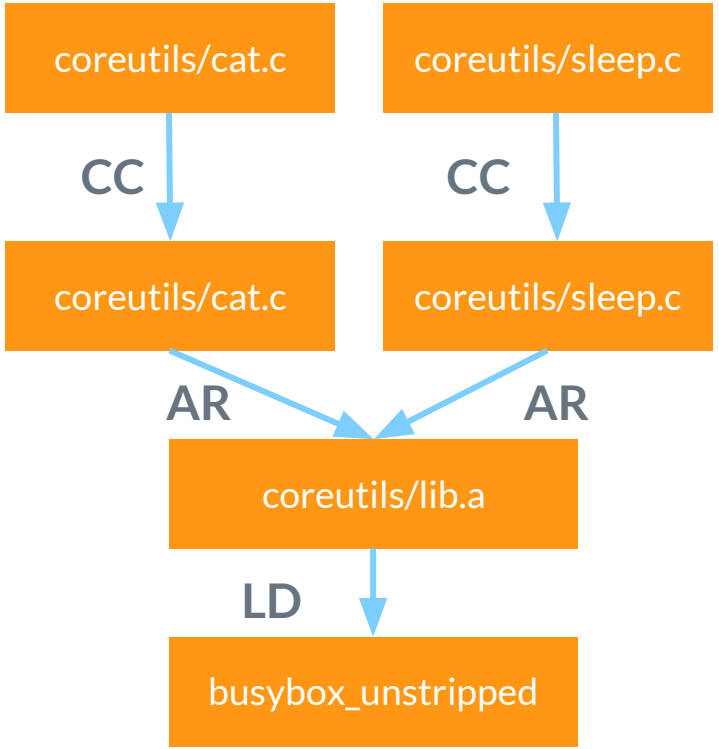


Program Decomposition

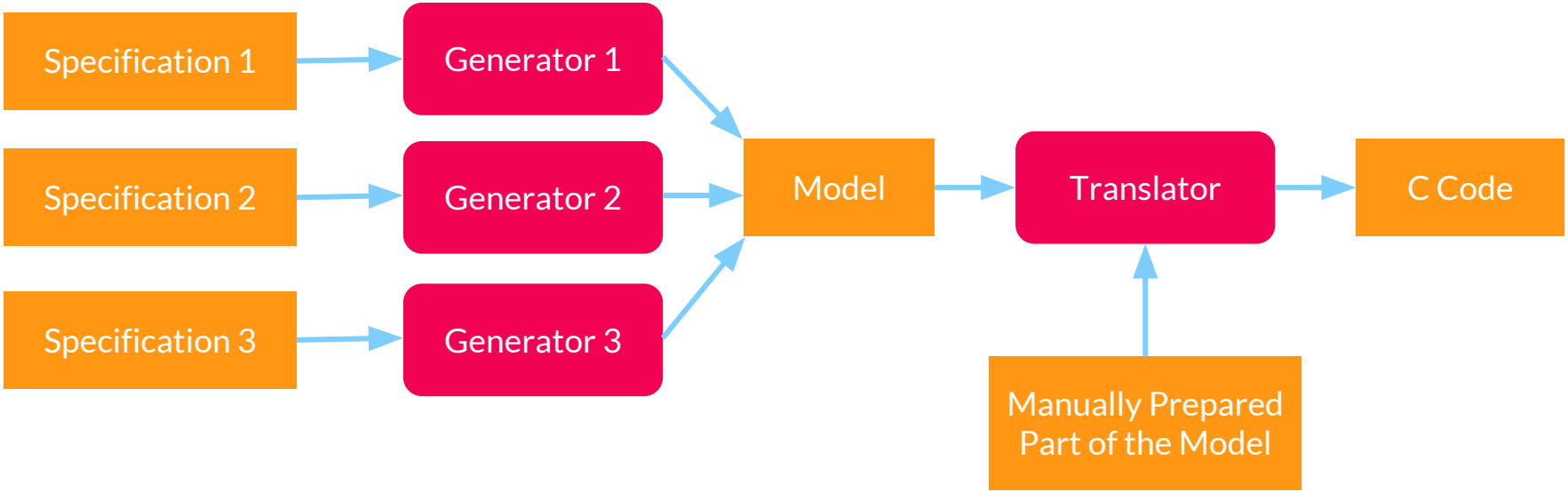


Program Decomposition





Environment modeling



Tools Configuring

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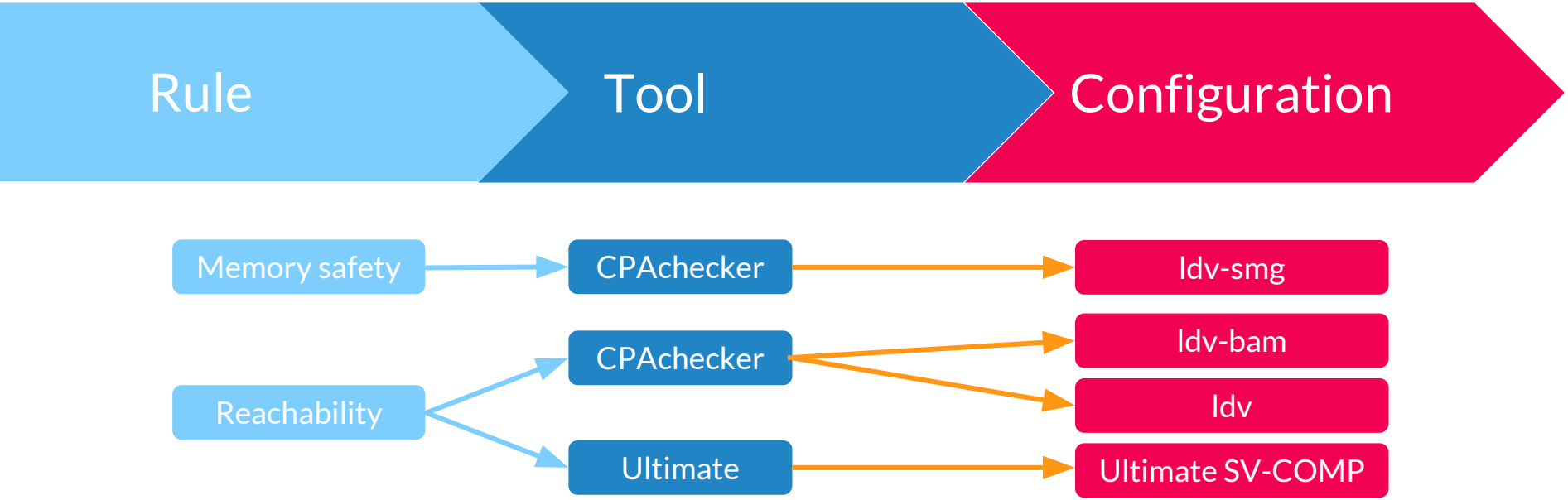


Results Analysis

Witnesses visualization

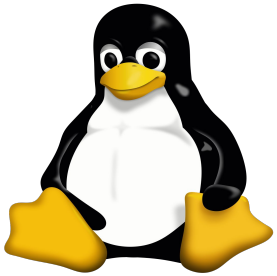
Coverage visualization

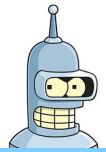
Expert analysis

Results comparison and statistics visualization

Application results

- Linux Device Drivers
