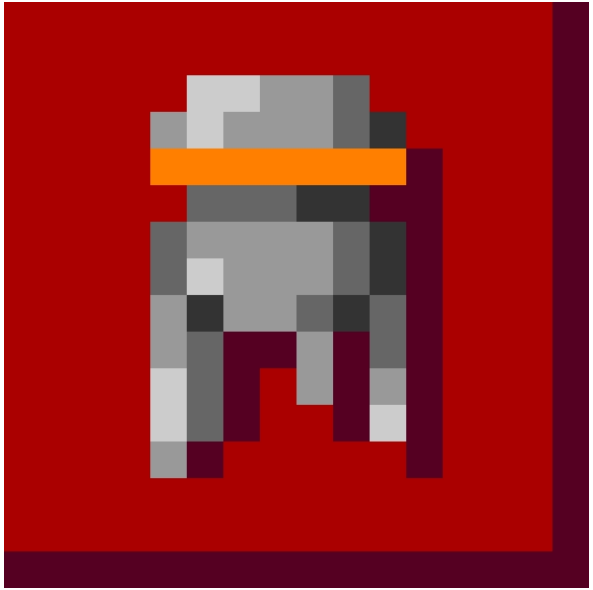
HAXE

Internship at Haxe

About me

Aurel [ow - rel]



Internship

4-year MEng degree

Required industrial placement

The Haxe Foundation is Recruiting!

We are looking for people who are passionate about programming languages.

Article by Nicolas Cannasse on 2018-01-31.

Comments

The Haxe Foundation is Recruiting!

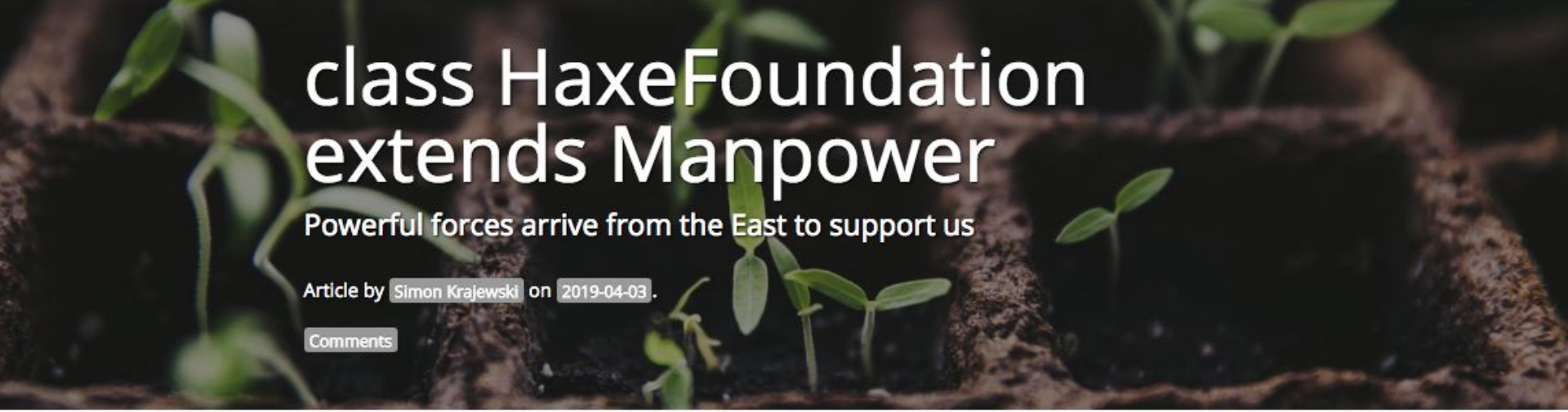
After a few years of working as a decentralized part-time team, I think that it is now a good time to start hiring some full-time people to work on Haxe. Thanks to our partners, we are able to hire for two full-time positions.

We are mostly looking for people who are passionate about programming languages and have a strong background in tech. No prior Haxe expertise is required as we can easily teach you Haxe. Of course, prior experience with Haxe would still be a plus.

Compiler Developer

can I work remotely pls?

kind regards, Aurel



class HaxeFoundation extends Manpower

The Haxe Foundation is proud to announce that Alexander Kuzmenko will be working for us full-time starting right now! Alexander has been a member of the community for many years and has already made awesome contributions, like the new PHP target and the null-safety feature. We are excited to have his support on our quest towards Haxe 4 and beyond!

Furthermore, Aurel Bily is joining us as an intern for 6 months. He will be working on various projects, for instance an asynchronous sys-API. We are looking forward to the results of his internship!

HF Internship

Topics of interest for a 6 month internship.

- Sys API : write unit tests and specification for current sys API, ensure specification is respected on all platforms
- Async Sys API : design, implement, document and test async Sys API on various platforms
- HashLink GC : look into improving performances of HashLink GC based on real world use cases (Northgard, Dead Cells)
- HashLink Profiling : allow HxScout to report both memory and cpu profiling information from HL JIT application.
- Ease the workflow to compile Hashlink to Android or iOS

Intern work

noun (also **internship**)

1 work that does not affect the productivity of the core team.

2 (also **wasted time**)work “for the benefit of the community”.

