Debugger

Extensions, infrastructure.

Steven Costiou — Pharo Days 2022

Agenda

- The infrastructure and how to add your own debugger to Pharo
- The extension mechanism, or plugins

The debugger infrastructure

- How to open a debugger: past and current state
- How to insert your own debugger into the system

How to open a debugger: past and current state

- Why is this interesting to know how debuggers are opened by the system?

Before — debugger opening process

Context
Exceptions
User Interrupts
(ad-hoc clients)
ProcessBrowser
Job
...
Process
UIManager
Exception handler
primitive error
3
Emergency Evaluator
Default Debugger
open debugger
1
debugger opening
signal debugger error
unhandled exception
2
debug process request
open debugger request
exception handling interaction

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It works! Why change anything?

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Hey! Let's insert the new spec 2 debugger into this and try to debug it when it fails :)
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BUT IT WORKS!

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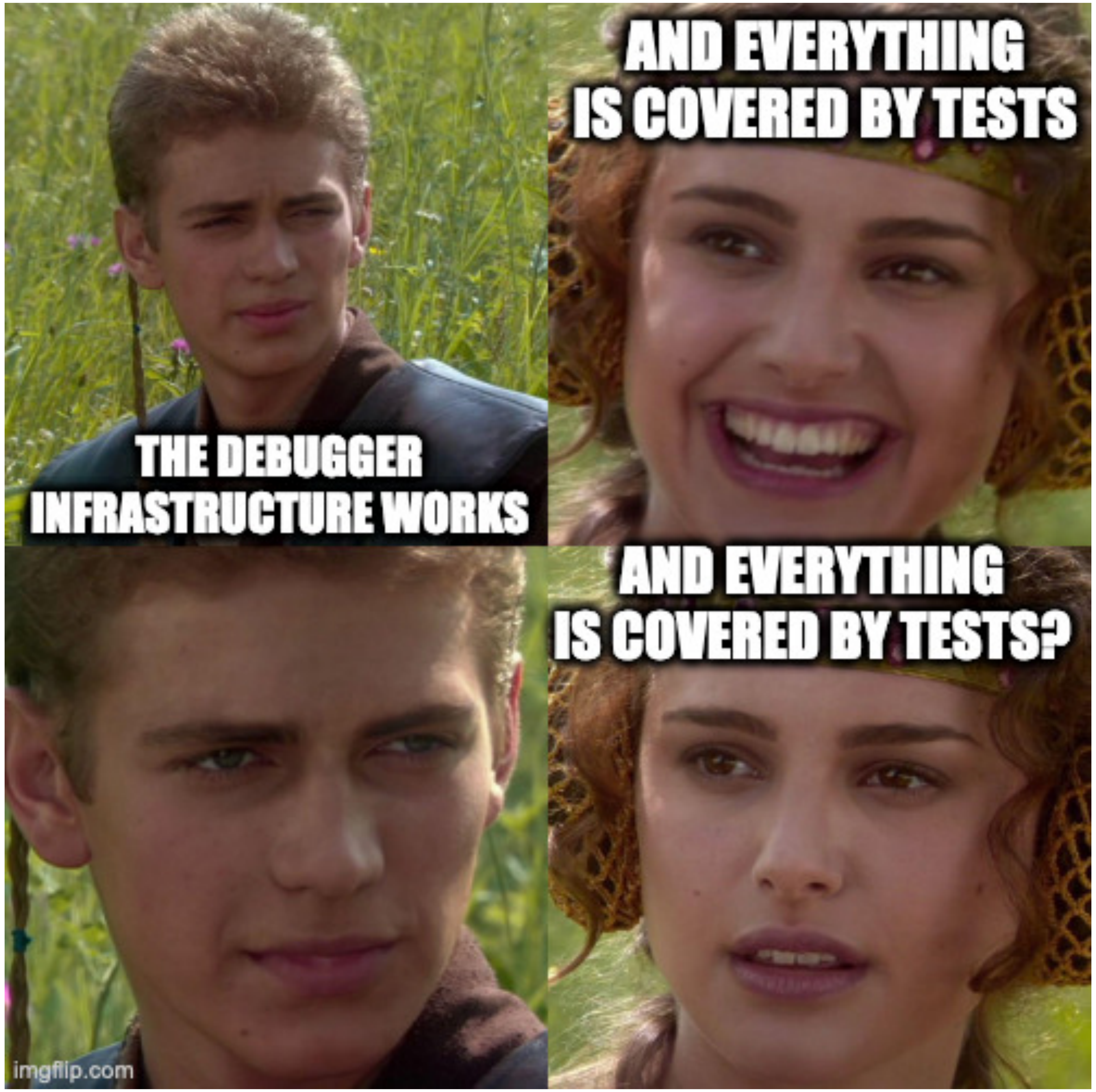
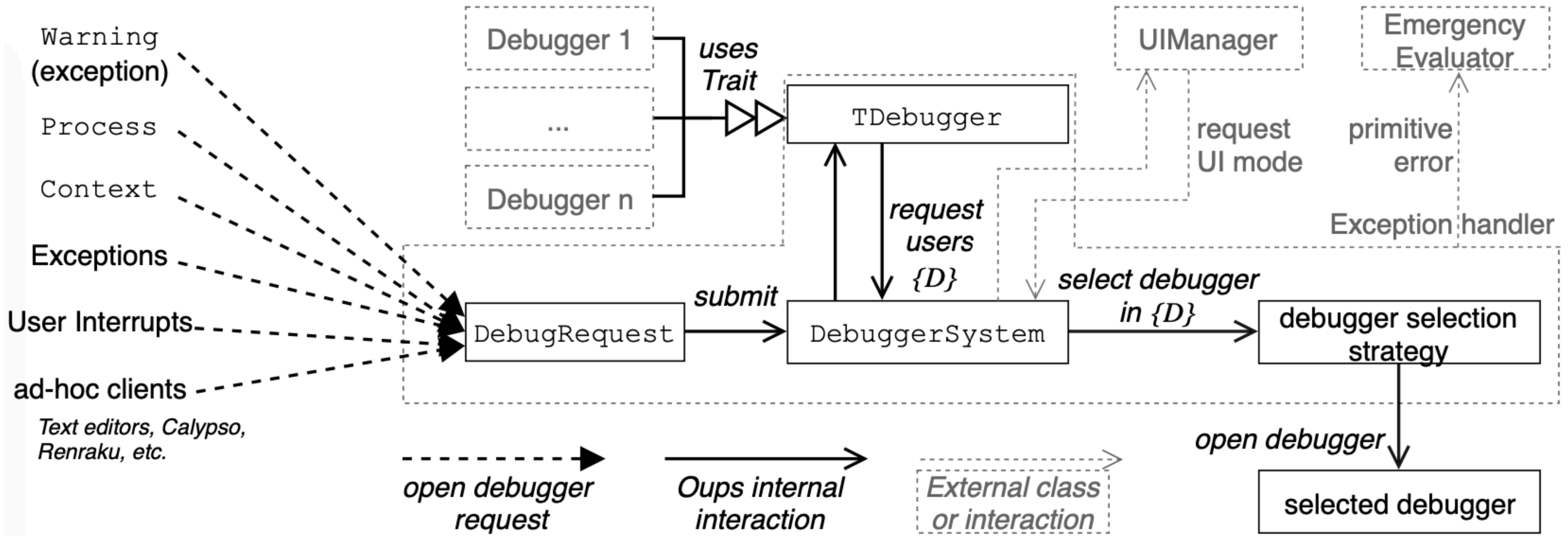