- Linux kernel subsystems
- BusyBox applets
- Apache http server (initial)





Results

Project	Modules	Line coverage	Function coverage	False positives	Bugs	
Drivers (3.14)	3821	48%	36%	70%	30%	ldv-bam
Subsystems (3.9-3.19)	3 (86)	79%	70%	57%	43%	ldv-bam SMG
BusyBox	185	93%	86%	93%	7%	SMG

Status of Development

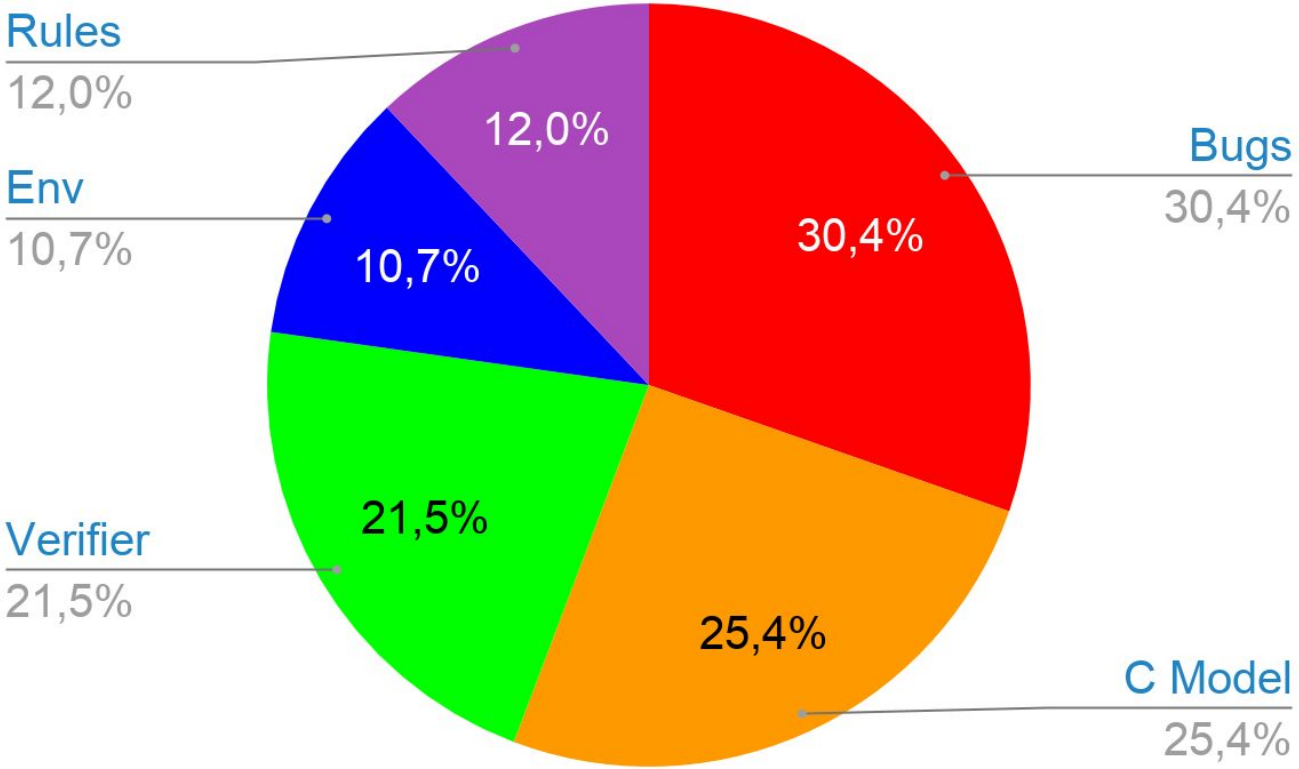
Klever 1.1	Klever 2.0	Klever 2.1
Stable framework	Userspace	Optimizations
Tests & CI	Busybox	Extended witnesses
Drivers support	Kernel subsystems	Models library

