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► **To cite this version:**

Adrien Vanègue, Steven Costiou. An extensible production-level debugger. Journées Nationales du GDR-GPL 2023, Jun 2023, Rennes, France. hal-04130163

**HAL Id: hal-04130163**

**<https://inria.hal.science/hal-04130163>**

Submitted on 15 Jun 2023

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# An extensible production-level debugger

Adrien Vanègue

Steven Costiou

## Problem: building and evaluating new debuggers

Debuggers are difficult to build.

- Huge development costs
- Difficult to reuse: prototypes are often one-shot
- Costly and difficult to maintain
- Difficult to test

How to make debuggers extensible to facilitate the construction and maintenance of new prototypes?

Debuggers are difficult to evaluate.

- Prototypes are often unstable
- Difficult to evaluate on real-world scenarios: practitioners need to adopt and use the new debugger

How to make debuggers solid to make them usable in practice and evaluate them?

## Requirements for extensible production-level debugger

Modular and easy to reuse, test and maintain

extensible and easy to build on top

production-level and regularly maintained

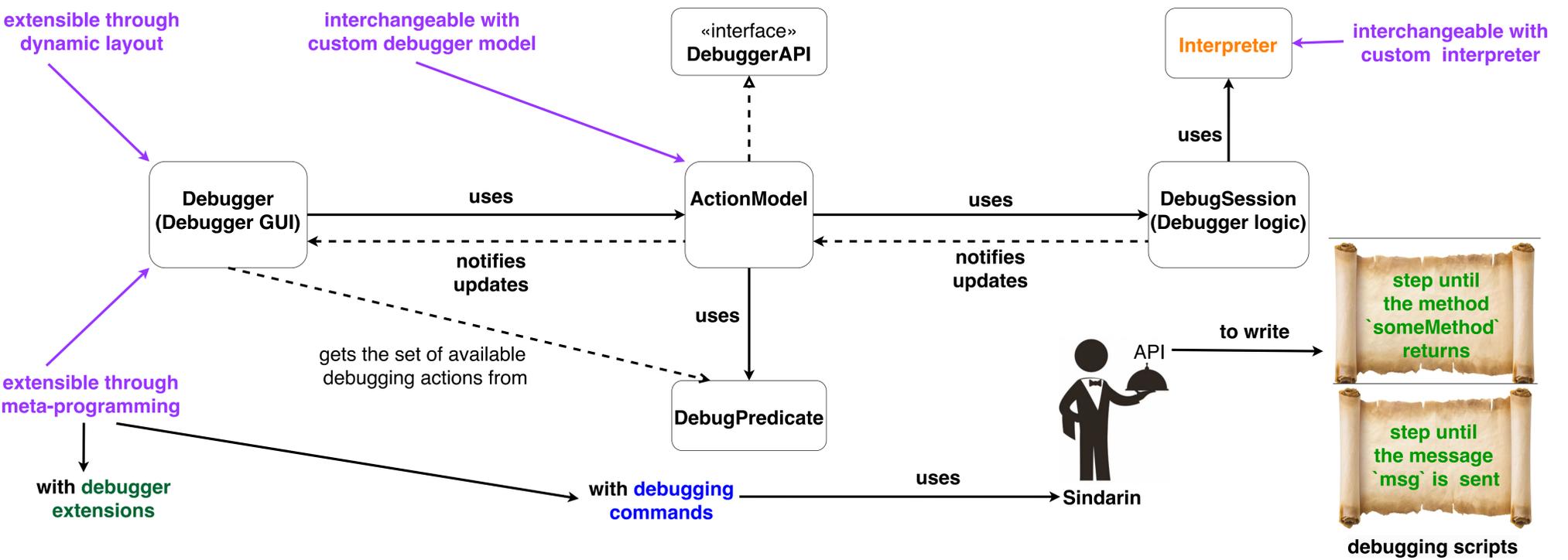
Testing



Tools resulting from prototypes are stable, through testing and bug fixes

Easy to adopt: practitioners use the debugger they know along with the new tool

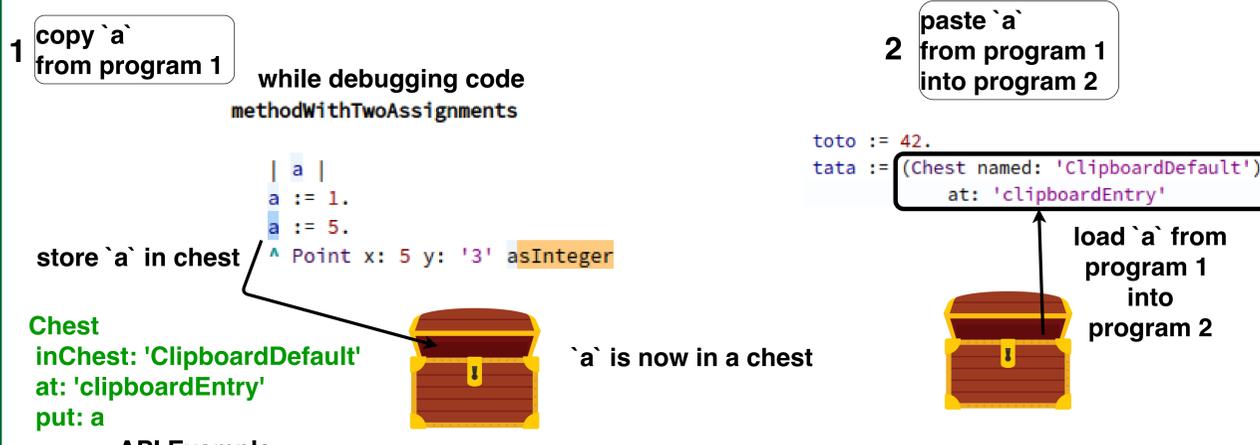
## The Pharo debugger design



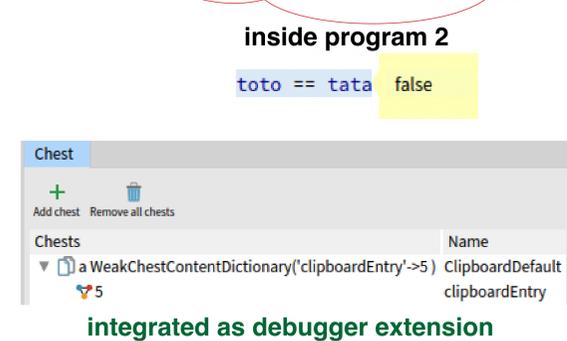
## Building new debugging tools: Examples

### CHEST:

a global collection with an API to access objects from everywhere

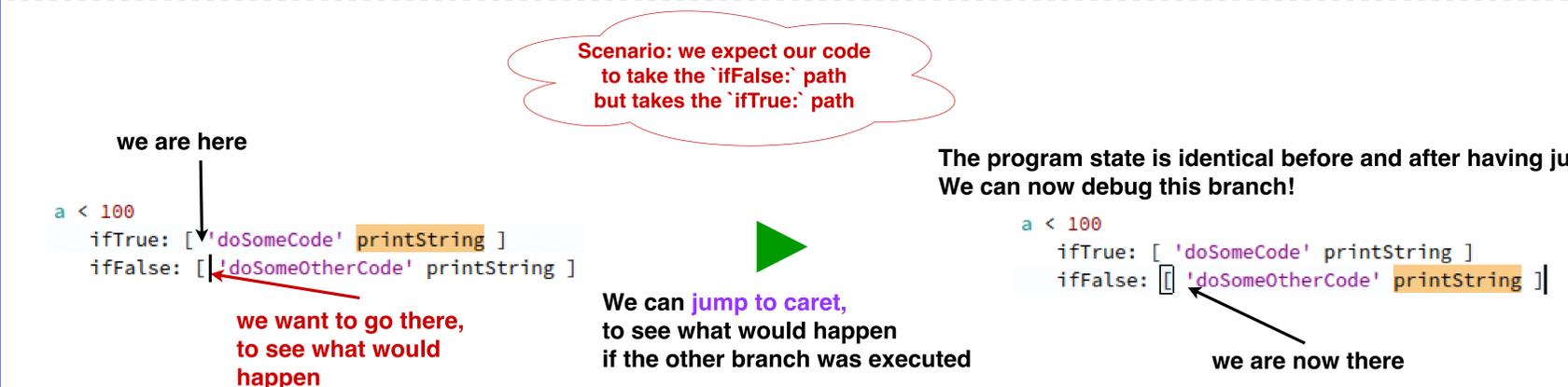


How to compare my objects between program 1 and 2?



### JUMP TO CARET:

a Goto command to debug



A production debugger integrated into the Pharo language

**THALES**

**REAL USERS**

moldable debugger, possible to add:

- specific debugging operations
- specific debugging tools

new debugging tools can be used as extensions of the existing debugger

Concerns are separated as each component is independent: the interpreter, the model, the API, the UI, the debugging commands, and the debugger extensions

Listening to feedback from users

The debugger is used for empirical evaluation of research prototypes

Lots of contributions merged into the Pharo baseline

3 main contributors, 958 commits

559 tests