

Waterfall

Compile Smalltalk (Slang) with static semantics

First some personal data

- Phd student LaFHIS <--> RMod.
- Topic -> Mate.
- Formerly related work:
 - SqueakNOS.
 - Benzo.
 - Waterfall.

High-level Dynamic Languages

- Executed by VM.
- Bytecode oriented.
- Difficult to optimize.
- Slow for some special low-level tasks.

Why?

- Message dispatch.
- Type checking.
- Object creation.
- Garbage collection.
- Code generation.

What we have?

- Compiler written in the language.
- Assembler written in the language.
- Benzo (NativeBoost).
- Lot of monomorphic dispatchs.
- Reduced quantity of different types.
- VM written in Slang.

Slang

- Subset of Smalltalk.
- Only basic types.
- Direct calls.
- Explicit memory management.
- Converted to C.

Dynamic Efficient Code Generation.

- Change Virtual Machine primitives on the fly.
- Strip plugins from VM compilation.
 - Generate them dynamically and lazily.
- Decoupling from platform specific low-level tools (c compilers, loaders, etc.)

Deliverables and references

- Code: <https://ci.inria.fr/rmod/view/Mate/job/Waterfall/>
- Waterfall paper: <http://arxiv.org/abs/1310.2741>