

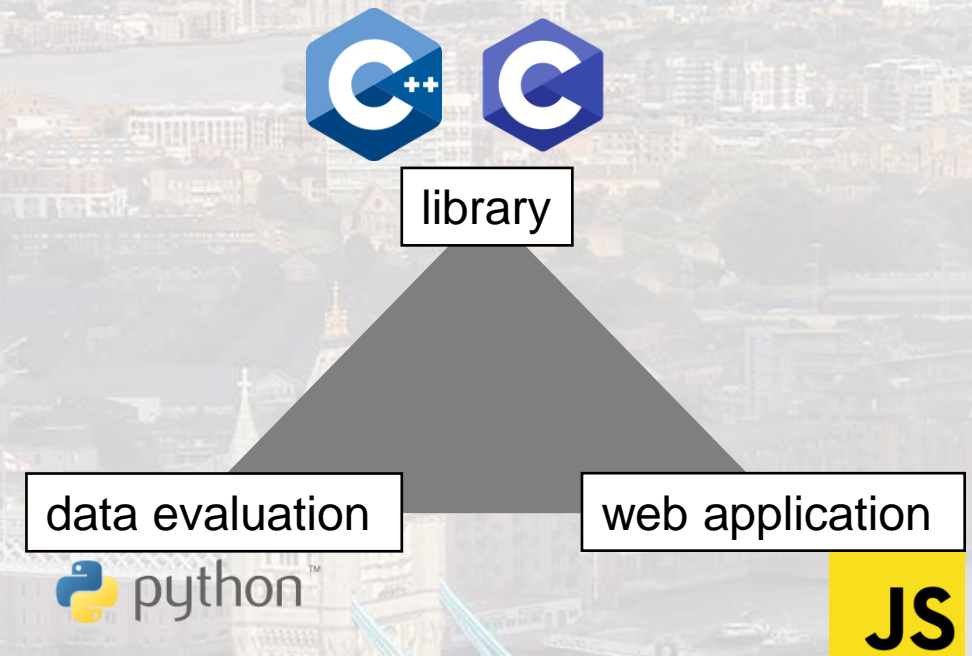


Engineering

→ combining best-suitable materials!

Software engineering?

→ cross-language interoperability!



Extending Sulong for cross-language interoperability between C++/Swift and Java, JavaScript or Python

Christoph Pichler, Johannes Kepler University Linz (Austria)

Supervised by **Roland Schatz**

Extending Sulong for cross-language interoperability between C++/Swift and Java, JavaScript or Python

Christoph Pichler, Johannes Kepler University Linz (Austria)

