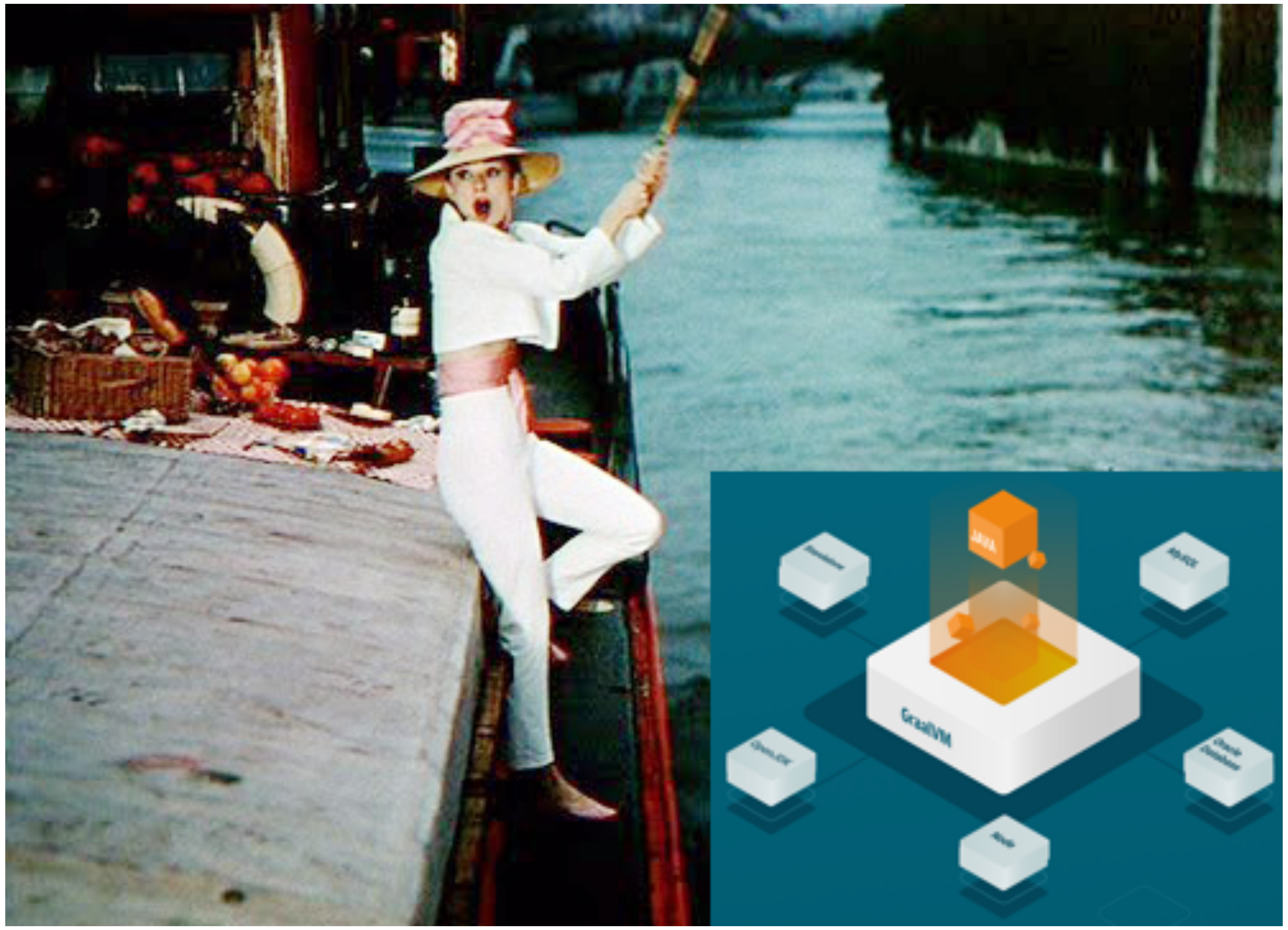
Audrey

On **D**emand **R**un time **I**nformation



Rathesan Iyadurai

6. November 2018

Supervised by Haidar Osman, Boris Spasojević and Oscar Nierstrasz

```java
public PatientCase parse(String line) throws ParseException {
    PatientCase pc = new PatientCase();

    List<String> vars = FIELD_SPLITTER.splitToList(line);

    if (vars.size() != EXPECTED_COLUMNS) {
        throw new ParseException();
    }

    pc.setAge(vars[2]);

    return pc;
}
```

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“haidar|osman|18|2000-02-23”

