Plugin Architectures in Haskell

An Overview over the ecosystem

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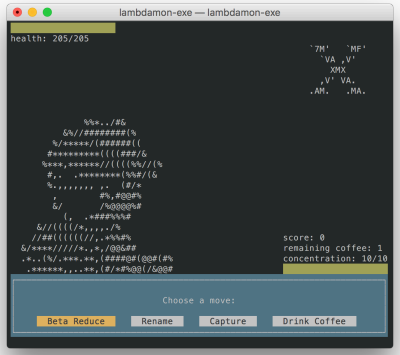
Motivation

Problem Description

$$(\lambda x.xx)(\lambda x.xx)$$

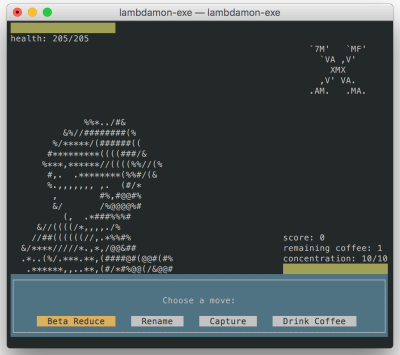
[1] [2]

Plugin Architecture Requirements



Plugin Architecture Requirements

Extensibility through third party code



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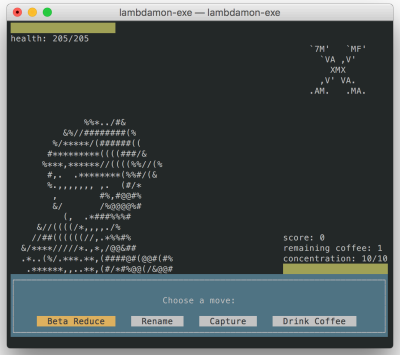

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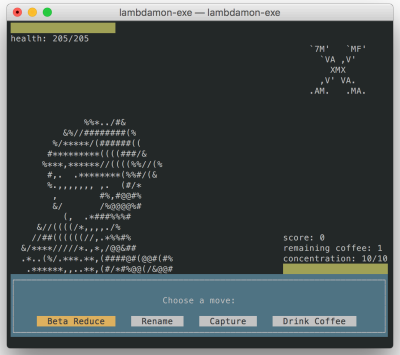
Stand-alone No compiler toolchain should be required on the client



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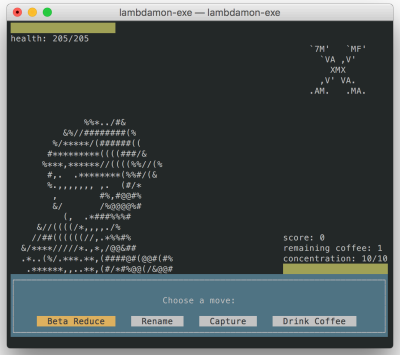