Supervised by **Roland Schatz**

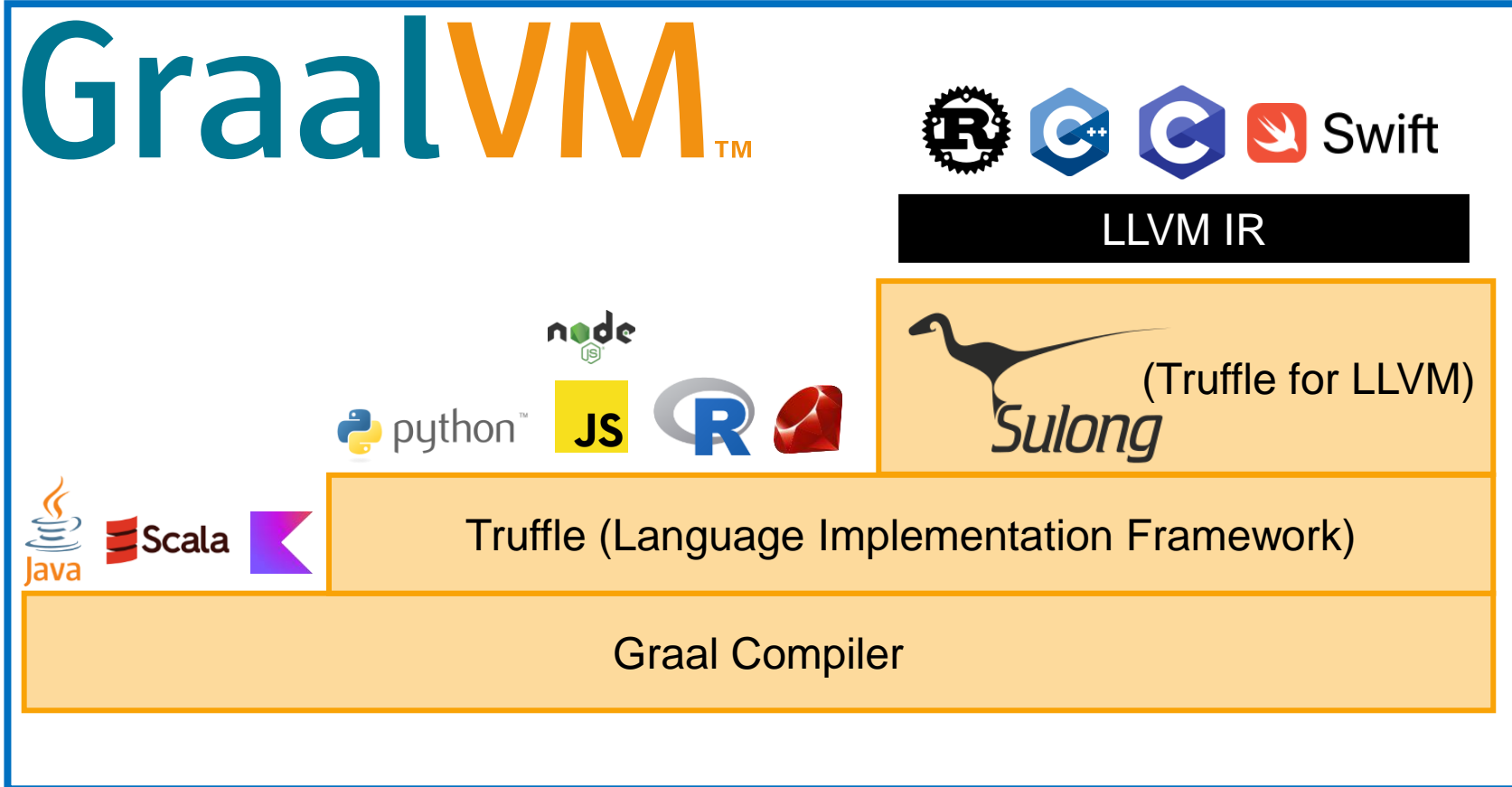
Extending **Sulong** for object-oriented cross-language interoperability

Christoph Pichler, Johannes Kepler University Linz (Austria)