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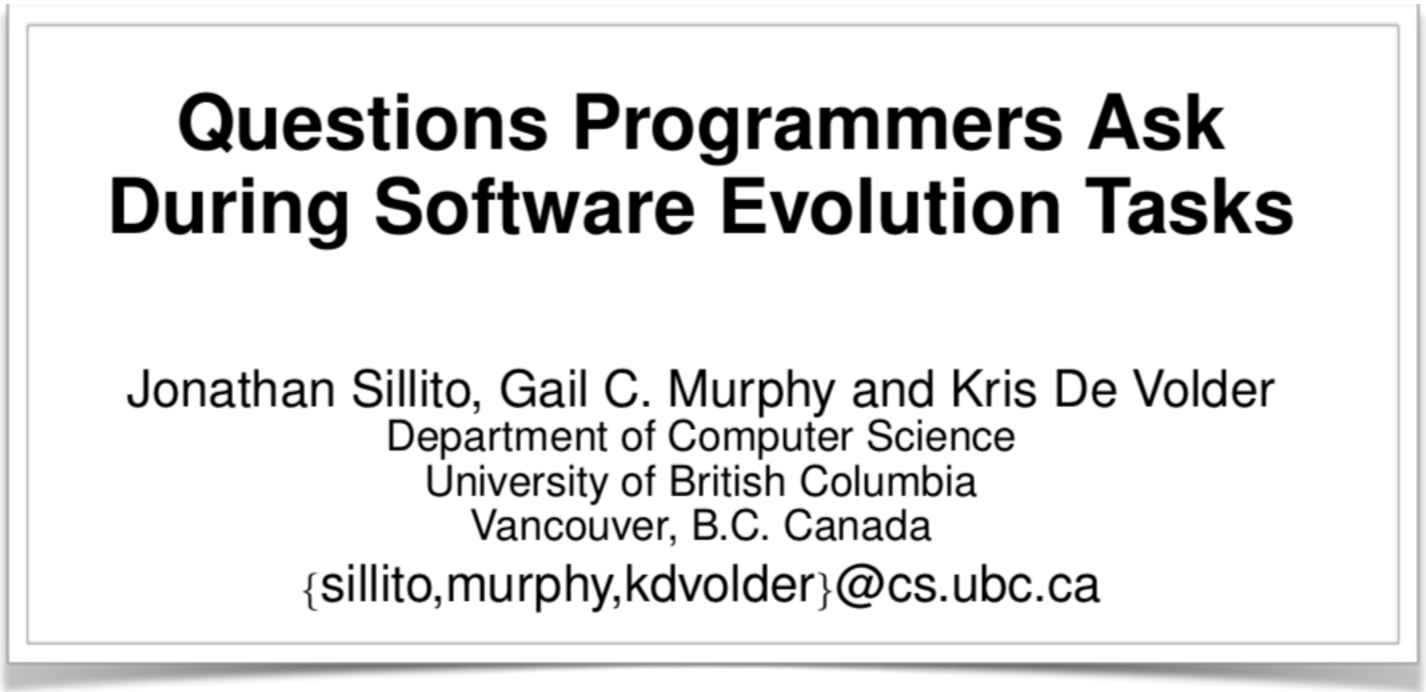
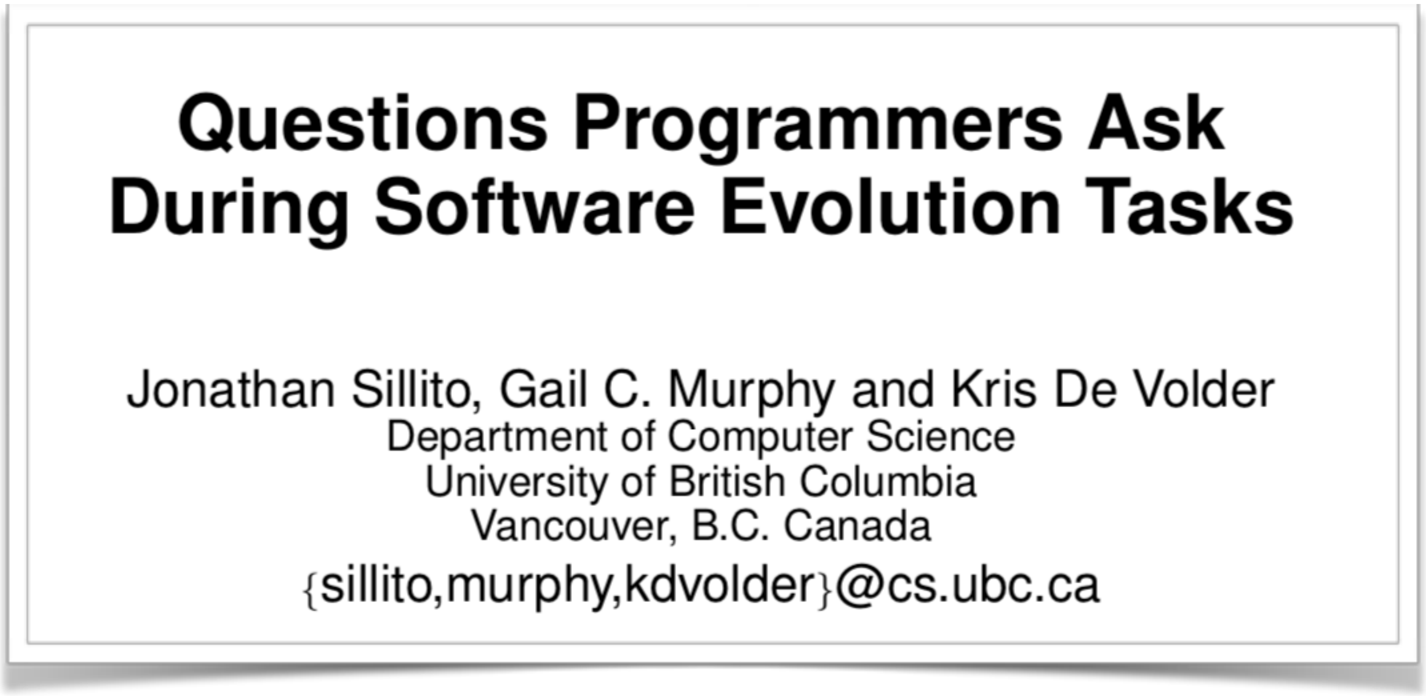


Questions Programmers Ask During Software Evolution Tasks

Jonathan Sillito, Gail C. Murphy and Kris De Volder
Department of Computer Science
University of British Columbia
Vancouver, B.C. Canada
{sillito,murphy,kdvolder}@cs.ubc.ca

“What are the values of these arguments at runtime?”



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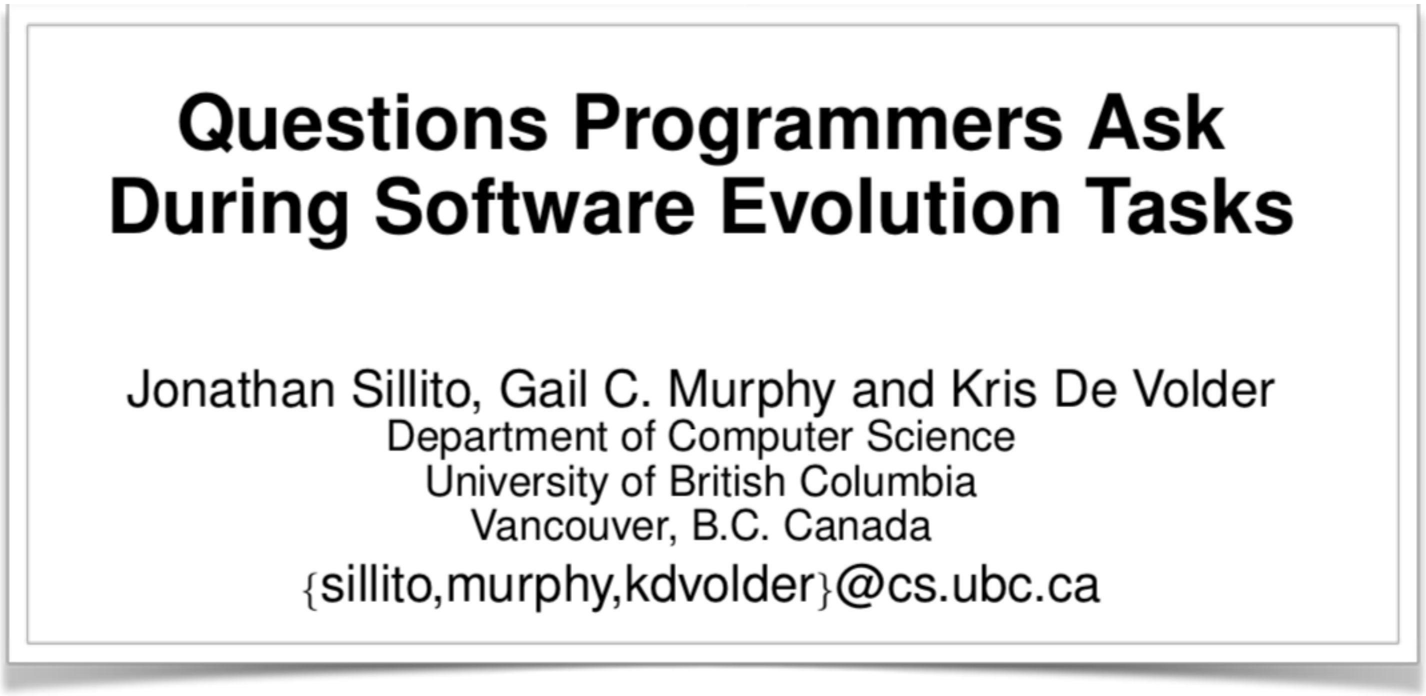

