Try-Mopsa
Relational Static Analysis in Your Pocket

Raphaël Monat

rmonat.fr

VMCAI'26
12 January 2026

Inria

Modular **O**pen **P**latform for **S**tatic **A**nalysis [Jou+19]

`mopsa.lip6.fr` or `opam install mopsa`

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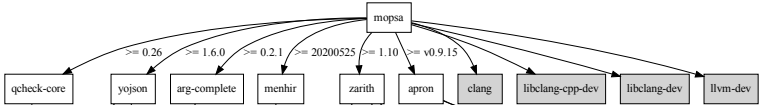
  - Academically competitive on real-world benchmarks (SV-Comp)

Static analyzers are complex pieces of software!



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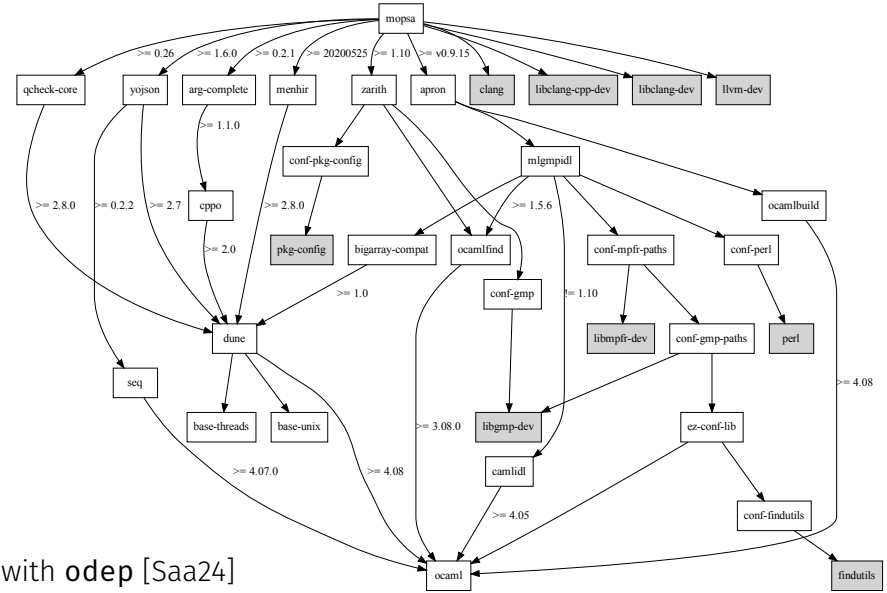

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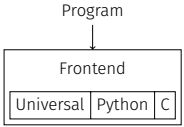
- Features responsive interface supporting smartphones to computers
- Scales in number of users (purely client-side)
- Can be convenient for onboarding or teaching

Outline

Under the Hood of Try-Mopsa

Overview of Mopsa



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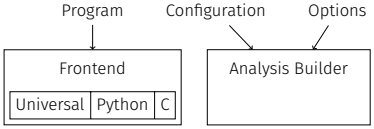

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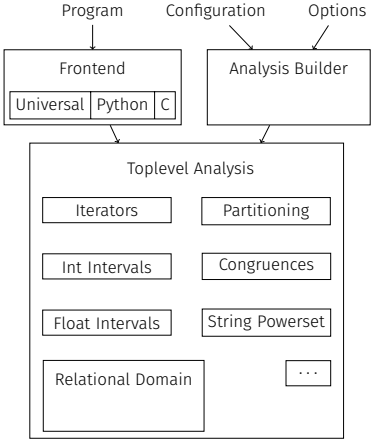

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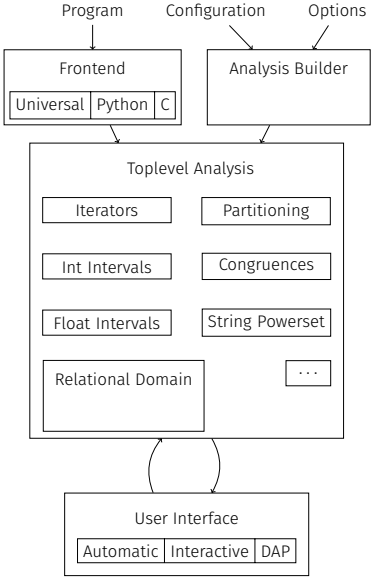

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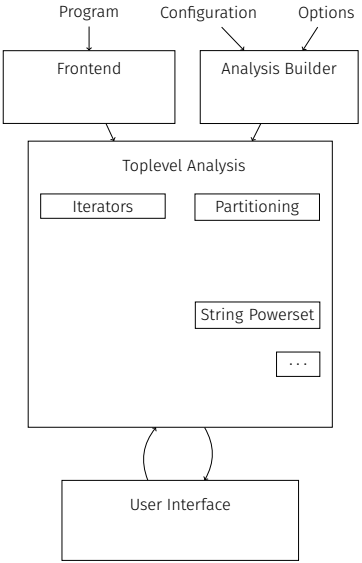

