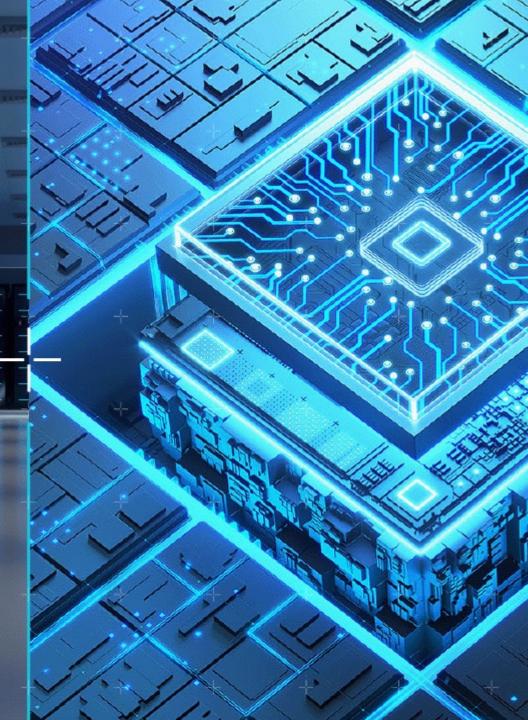
arm

Validating Arm
Feature Configurations

Using HOL4 to write a standalone tool

Magnus Myreen 2024-06-19



Validating Arm Feature Configurations

Using HOL4 to write a standalone tool



Validating <u>Arm</u> <u>Feature Configurations</u>

Using HOL4 to write a standalone tool

- The Arm architecture is parametrised by many Boolean feature options, e.g. FEAT_A and FEAT_B.
- + There are constraints, e.g.

```
ver34 && FEAT_A --> FEAT_B
and
ver36 && !FEAT B --> !FEAT C
```

How do we know the constraints are right?What could go wrong?Let me show you...



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HOL is mostly used like this:

```
open arithmeticTheory;

Theorem fermat:
    ∀a b c n.
        0 < a ∧ 0 < b ∧ 0 < c ∧ 2 < n ⇒
        a ** n + b ** n ≠ c ** n

Proof
    rw []
    \\ . . . (* what should I write here? *)
QED</pre>
```

But in this work, we want to use HOL to implement *a standalone tool*.



Rest of this talk

- → Things I want to show:
 - How the current implementation runs
 - + Command line and JSON input
 - + HTML and JSON output
 - How it is implemented
 - + A collection of Lib files + Docker
 - + SAT and SMT support

- + What can the tool do:
 - It can look for:
 - + always true / false features
 - + groups of equal features
 - + mutually exclusivity of features
 - + version anomalies
 - + redundant constraints
 - It can shrink/specialise the constraint set

Questions are encouraged throughout!





Thank You

Danke

Gracias

Grazie 谢谢

ありがとう

Asante

Merci

감사합니다

धन्यवाद

Kiitos

شکرًا

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Thank You

Danke

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