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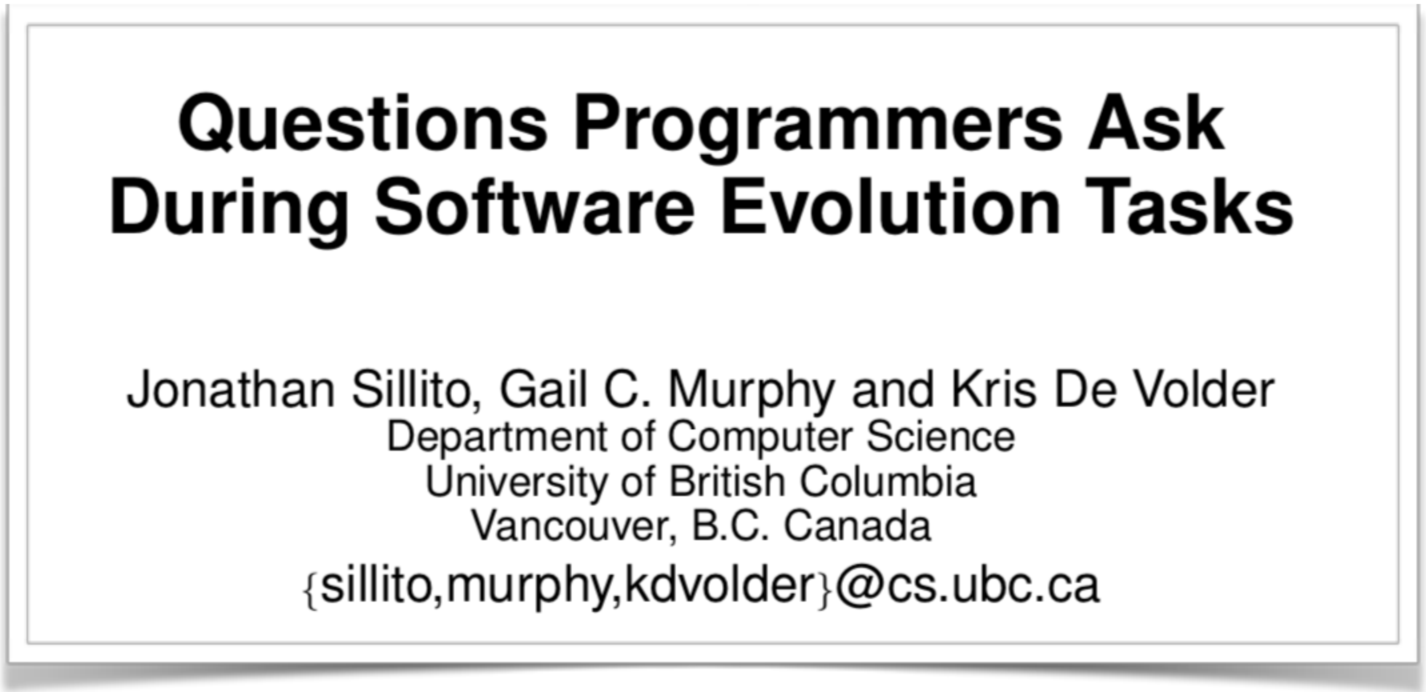

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“Which run time data leads to throw a particular exception?”

“What are the values of these arguments at runtime?”

“How does this data structure look at runtime?”

Can we address these issues with a system that provides run time examples on demand?

“Which run time data leads to throw a particular exception?”

Audrey

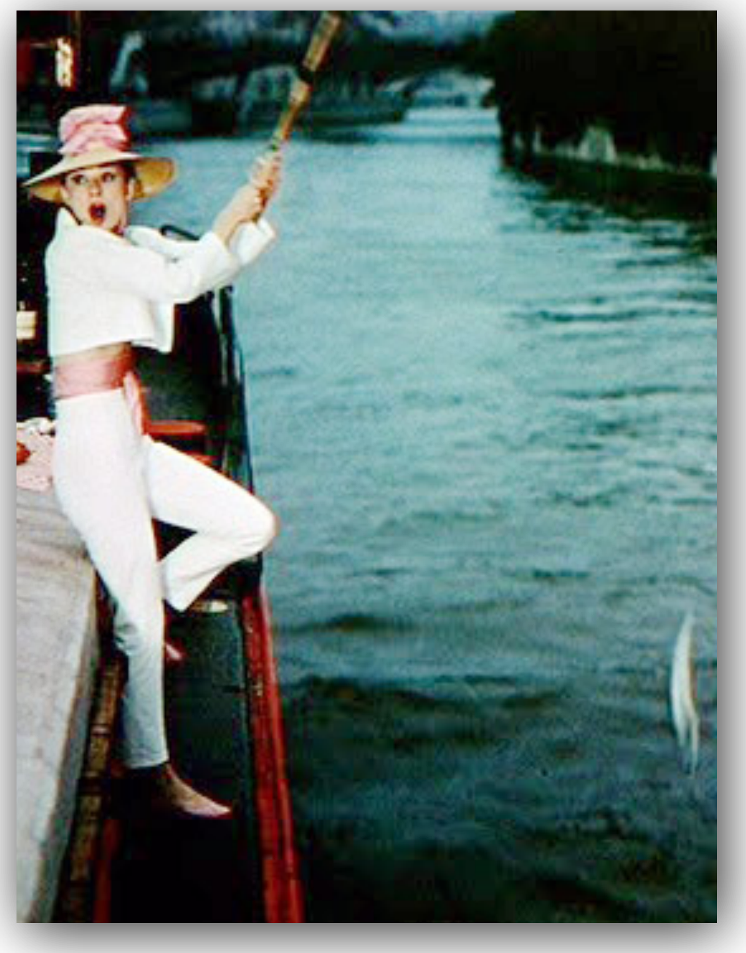
On **D**emand **R**un time **I**nformation