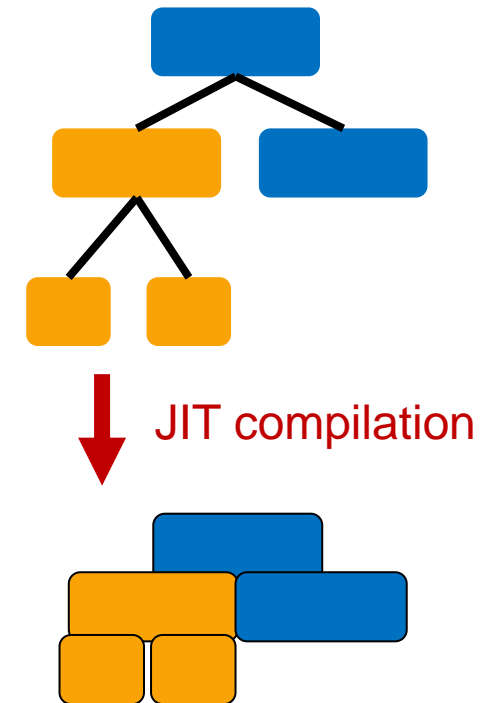
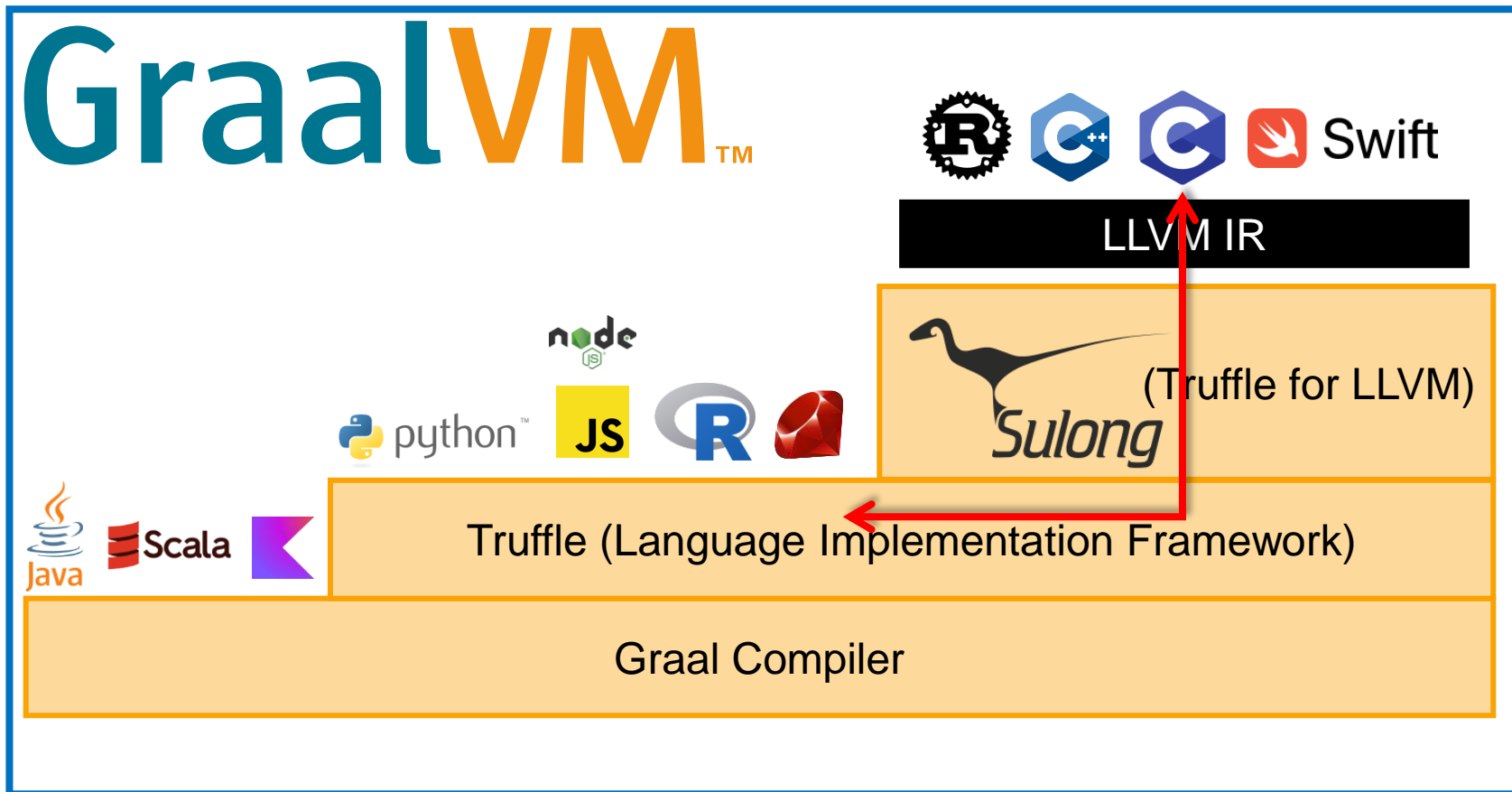
Supervised by **Roland Schatz**

"Ili of GraalVM"

GraalVM and Sulong



Existing interoperability



Existing interoperability

GraalVM



Truffle (Language)

Graal Compiler

→ LLVM Developers' meeting 2019!