THE DEBUGGER INFRASTRUCTURE WORKS
AND EVERYTHING IS COVERED BY TESTS
AND EVERYTHING IS COVERED BY TESTS?
imgflip.com

After — new debugger infrastructure



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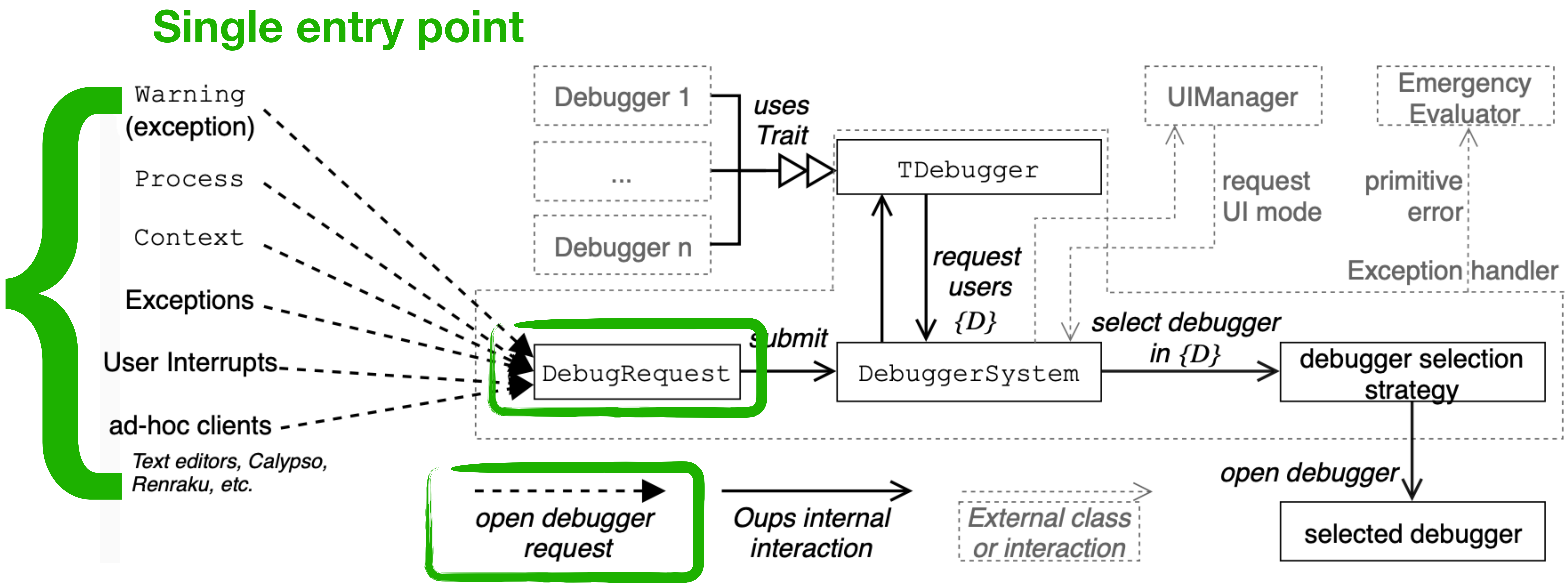