in

Pharo

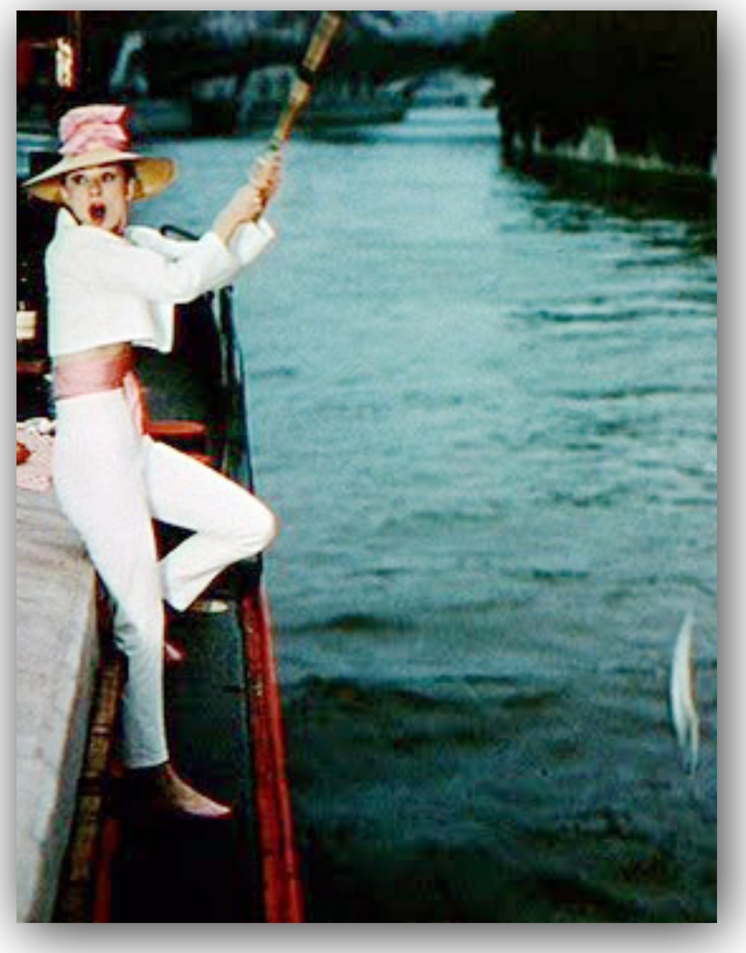
Audrey Components

Audrey Components



Instrumentation

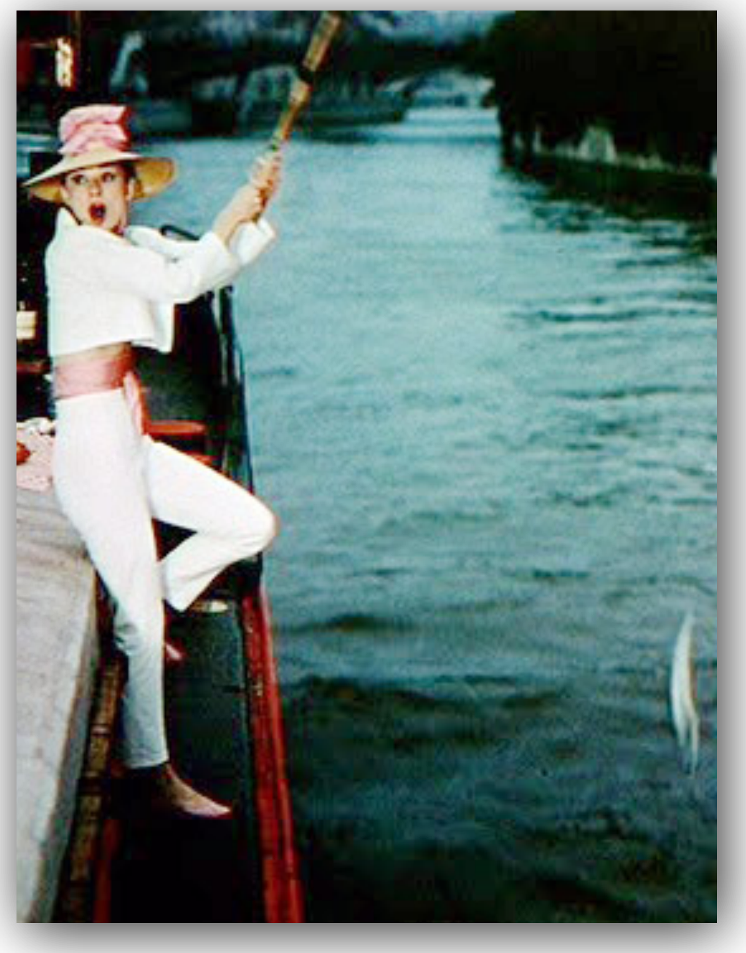
Audrey Components



Instrumentation

Storage

Audrey Components



Instrumentation

Storage

Visualization

Problem: Overhead

30 - 50% Instrumentation overhead in Pharo!

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Solution?

Problem: Overhead

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Solution?

Partial instrumentation with temporal sharding

Problem: Overhead

30 - 50% Instrumentation overhead in Pharo!

Solution?

Partial instrumentation with temporal sharding

50%

50%

% of time spent in your codebase

Problem: Serialization

How do you store the example data so that
it is presentable for program
comprehension later on?

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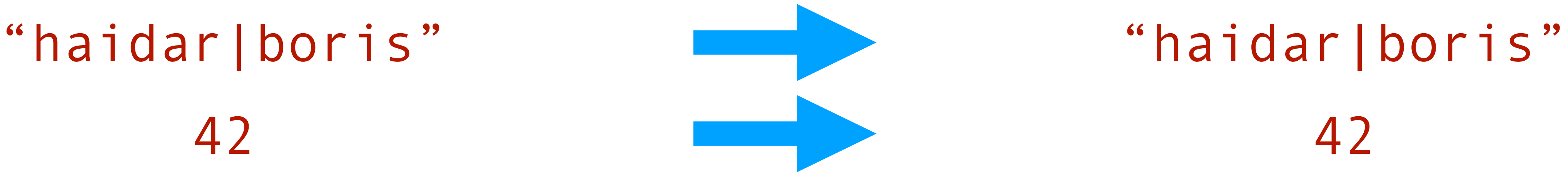


“haidar|boris”

