Ocelot

Relational Logic in a Solver-Aided Language

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http://ocelot.tools

all d: Dir | lone d.~contents
becomes
```
(all ([d Dir])
  (lone (join d (~ contents))))
```

Ocelot is a **DSL for relational logic, embedded** in the **Rosette solver-aided language**

```
(define X (join d (~ contents)))
(println X)
> (join d (~ contents))
```

Supports **synthesis** of relational expressions, and combination with other constraints.

Analysis backend is SMT (Z3)

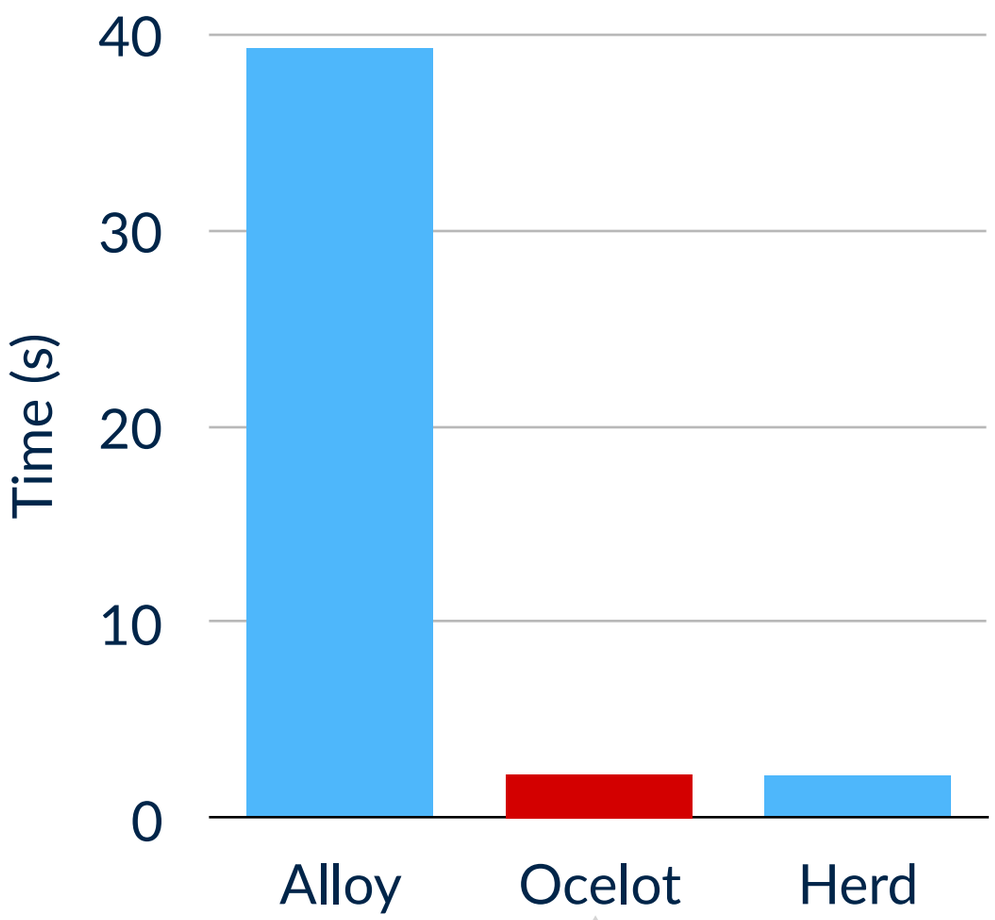
Ocelot can synthesize and debug **large** memory model specifications

[Bornholt & Torlak, PLDI 2017]

		Synthesis	**Ambiguity**
PowerPC	768 tests [Alglave et al, CAV'10]	✓ 12 seconds Search space: 2^{1406} Not equivalent to published model!	9 new tests `sync`, `lwsync`, etc.
x86	10 tests 	✓ 2 seconds Search space: 2^{624} Not equivalent to TSO!	4 new tests `mfence`, `xchg`