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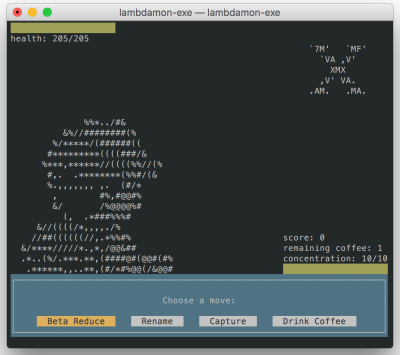
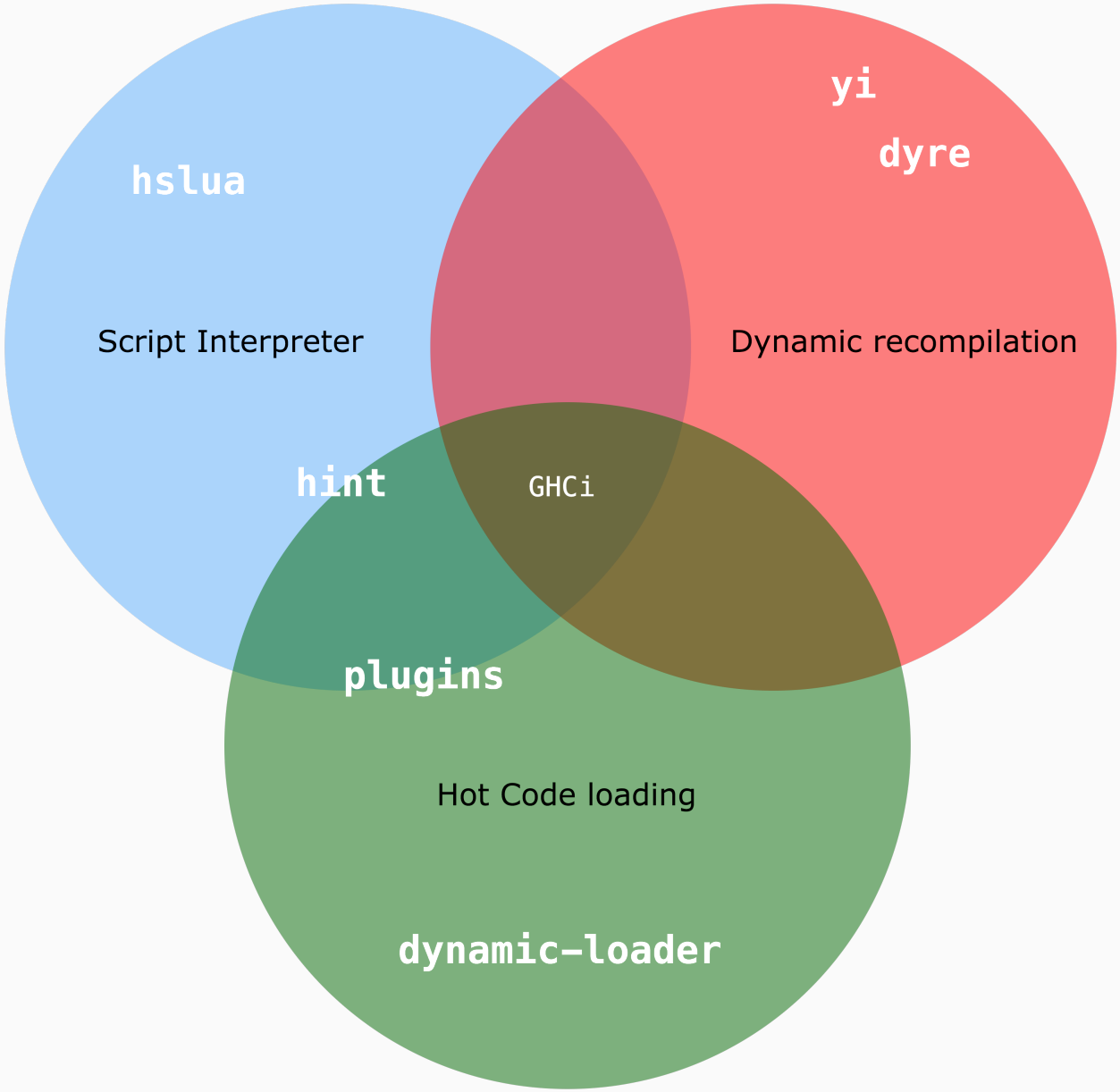
Maturity Easy integration in a `Cabal` build process



Shootout

Contenders


hslua
Script Interpreter
yi
dyre
Dynamic recompilation
hint
GHCi
plugins
Hot Code loading
dynamic-loader

