Using Aspects for Language Portability

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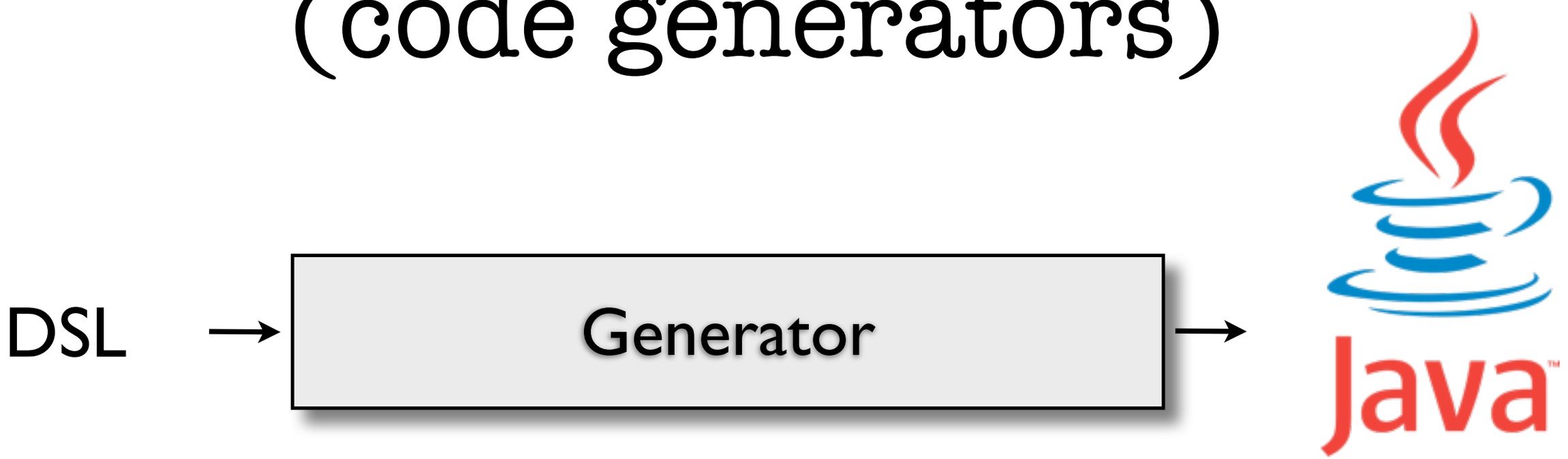
DSLs