Sulong

An experience report of using the "other end" of LLVM in GraalVM

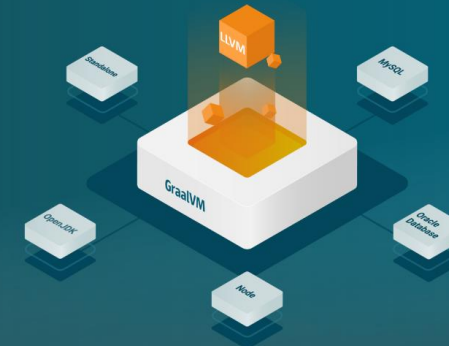
Roland Schatz
Sulong Team Lead
@rschatz_at

Josef Eisl
Sulong Team
@zapstercc

GraalVM, Oracle Labs
April 9, 2019

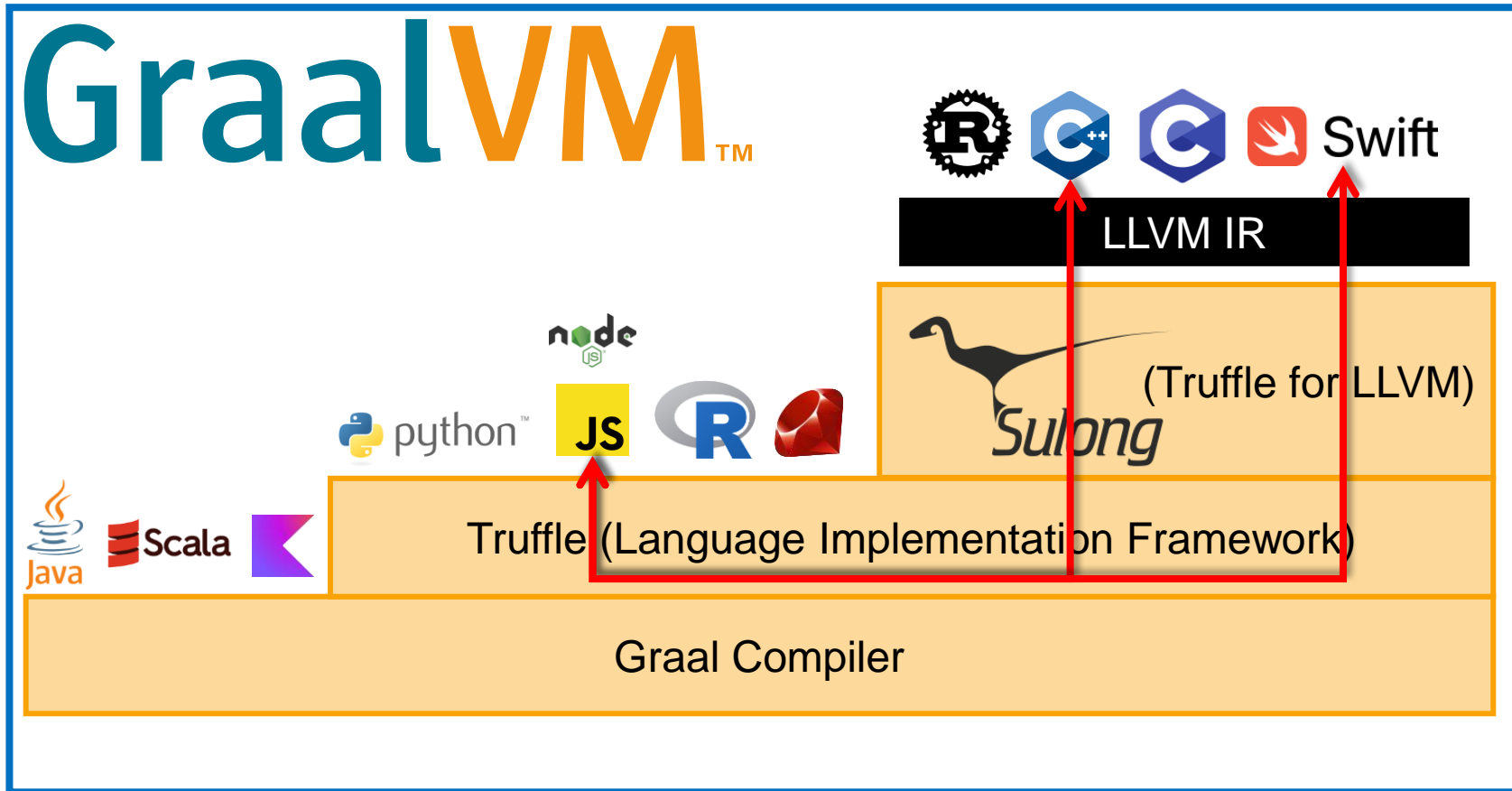
ORACLE

Copyright © 2019, Oracle and/or its affiliates. All rights reserved. |



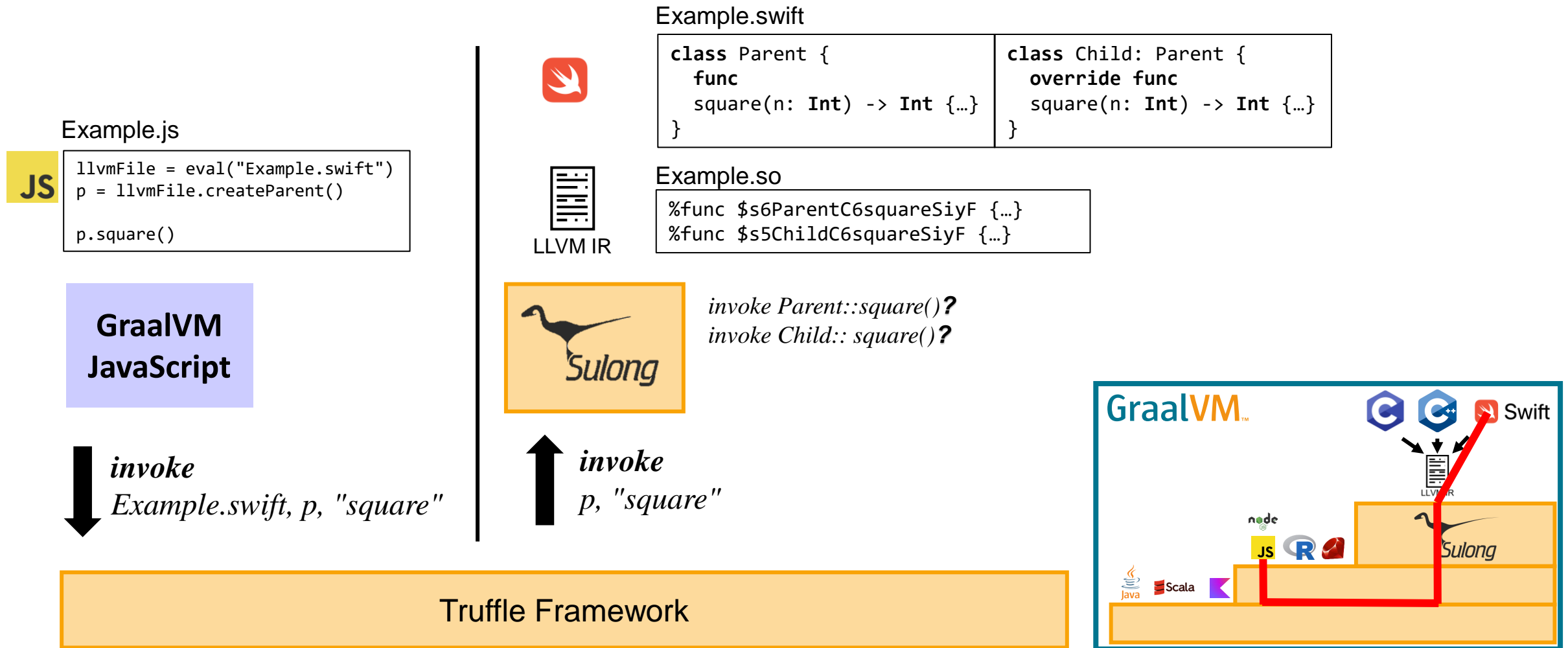
https://llvm.org/devmtg/2019-04/talks.html#Talk_13