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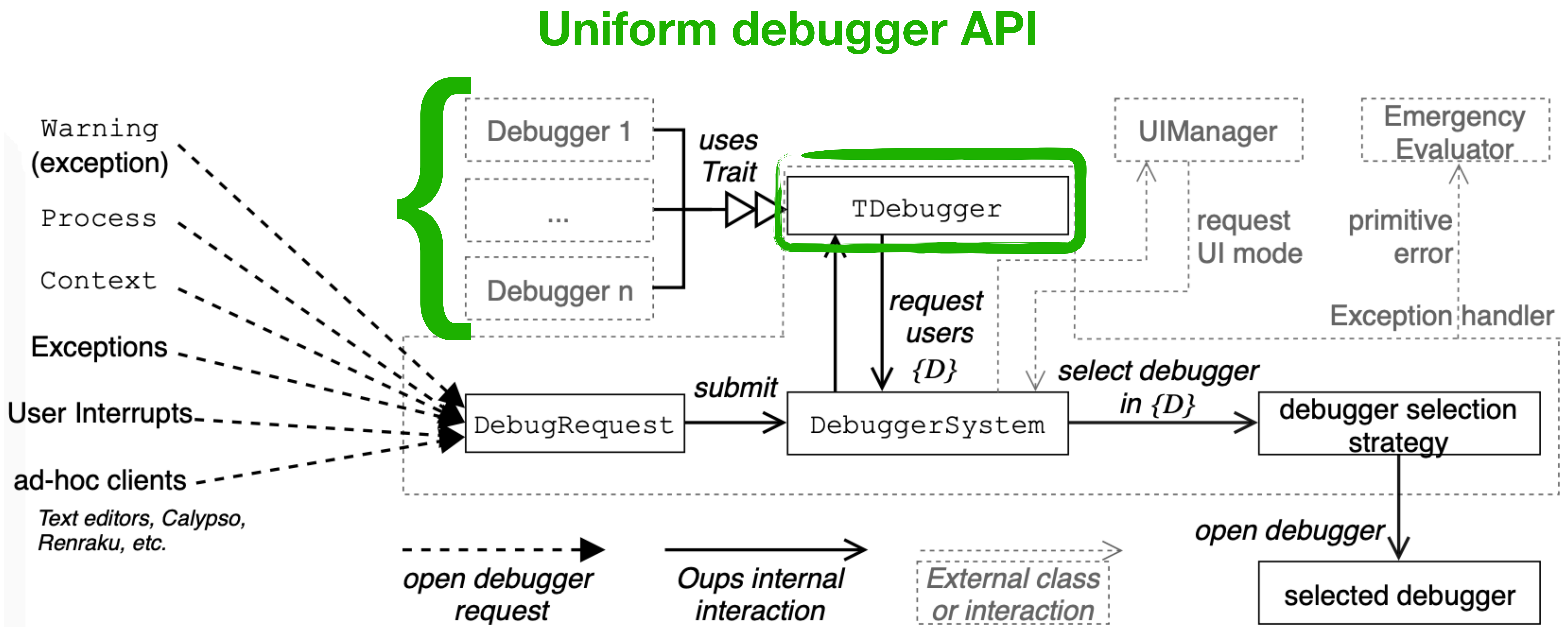