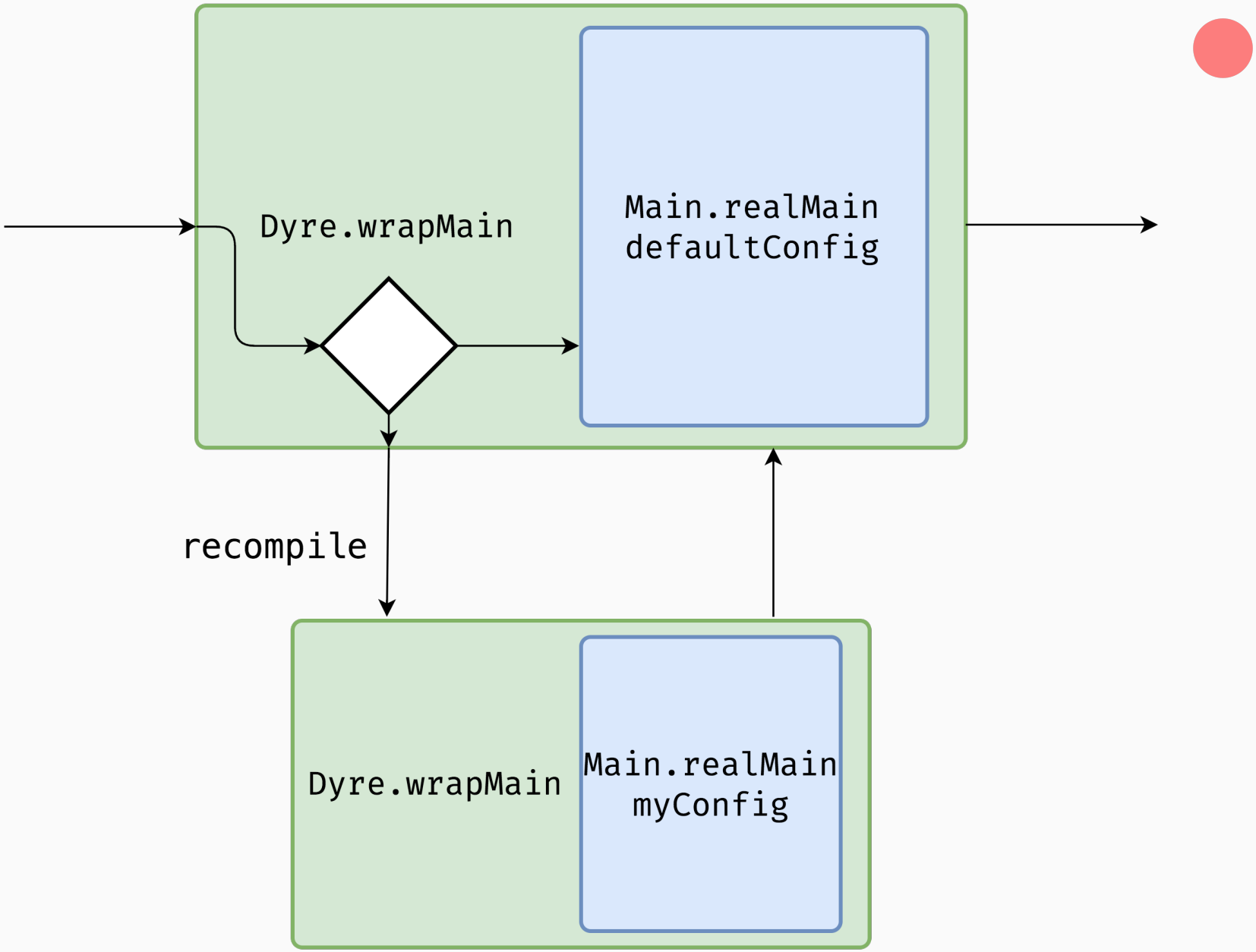
hslua

Extensibility	can't be easier for third parties, see WoW. ✓✓
Haskell	is not lua. ✗
Stand-alone	The C bits are statically linked, no further dependencies. ✓✓
Type safety	Neither in called code nor at API boundaries, also lua stack. ✗✗
Maturity	lua is battle-tested and dead simple to include, yet `hslua`'s API is rather low-level. ✓

`hint`

Extensibility	Just drop in source files, although package dependencies are resolved through GHC package registry ✓
Haskell	✓
Stand-alone	Uses the GHC API, including compilation specific settings paths ✗
Type safety	through broken `Typeable` overloads, falling back to `read`/`show` serialization. ✗
Maturity	Most-used (52 reverse deps) contender according to hackage. ✓

dyre


Dyre.wrapMain
Main.realMain
defaultConfig
recompile
Dyre.wrapMain
Main.realMain
myConfig

dyre

Extensibility	You can't have more than one config file. Merging them requires knowledge of Haskell. ✗
Haskell	✓
Stand-alone	Needs a complete compiler/stack toolchain available. ✗✗
Type safety	There are no API boundaries, it's all one program and consequently type-checked as one. ✓✓
Maturity	Rotting. Only really works with GHC, no cabal or stack. Mind-bending API. ✗

dynamic-loader

Extensibility	Just drop in object archives. ✓✓
Haskell	✓
Stand-alone	Although it depends on the GHC API, it works on a fresh installation. ✓
Type safety	Needs reproducible builds in order to work seemlessly. Installed package id needed to find objects. Type errors at API boundaries lead to crashes at runtime.✗
Maturity	Unwieldy, scarcely documented API. Handling GHC generated symbols is low-level and unresolved. 0 reverse deps. ✗

A word about `plugins`

Extensibility Just drop in object files. Package dependencies via `package.conf`s (outdated) ✓✓

Haskell ✓

Maturity Nicer API than `dynamic-loader`, but it's horribly outdated and broken. ✗✗✗

Summary

	`hslua`	`hint`	`dyre`	`dynamic-loader`	`plugins`
Extensibility	✓✓	✓	✗	✓✓	✓✓
Haskell	✗	✓	✓	✓	✓
Stand-alone	✓✓	✗	✗✗	✓	?
Type safety	✗✗	✗	✓✓	✗	?
Maturity	✓	✓	✗✗	✗	broken

Thanks! Questions?

References

- http://www.ebay.com/itm/Anime-Cosplay-Pokemon-Go-Pocket-Monster-Ash-Ketchum-232012326919. Accessed: 2016-09-09.
- https://upload.wikimedia.org/wikipedia/commons/1/17/Rogue_Screen_Shot_CAR.PNG. Accessed: 2016-09-09.

Check out the code of this talk at https://github.com/sgraf812/hal16