Stratego

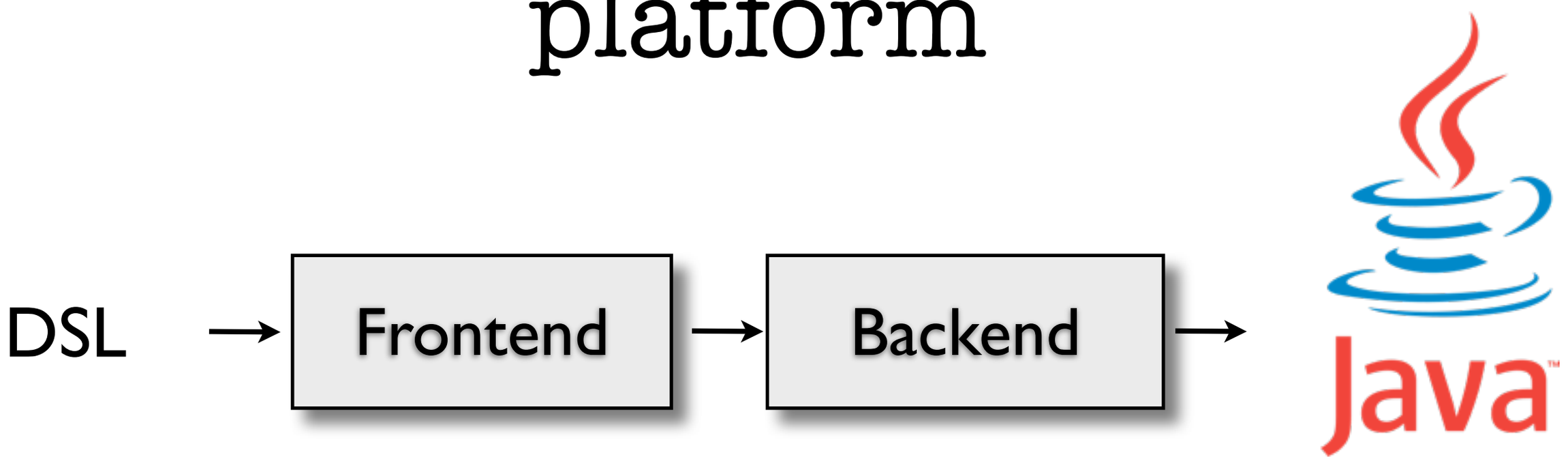
SDF

Spoofax

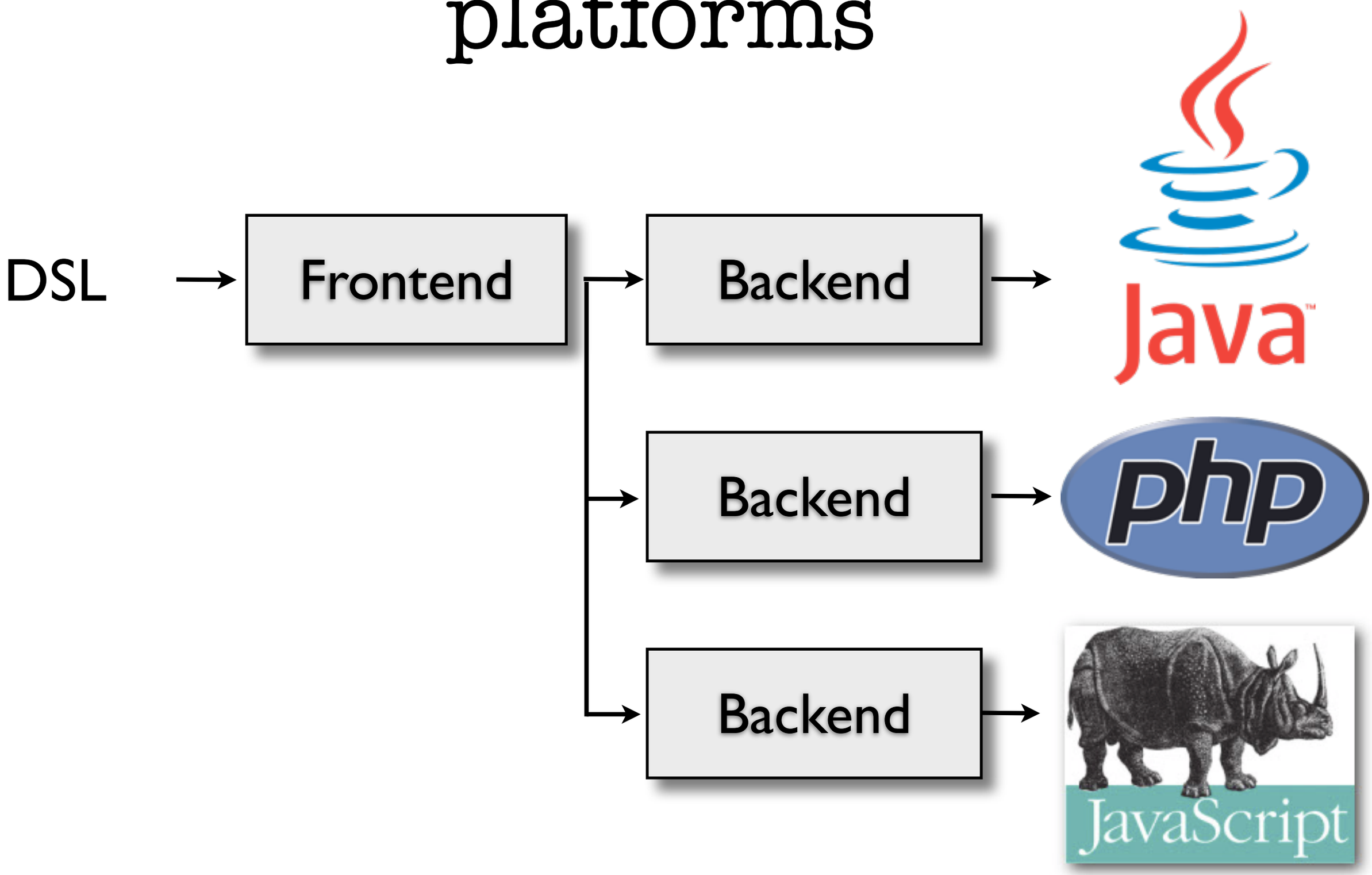
DSL compilers (code generators)



Backend targets the platform



Backend targets the platforms



“So switching to another platform is just a little matter of switching the backend, right?”