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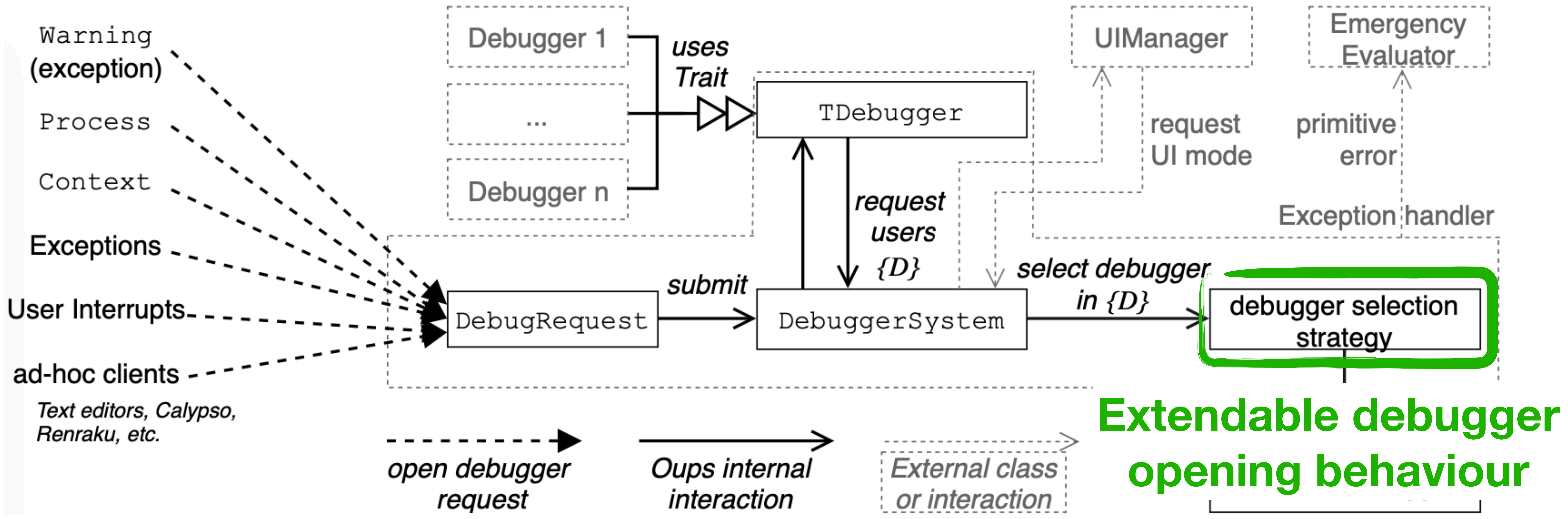
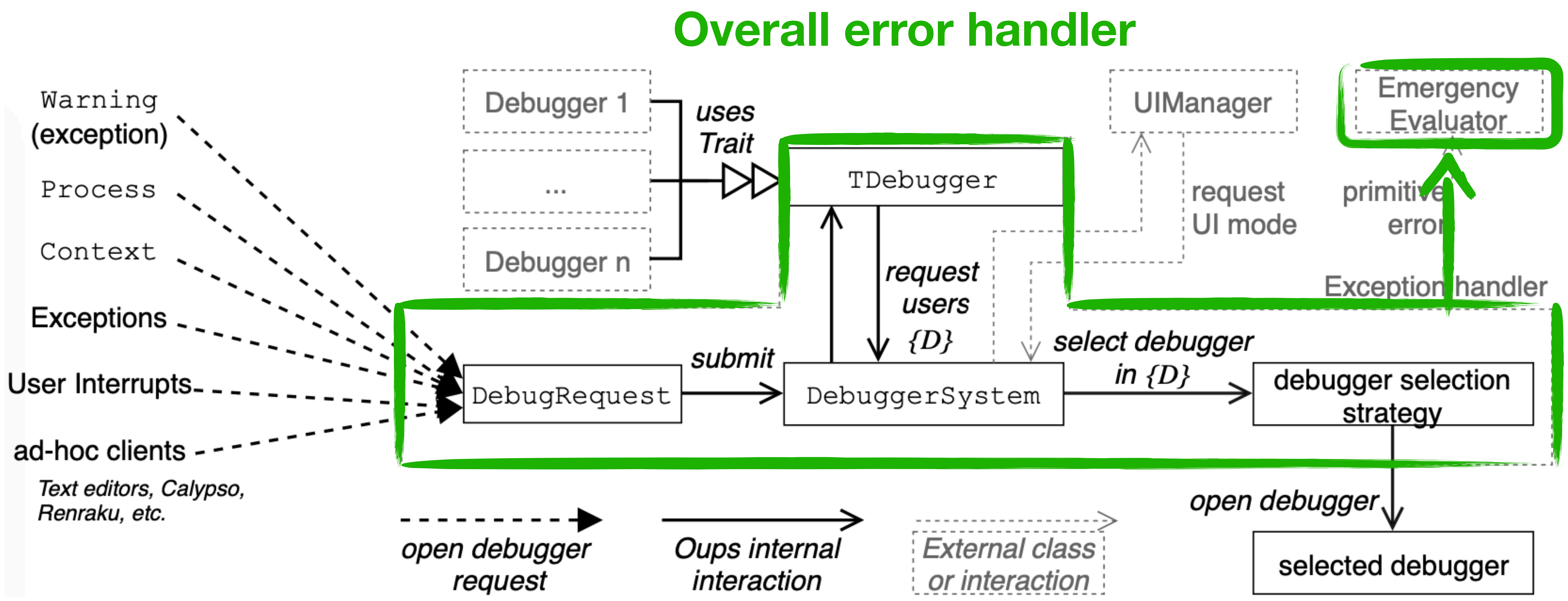