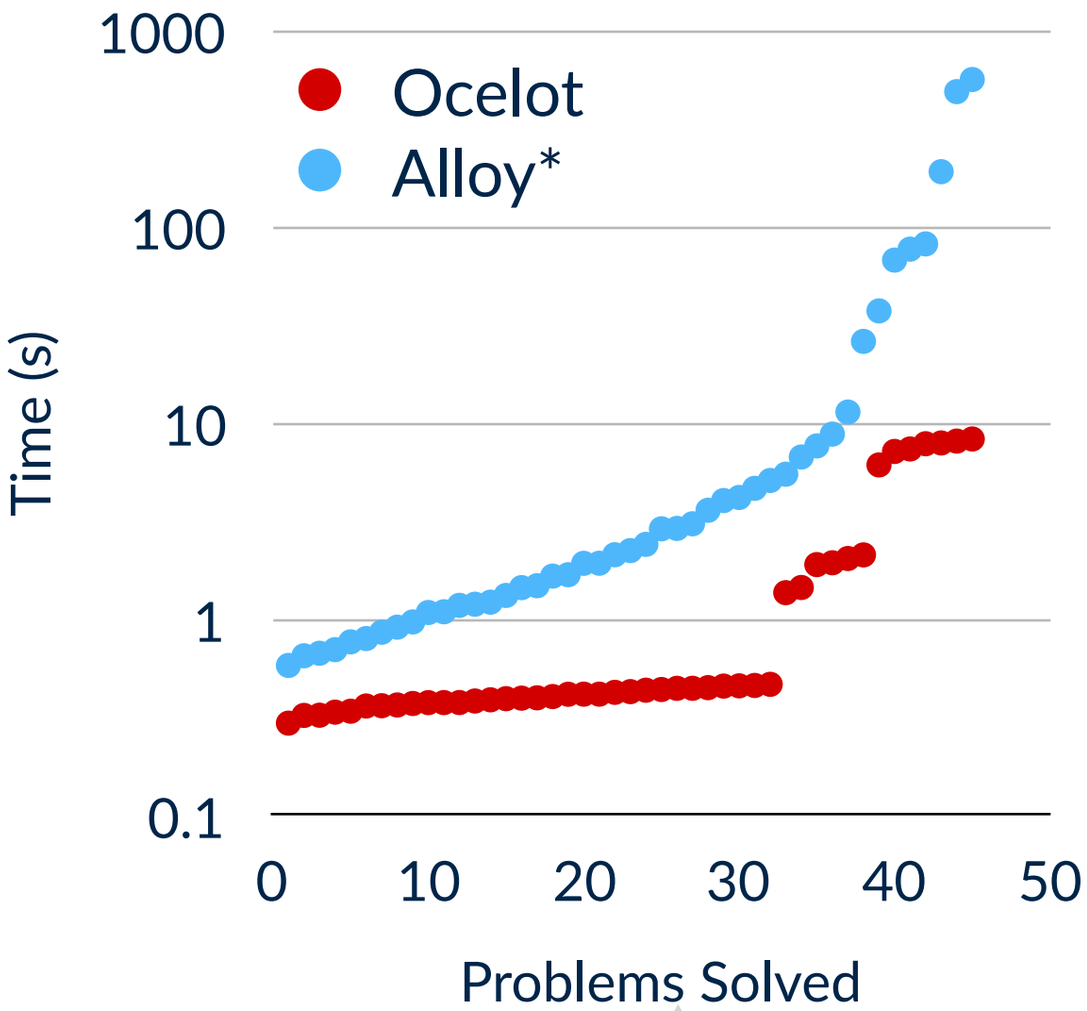
Ocelot is **fast** at both verification and higher-order queries

Verification



As fast as a custom memory model decision procedure

Equivalence



Average 22× faster than Alloy*

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