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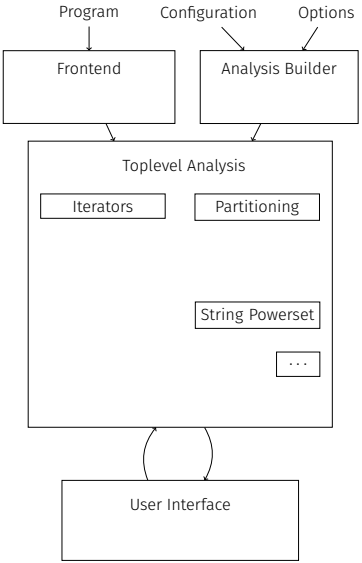

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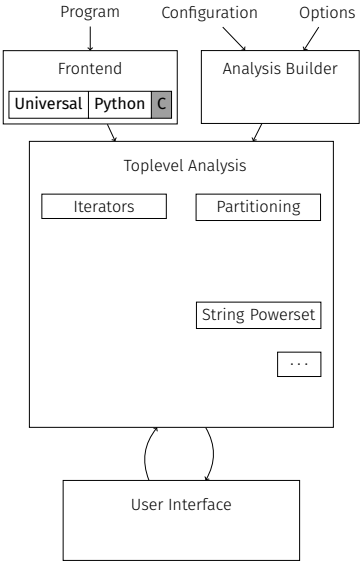

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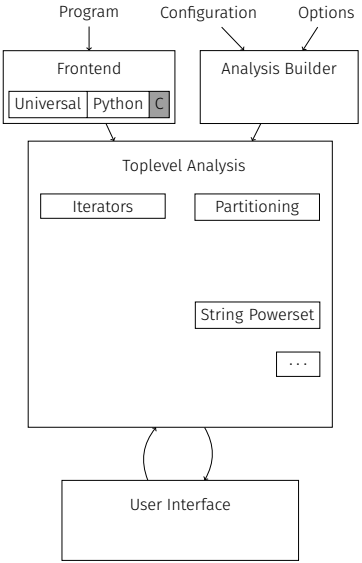

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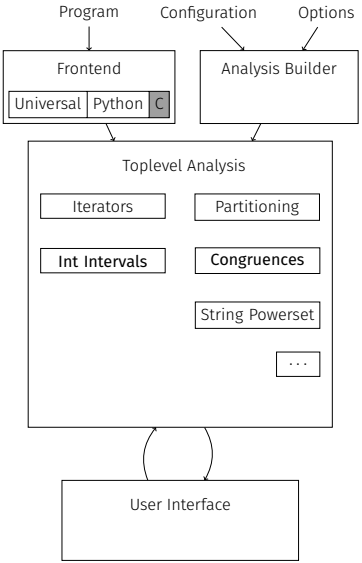

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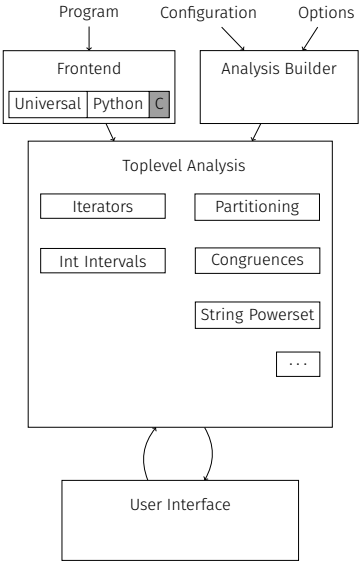

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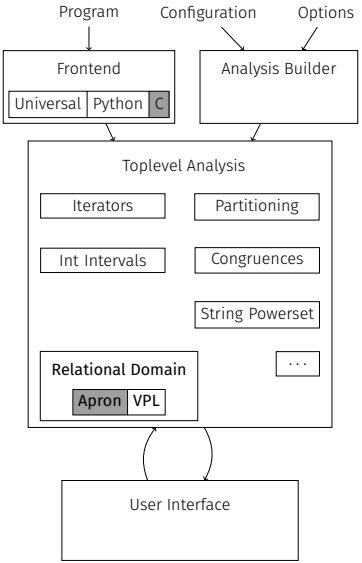