Extendable debugger opening behaviour

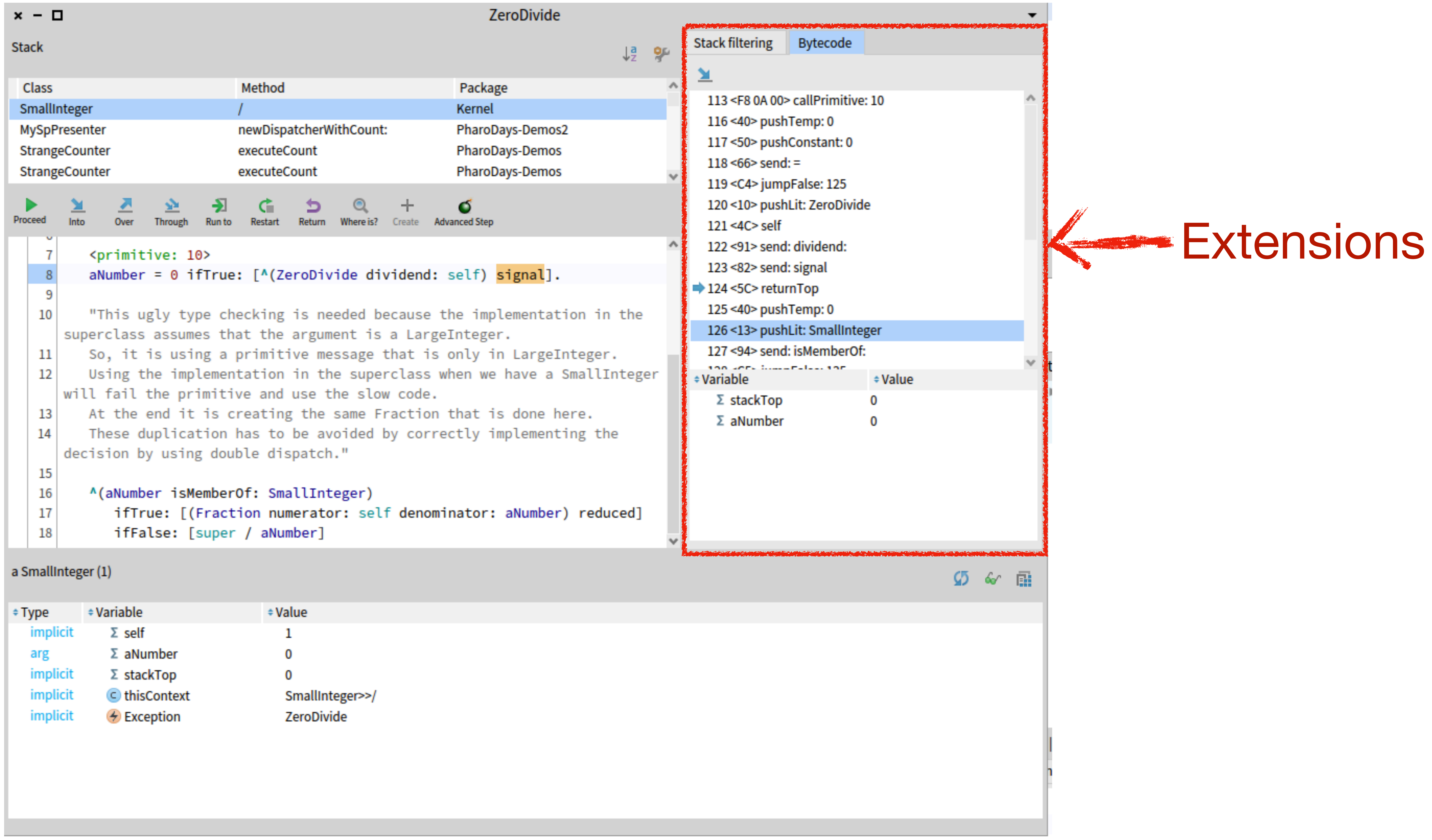
After — new debugger infrastructure



How can you build add your own debugger to the system?

DEMO

Debugger extensions



ZeroDivide

Stack

Class	Method	Package
SmallInteger	/	Kernel
MySpPresenter	newDispatcherWithCount:	PharoDays-Demos2
StrangeCounter	executeCount	PharoDays-Demos
StrangeCounter	executeCount	PharoDays-Demos