(wrong)

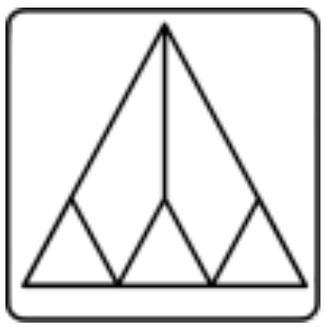
Why not?

- platform-exclusive libraries
- platform escapes and native calls
- interoperability and integration with platform applications
- performance and stack behavior

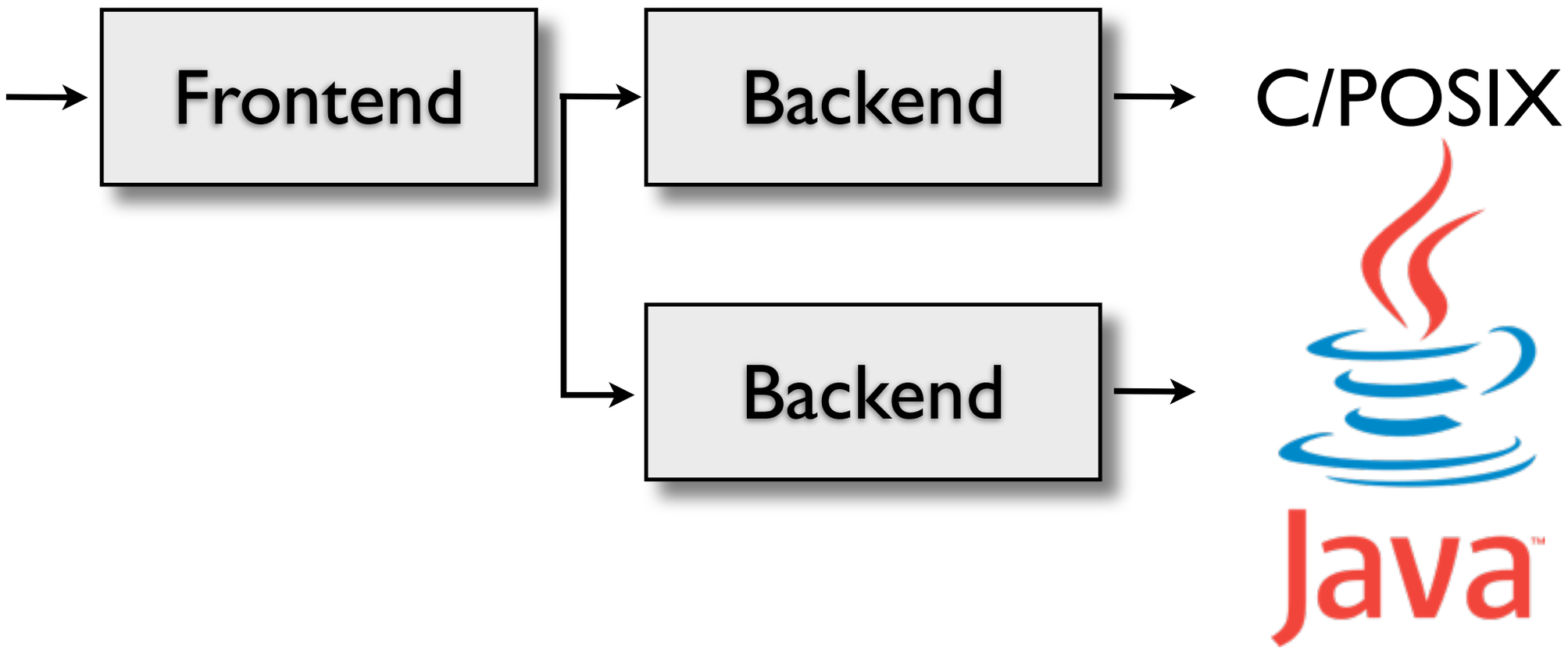
Then what?