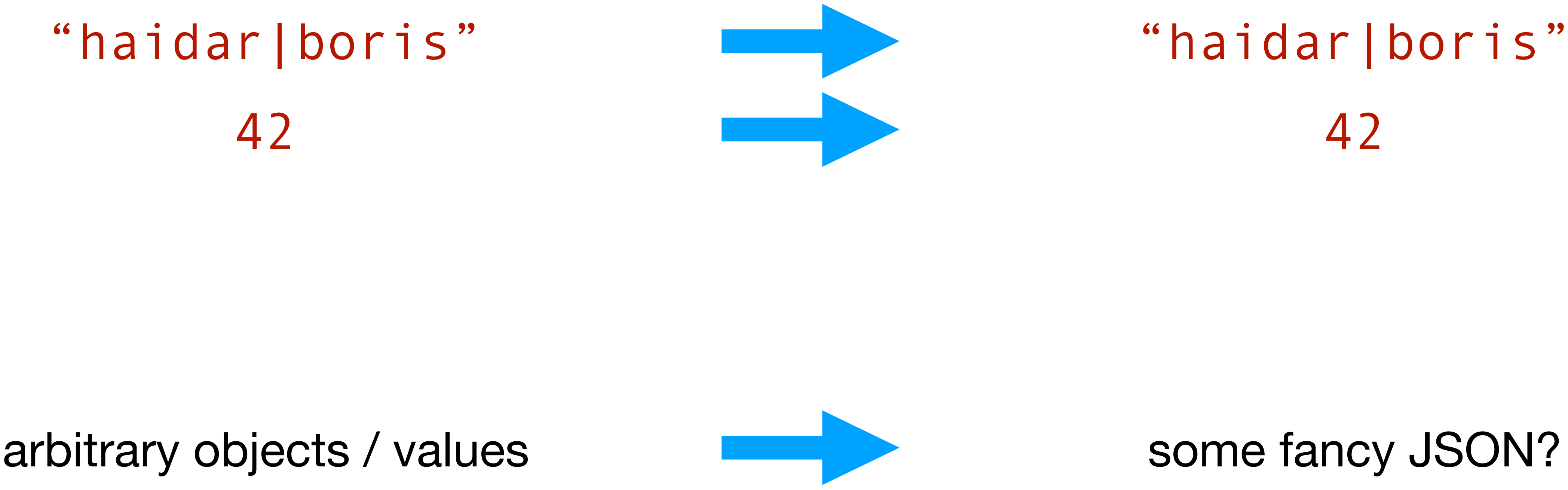
42

“haidar|boris”

42

Problem: Serialization

How do you store the example data so that it is presentable for program comprehension later on?



“haidar|boris” → “haidar|boris”

42 → 42

arbitrary objects / values → some fancy JSON?

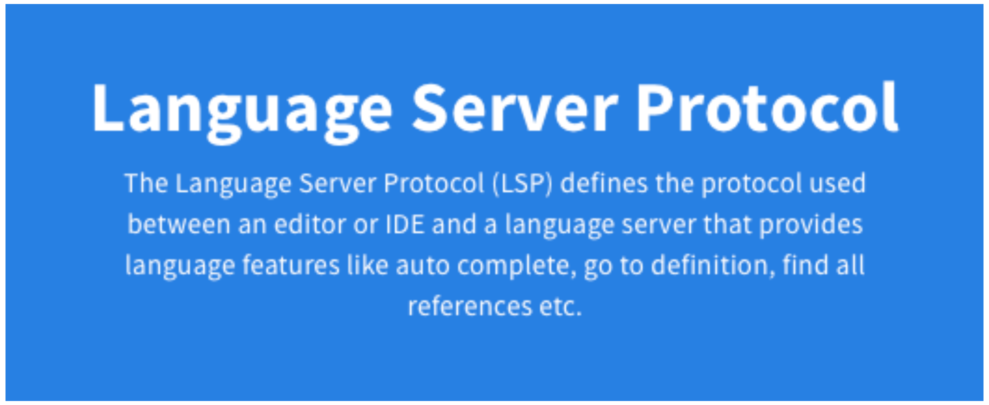
Problem: IDE Infrastructure

How to communicate with the IDE?

Problem: IDE Infrastructure

How to communicate with the IDE?

Solution?



Language Server Protocol

The Language Server Protocol (LSP) defines the protocol used between an editor or IDE and a language server that provides language features like auto complete, go to definition, find all references etc.

https://microsoft.github.io/language-server-protocol/

Problem: Usability

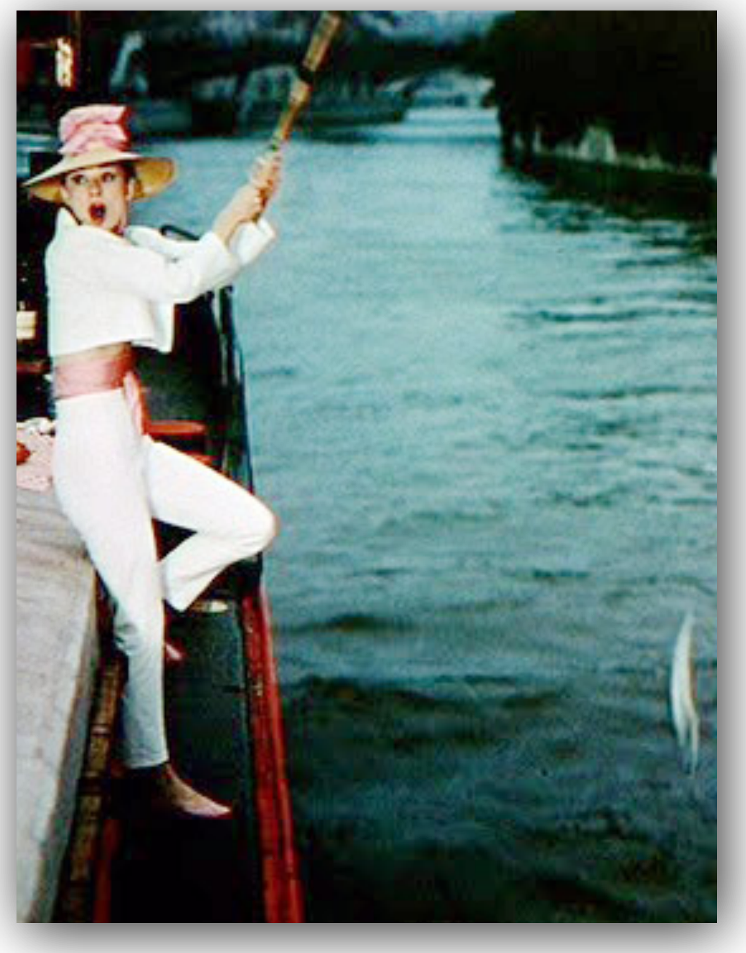
Problem: Usability

Solution?