Proceed Into Over Through Run to Restart Return Where is? Create Advanced Step

```
    <primitive: 10>
    aNumber = 0 ifTrue: [^(ZeroDivide dividend: self) signal].

    "This ugly type checking is needed because the implementation in the
superclass assumes that the argument is a LargeInteger.
    So, it is using a primitive message that is only in LargeInteger.
    Using the implementation in the superclass when we have a SmallInteger
will fail the primitive and use the slow code.
    At the end it is creating the same Fraction that is done here.
    These duplication has to be avoided by correctly implementing the
decision by using double dispatch."

    ^(aNumber isMemberOf: SmallInteger)
        ifTrue: [(Fraction numerator: self denominator: aNumber) reduced]
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Stack filtering | Bytecode

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120 <10> pushLit: ZeroDivide
121 <4C> self
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123 <82> send: signal
124 <5C> returnTop
125 <40> pushTemp: 0
126 <13> pushLit: SmallInteger
127 <94> send: isMemberOf:
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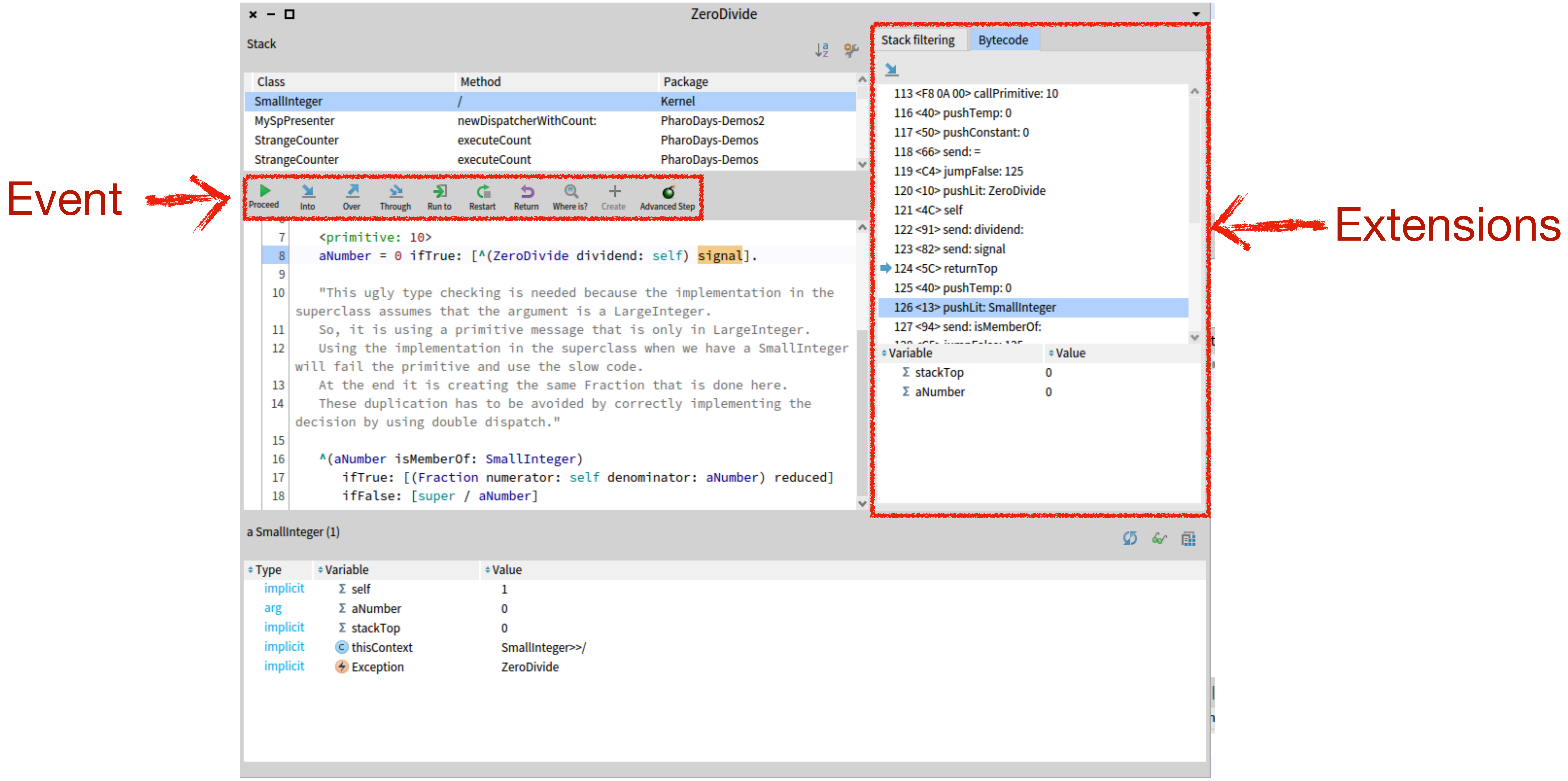
Variable	Value
stackTop	0
aNumber	0

a SmallInteger (1)

Type	Variable	Value
implicit	self	1
arg	aNumber	0
implicit	stackTop	0
implicit	thisContext	SmallInteger>>/
implicit	Exception	ZeroDivide

Debugger extensions



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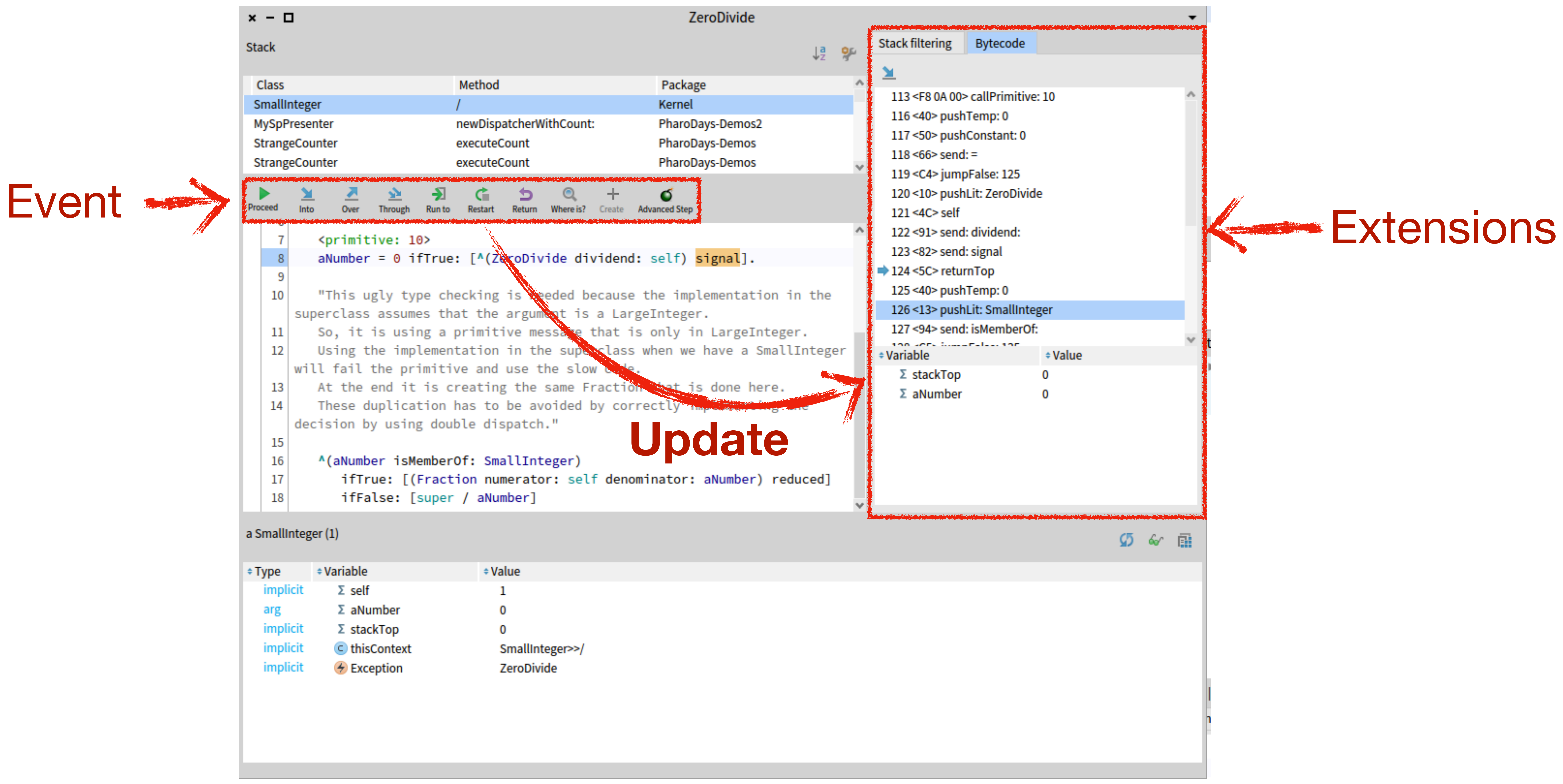

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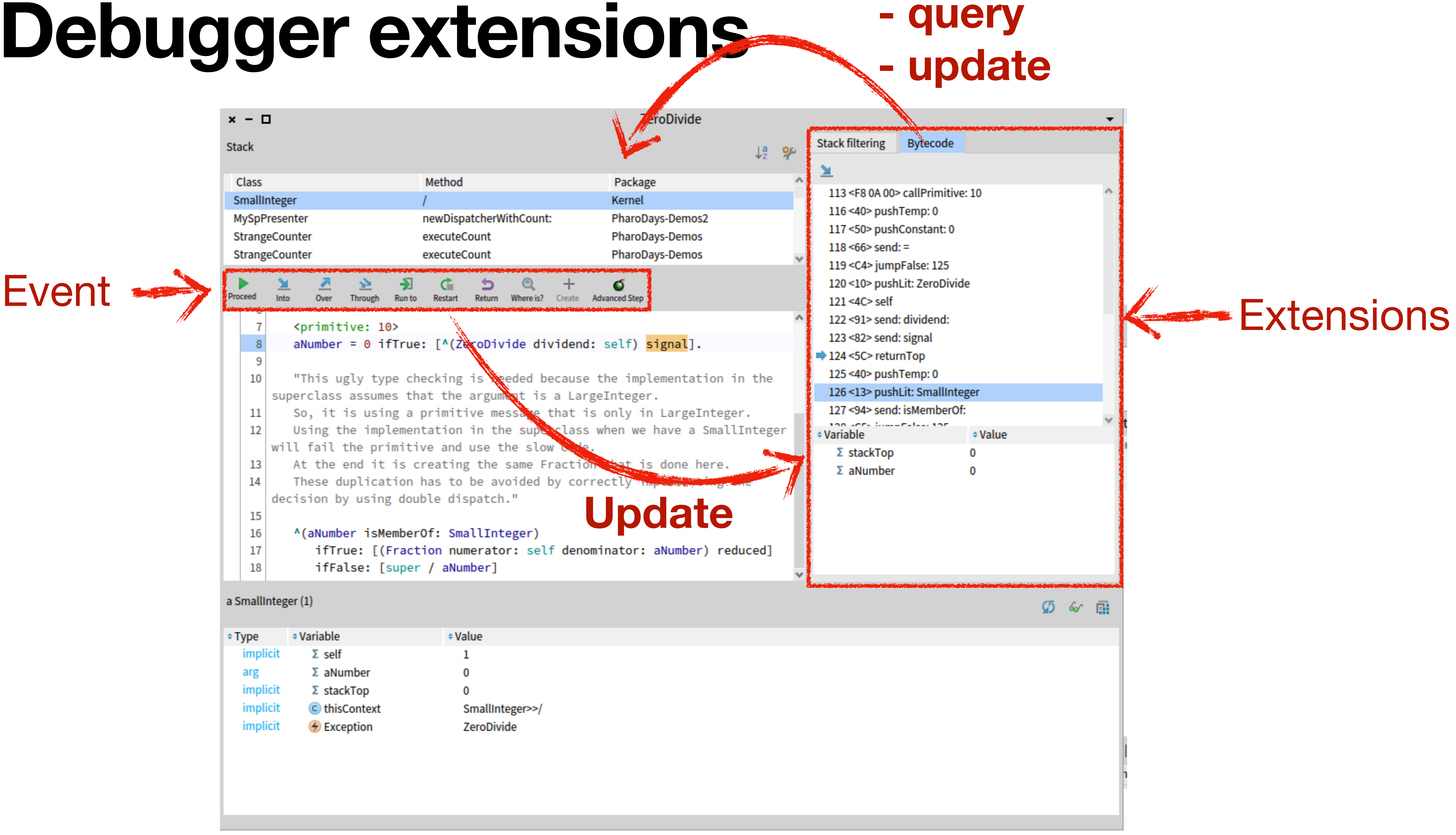
Debugger extensions

- query
- update



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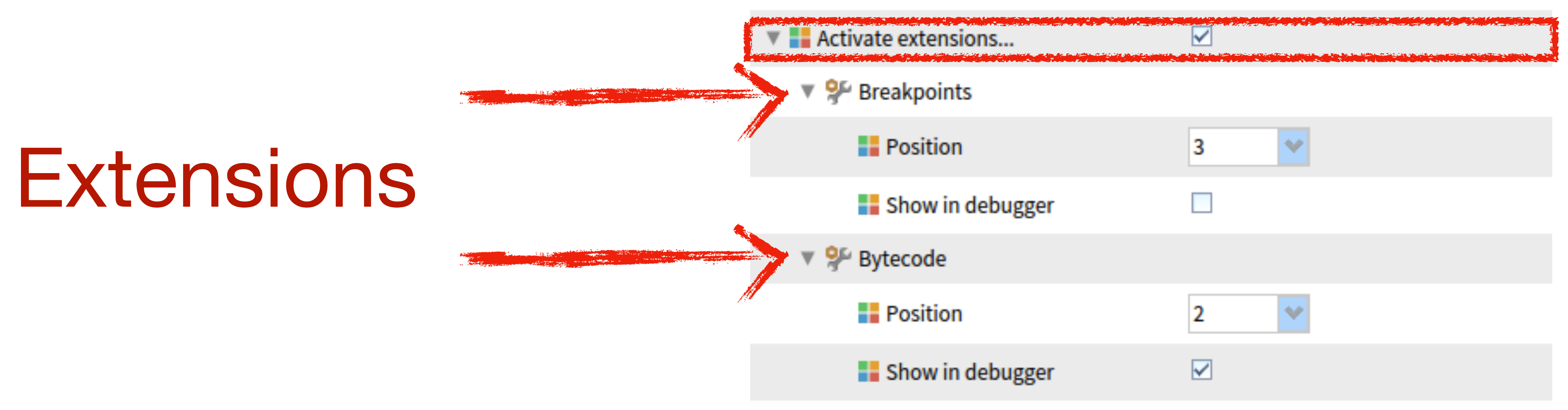
Debugger extensions

- Find and configure the list of extensions in the settings
  - The extensions can be enabled/disabled
  - Each extension can be configured separately



▼ Activate extensions...	✓
▼ Breakpoints	
Position	3
Show in debugger	☐
▼ Bytecode	
Position	2
Show in debugger	✓

How can you build your own debugger extension?

DEMO

SUMMARY — Debugger extensions

- **To build your own debugger extension, you need:**
  - Your tool with its presenter
  - Make your presenter use the Trait `TStDebuggerExtension`
  - Implement the methods required by the Trait
  - Activate the extension in the settings
  - Implement the `updatePresenter` method to get the debugger event notifications
  - Implement the optional requests and updates to apply to the debugger
  - Implement optional debugger interaction menus by extending the debugger command tree