Benefits for you

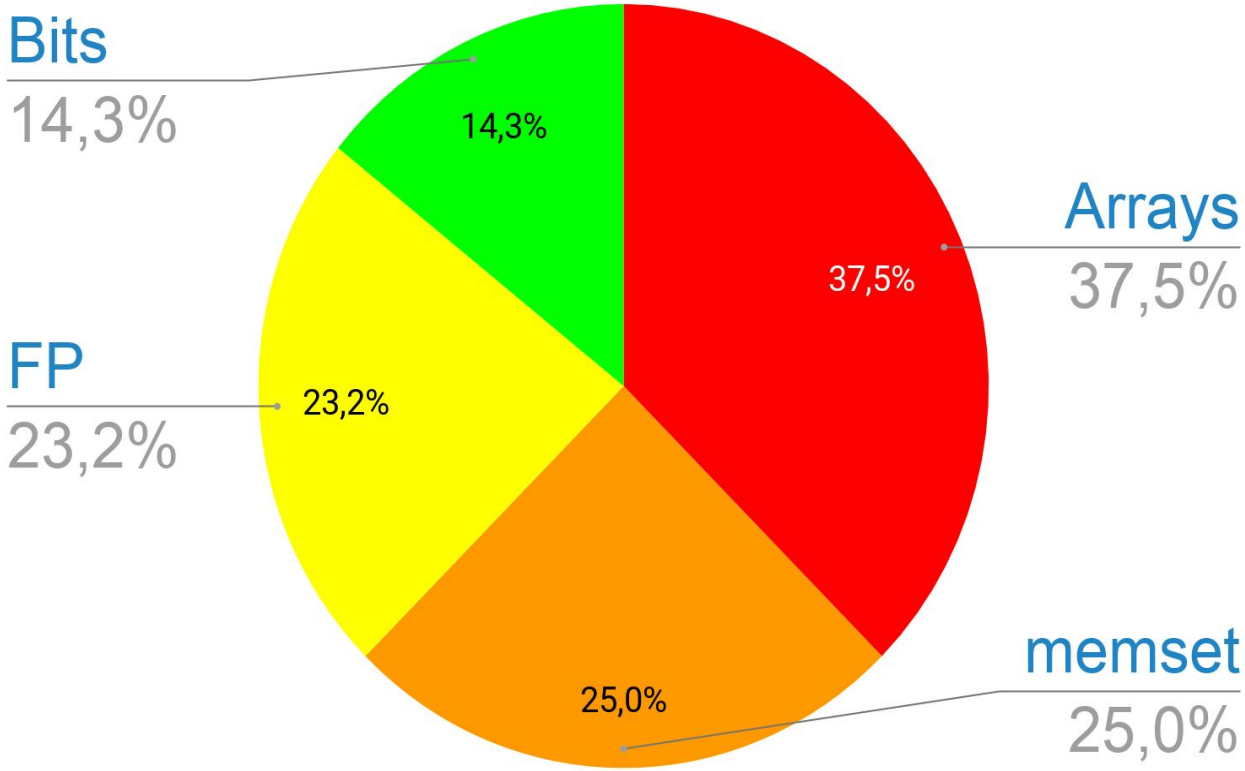
- ✓ Verification tasks from Klever
- ✓ Real bugs
- ✓ Revealed problems and restrictions
- ✓ Education

CPAchecker in Klever: statistics & feature requests

Violations for drivers



Accuracy problems (ldv-bam)



Features Wanted (CPAchecker)

Extended Witnesses

CPAchecker without CIL/with a slicer

Timeouts debug

Highlight assumptions and unsupported statements

Generic rules checking (integer overflows, deadlocks)

Features Wanted (BenchExec)

Verification mode

Benchmarking mode

Questions?

https://github.com/ldv-klever/klever
https://forge.ispras.ru/projects/klever