Usability tests during change tasks

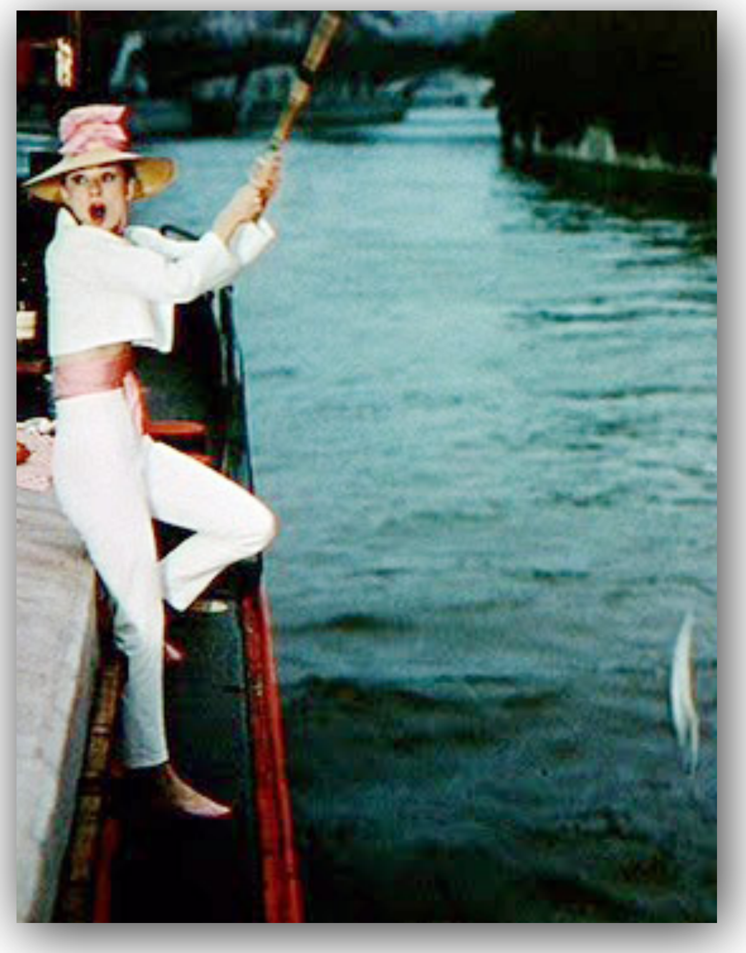
The Perfect Audrey

The Perfect Audrey



Minimal overhead
Instrumentation

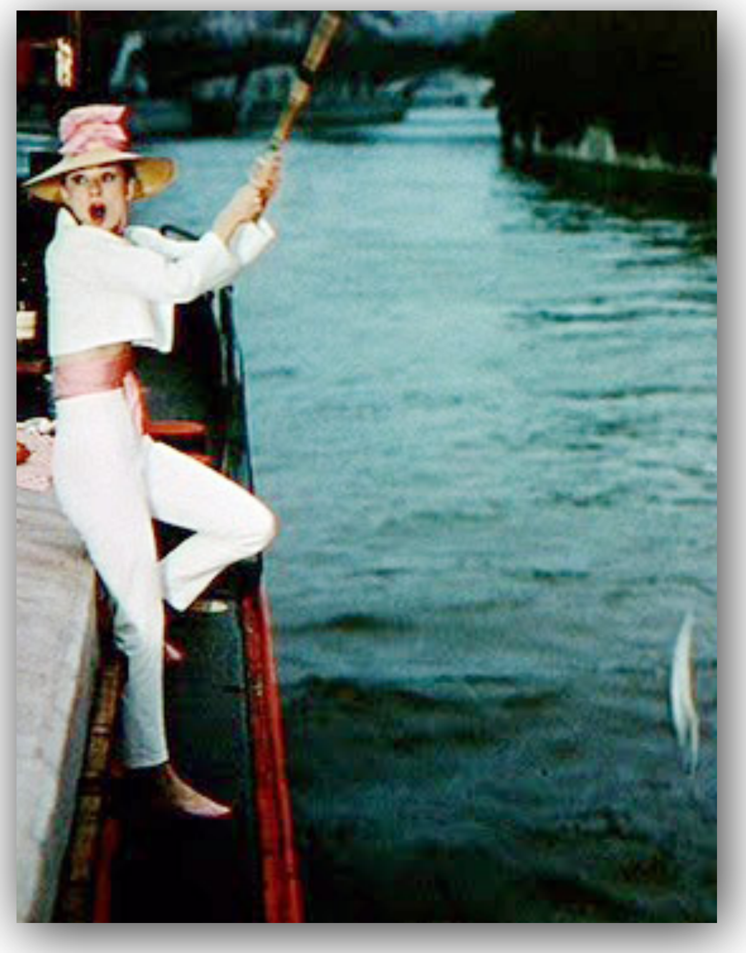
The Perfect Audrey



Minimal overhead Instrumentation

Efficient, language-agnostic representation

The Perfect Audrey

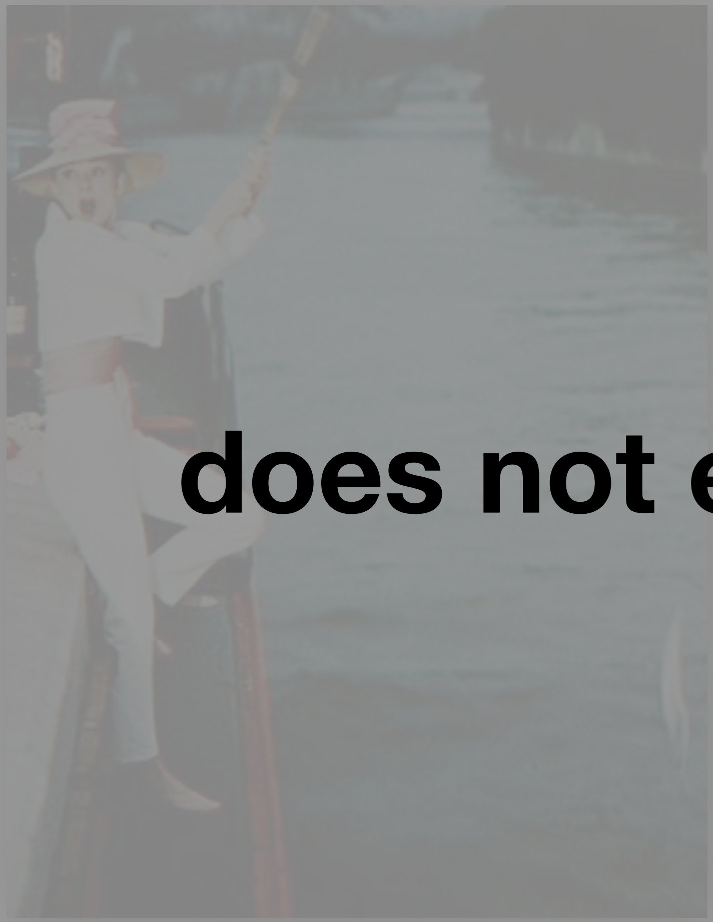


Minimal overhead Instrumentation