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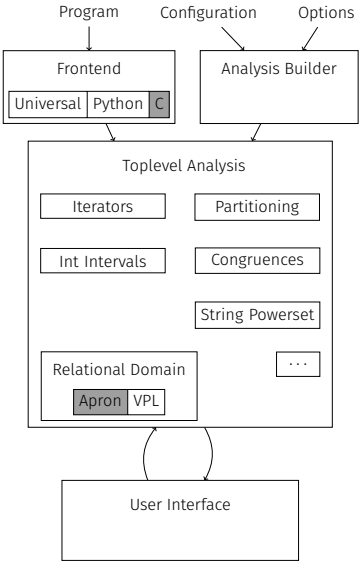

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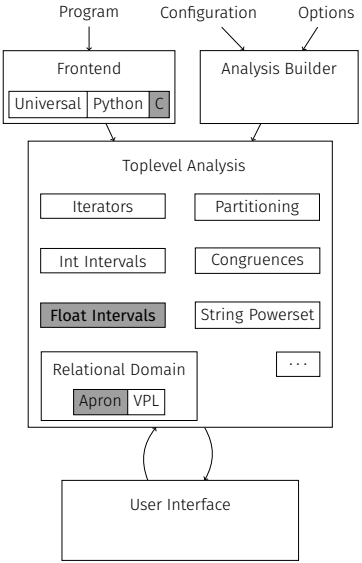

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$\Longrightarrow$ Rely on `sync-message` [Moj23] (low-level synchronous comm.)

Interface Overview

Demo!

Running example

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1 str s = "a";
2 int i = 1;
3 while('a' + i <= 'z') {
4   if (rand(0, 1)) break;
5   s = s @ to_string('a' + i);
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⟹ try-mopsa.rmonat.fr

Implementation Discussion

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Performance

Program	Binary execution	Firefox execution
attributes.py	0.09s ± 0.00	0.52s ± 0.03
fspath.py	0.09s ± 0.00	0.49s ± 0.02
list.py	0.15s ± 0.01	0.88s ± 0.03
loop.py	0.12s ± 0.01	0.72s ± 0.03
recency.py	0.08s ± 0.01	0.63s ± 0.03
str_alphabet.u	0.04s ± 0.01	0.20s ± 0.01
str_alphabet2.u	0.23s ± 0.01	0.81s ± 0.01
str_conc_loop.u	0.08s ± 0.01	0.29s ± 0.01
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- 5× slowdown compared to native binary
- Raw performance is not a priority
- Still reasonable analysis times

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Playwright framework to asses the browser compatibility of Try-Mopsa

Conformance tests
5 tests x (3 desktop browsers + 2 mobiles browsers x 2 viewports)
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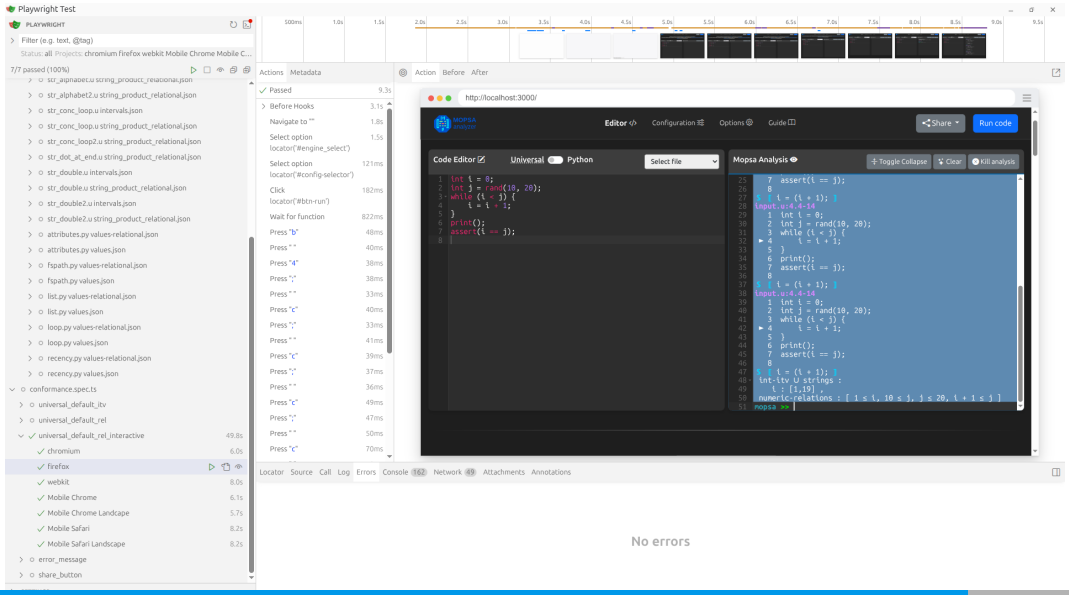
Additional tests

Universal: 13 programs x 11 configurations

Python: 5 programs x 6 configurations

Browser compatibility (II)



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- Works between concrete and abstract debuggers [Do+20; Hol+24; MVR23]