Extending Sulong's interoperability for object-oriented languages



The following examples take place along the red axes!

Sample extension: Dynamic binding [1]



Sample extension: Dynamic binding [2]



LLVM IR

Example.so

```
%func $s6ParentC6squareSiyF {...}  
%func $s5ChildC6squareSiyF {...}
```



invoke Parent::square()?
invoke Child::square()?

p->vtable[square_idx]()



invoke
p, "square"

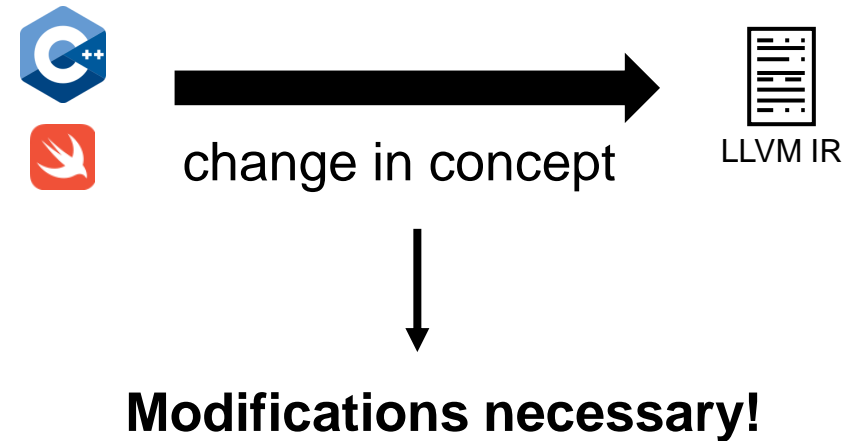
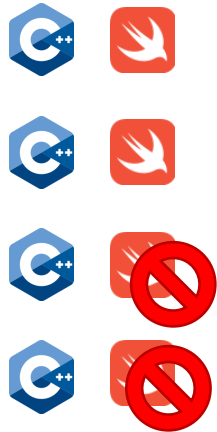
Truffle Framework

Live Demo

Files and step-by-step instructions can be found at
<https://github.com/pichristoph/eurollvm2022>

Higher-level semantics across languages!

- Name mangling
- **Dynamic binding**
- Field access
- Exception flow



Open Source - ^{*TRY*} ~~Do~~ It Yourself!

GraalVMTM

- graalvm.org
- github.com/oracle/graal

Concerning this talk:

- Slides, live demo files, step-by-step instructions, ...:
<https://github.com/pichristoph/eurollvm2022>

Related Talks at EuroLLVM 2019:

- Sulong and its interoperability for C-compiled LLVM (Roland Schatz, Josef Eisl):
[Sulong: An experience report of using the "other end" of LLVM in GraalVM.](#)
- Sulong's debugging tools (Jacob Kreindl):
[LLVM IR in GraalVM: Multi-Level, Polyglot Debugging with Sulong](#)