Efficient, language-agnostic representation

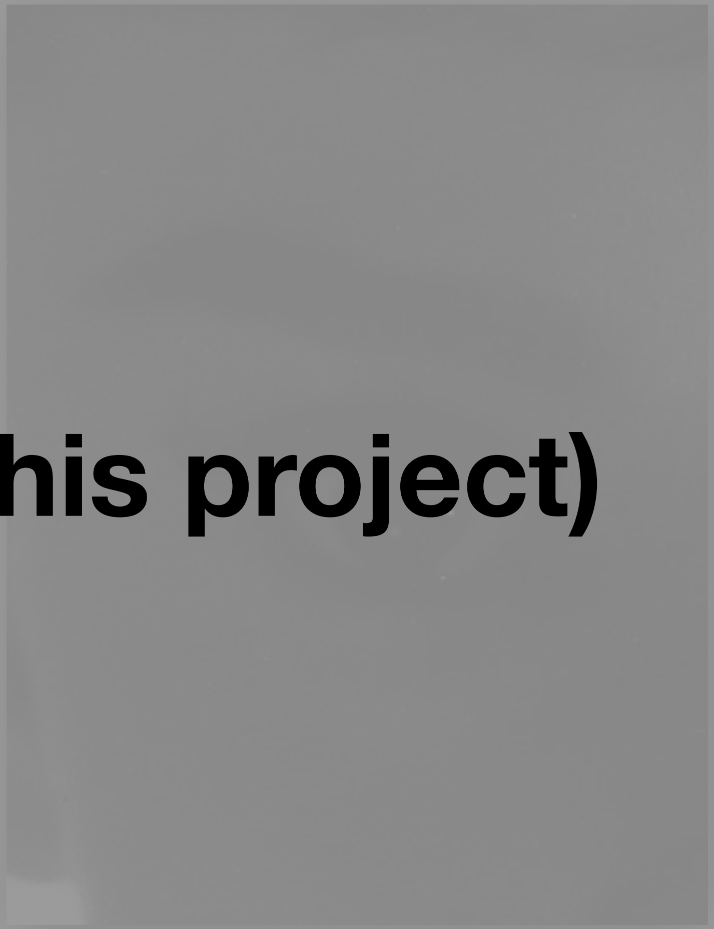
Useful visualizations in multiple IDEs

The Perfect Audrey



Minimal overhead Instrumentation

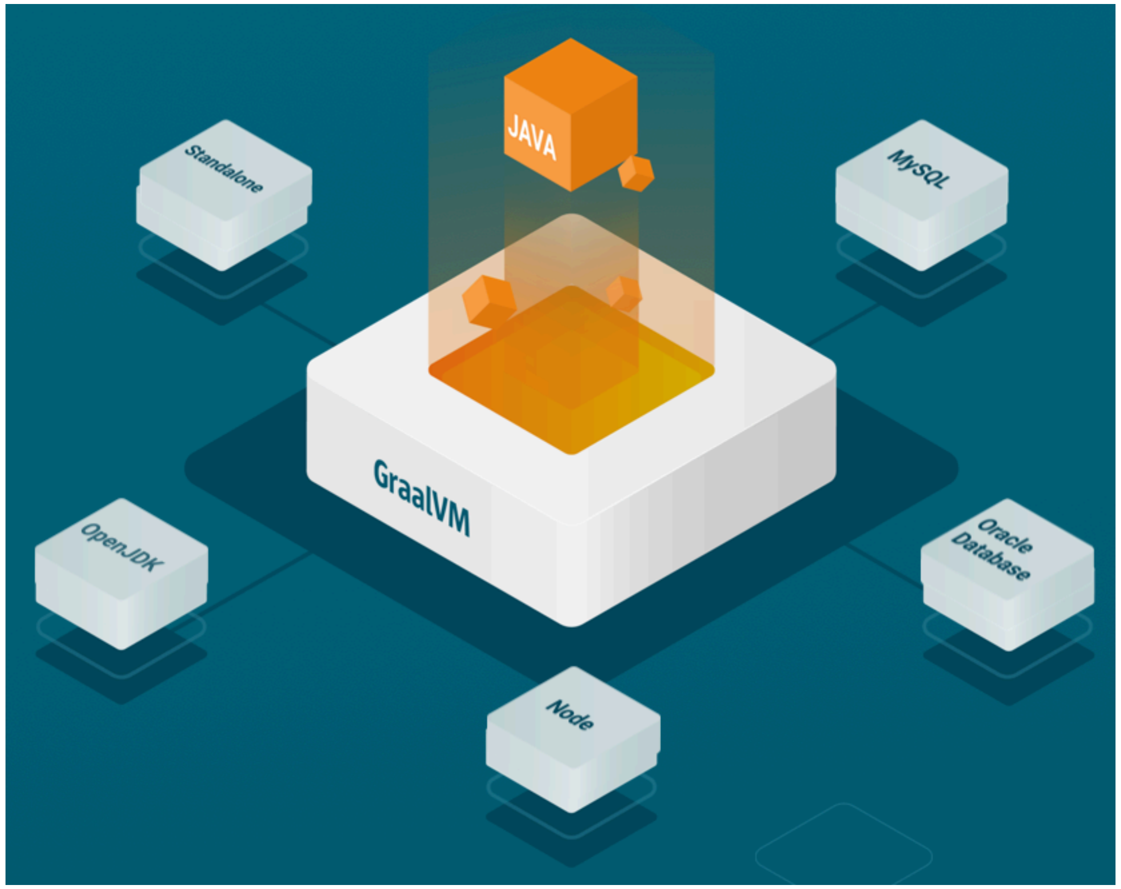
Efficient, language-agnostic representation



Useful visualizations in multiple IDEs

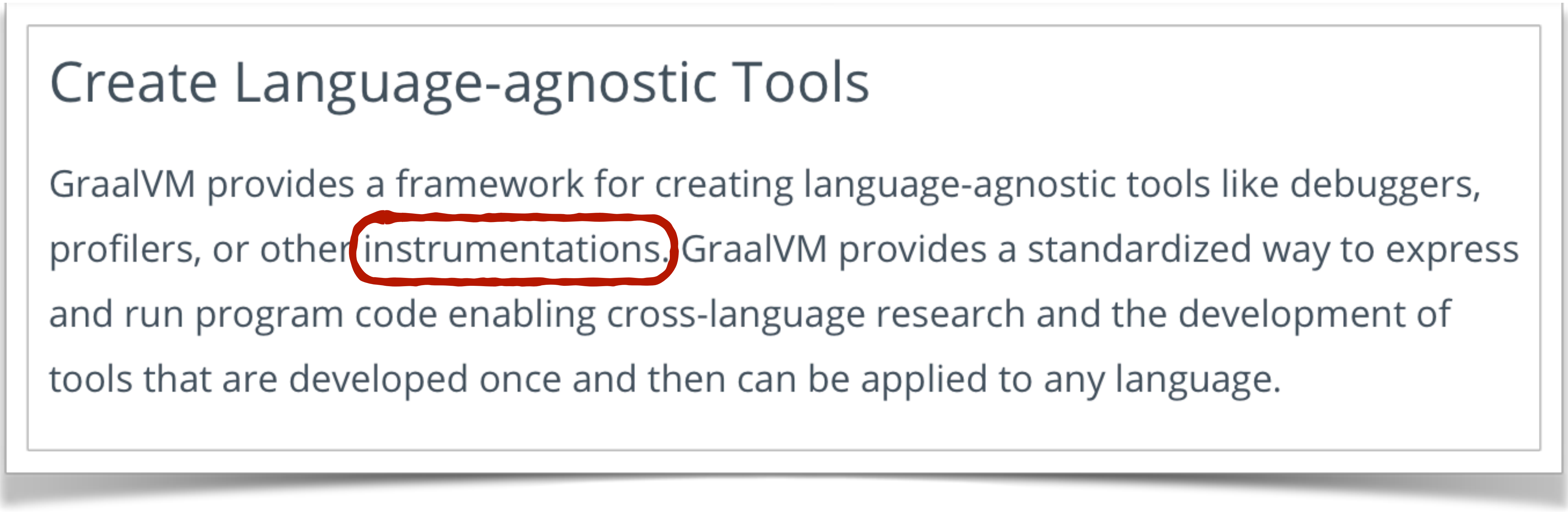
does not exist (at the end of this project)