Use aspect weaving to address portability issues in programs and libraries!

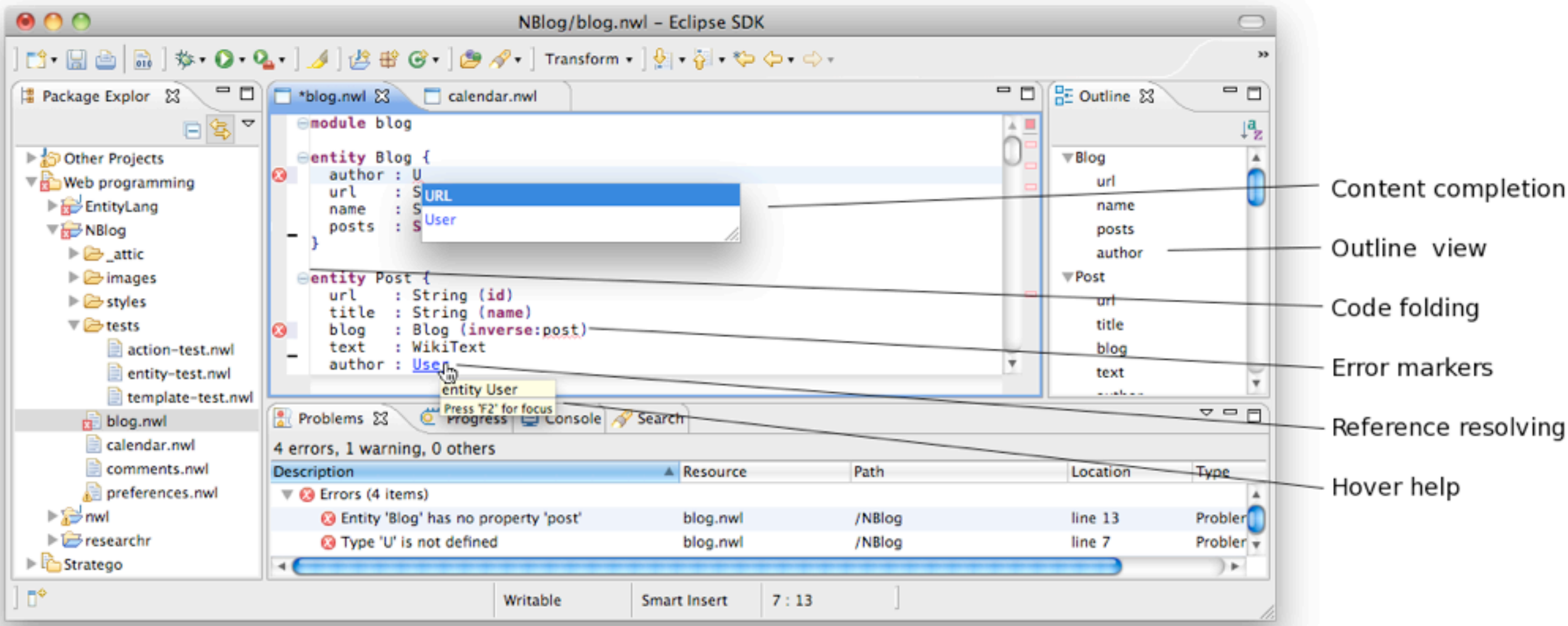
Our case study



Stratego/XT

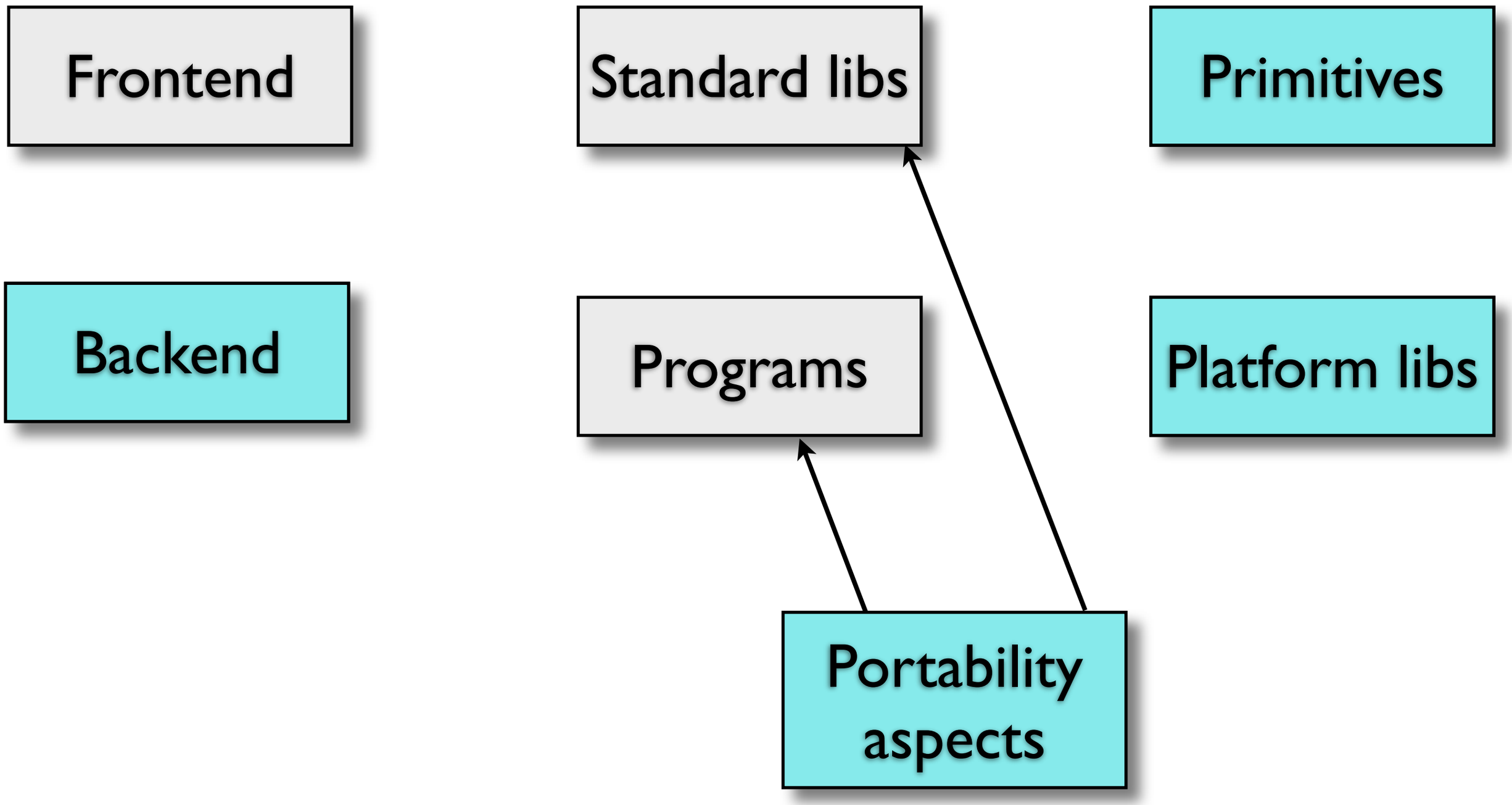


Why Java?



(spoofax.org)

Architecture



1. Glue code aspects

Override functions and library invocations

to work with platform-specific libraries

- SGLR vs. JSGLR
- ORM
- communication
- etc.

2. Migration aspects

Because we cannot solve all portability problems (right away)

- There may be no alternative for a library
- Primitives may make assumptions about the platform (e.g., POSIX vs. Java)

2. Migration aspects

Warn developers about unportable code

Perform “next best” operation

3. Integration aspects

Enhance platform integration:

- error handling (exceptions, console vs. GUI)
- logging
- hooks
- user interaction (console vs. GUI vs. web)

4. Optimization aspects

Address platform performance issues of...

...expensive operations

...common operations (bottlenecks)

by using platform-specific code

or by using code more suited for the platform

Summary

Many additional portability issues

- replacing the backend is not enough!

AOP elegantly addresses them

- four classes of portability aspects
- encapsulate platform concerns in separate libraries