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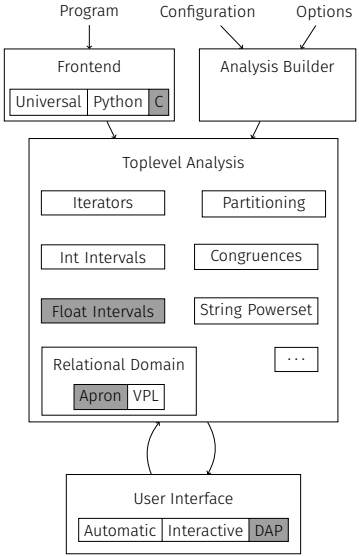

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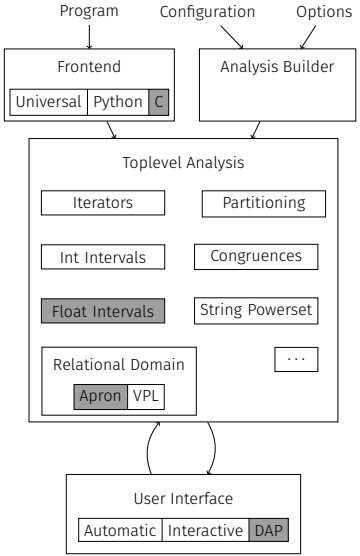

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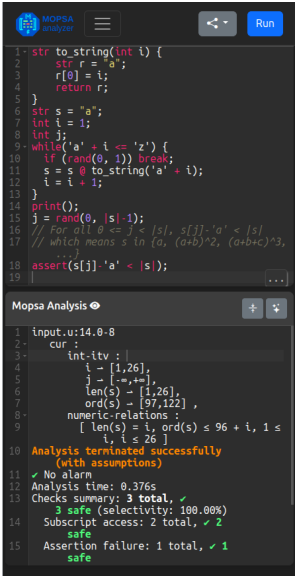

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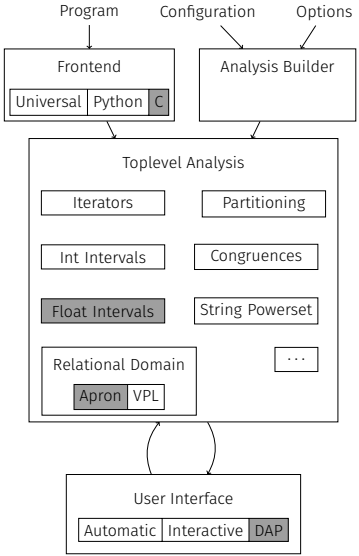

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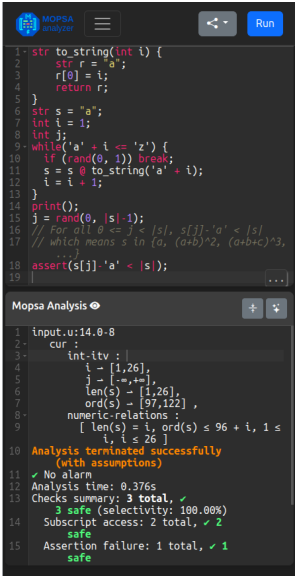
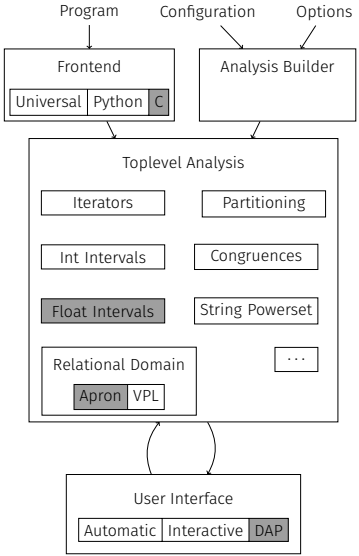


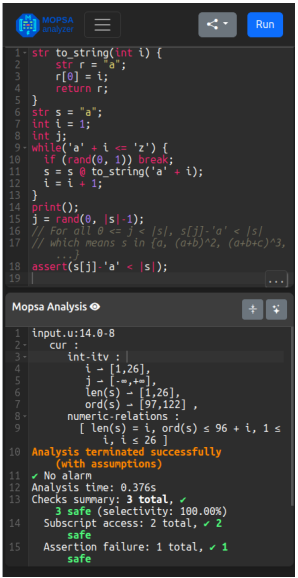
Conclusion



Gray = unsupported by Try-Mopsa.

- Pure JS version of Mopsa
- Supports polyhedra, abstract debugger
- Works on smartphones and desktops alike
- Useful for demo or lightweight teaching purposes

`try-mopsa.rmonat.fr`



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