Towards a language-agnostic solution



Why GraalVM?

https://www.graalvm.org/docs/why-graal/



Create Language-agnostic Tools

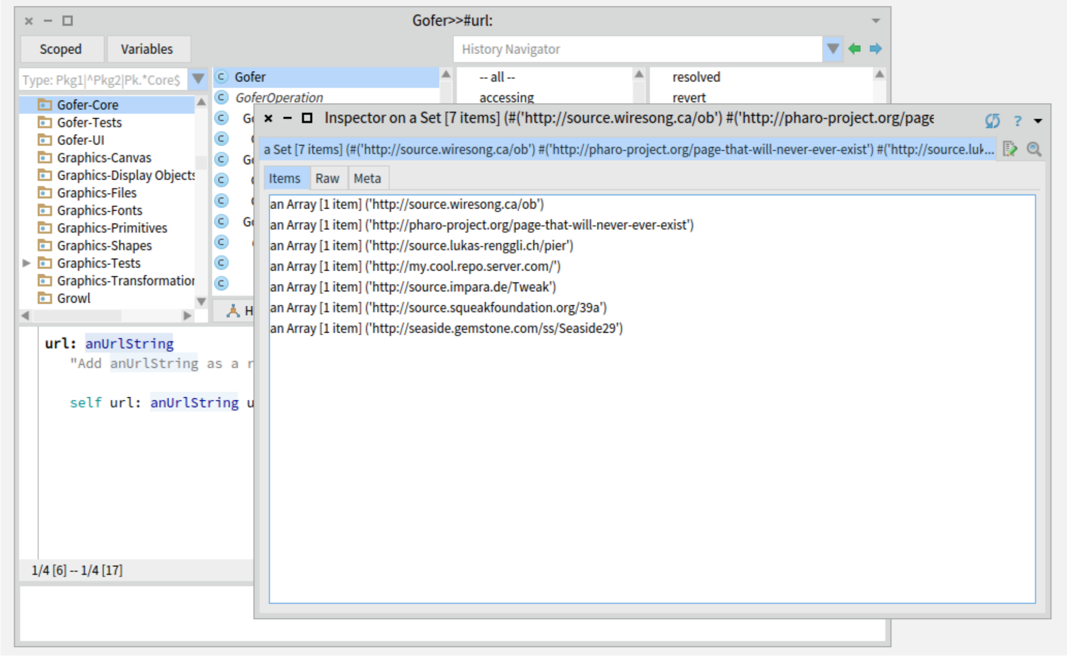
GraalVM provides a framework for creating language-agnostic tools like debuggers, profilers, or other instrumentations. GraalVM provides a standardized way to express and run program code enabling cross-language research and the development of tools that are developed once and then can be applied to any language.

JS

TRUFFLE RUBY

R

So far…



```
url: anUrlString
	"Add anUrlString as a r

	self url: anUrlString u
```

Inspector on a Set [7 items] (#('http://source.wiresong.ca/ob') #('http://pharo-project.org/page

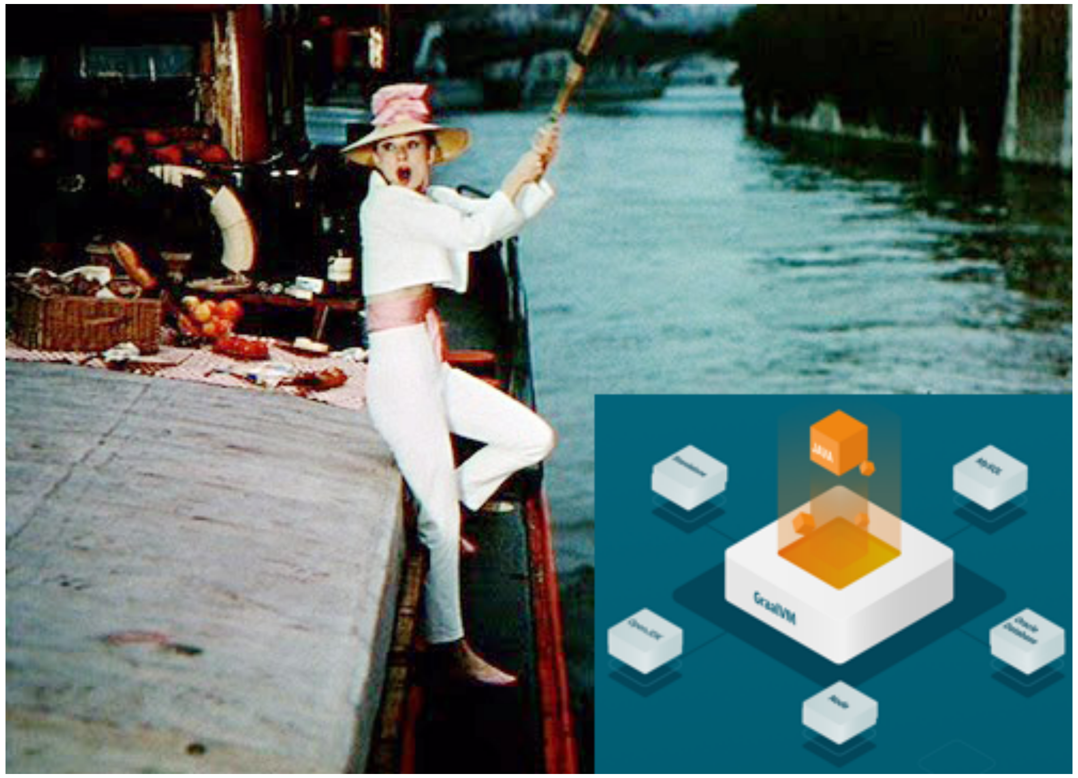
a Set [7 items] (#('http://source.wiresong.ca/ob') #('http://pharo-project.org/page-that-will-never-ever-exist') #('http://source.luk...

```
an Array [1 item] ('http://source.wiresong.ca/ob')
an Array [1 item] ('http://pharo-project.org/page-that-will-never-ever-exist')
an Array [1 item] ('http://source.lukas-renggli.ch/pier')
an Array [1 item] ('http://my.cool.repo.server.com/')
an Array [1 item] ('http://source.impara.de/Tweak')
an Array [1 item] ('http://source.squeakfoundation.org/39a')
an Array [1 item] ('http://seaside.gemstone.com/ss/Seaside29')
```

An argument inspector in Pharo. Why?

- To get a feel for the problem
- Quick prototyping

Next up…



Audrey on Truffle. Why?

- Language-agnostic tooling