ORIGIN early 16th cent. (as an adjective in the sense ‘internal’): from French ***interne*** (adjective), ***interner*** (verb), from Latin ***internus ‘inward, internal’***. Current senses date from the 19th cent.

Manual


Haxe 4 changes, part 1 #383
Edit
Haxe 4 changes, part 2 #387
Edit
Auto-generated define / metadata tables #395
Edit
Operators #402
Edit
Strings #406
Edit
Literals and constants #410
Edit
Merged
Simn merged 4 commits into master from feature/literals-md on Jun 25
Conversation 0
Commits 4
Checks 0
Files changed 3
+107 −56

```
- \begin{lstlisting}
- var myButton = new MySpecialButton();
- \end{lstlisting}
- We will explore type inference in det
 variable \expr{myButton} in the above
-
- The Haxe type system knows seven type
-
- \begin{description}
-  \item[\emph{Class instance}:] an obj
-  \item[\emph{Enum instance}:] a value
-  \item[\emph{Structure}:] an anonymou
-  \item[\emph{Function}:] a compound t
-  \item[\emph{Dynamic}:] a wildcard ty
-  \item[\emph{Abstract}:] a compile-ti
-  \item[\emph{Monomorph}:] an unknown
- \end{description}
```

```
+ ```haxe
+ var myButton = new MySpecialButton(); // Haxe
+ ```
+ We will explore type inference in detail later in [Type Inference](type-system-type-inference).
 that the variable `myButton` in the above code is known to be an **instance of class** `MySpecial
+
+ The Haxe type system knows seven type groups:
+
+  * **Class instance**: an object of a given class or interface
+ * **Enum instance**: a value of a Haxe enumeration
+ * **Structure**: an anonymous structure, i.e. a collection of named fields
+ * **Function**: a compound type of several arguments and one return
+ * **Dynamic**: a wildcard type which is compatible with any type
+ * **Abstract**: a compile-time type which is represented by a different type at runtime
+ * **Monomorph**: an unknown type which may later become a different type
+
+ We will describe each of these type groups and how they relate to each other in the next chapter
```

LaTeXorcism #409

Edit

Merged Aurel300 merged 16 commits into `master` from `feature/markdown` on Jun 24

Conversation 0 | Commits 16 | Checks 0 | Files changed 518 | +9,262 −20,748

Reformat std #8408

Merged Simn merged 28 commits into `HaxeFoundation:development` f

Conversation 30 Commits 28 Checks 35

Stdlib and Compiler

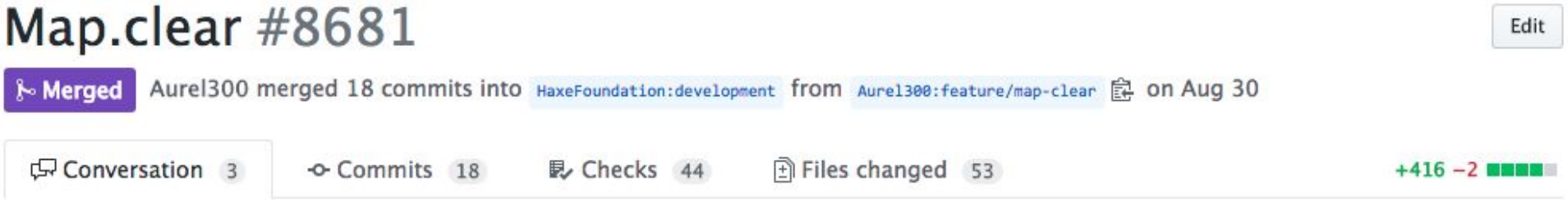
Improvements

Map.clear()

→ Haxe 4.0

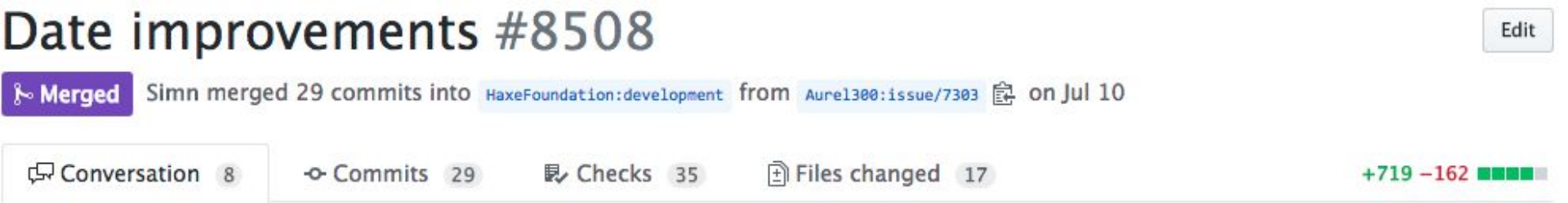
```
var map = new Map<String, Int>();
// add keys...
map = []; // clear keys

final map = new Map<String, Int>();
// add keys...
map = []; // error!
```



UTC-based Date methods → Haxe 4.0

```
date.getUTCHours();
date.getUTCMinutes();
date.getUTCSeconds();
date.getUTCFullYear();
date.getUTCMonth();
date.getUTCDate();
date.getUTCDay();
date.getTimezoneOffset();
```



```
- type strict_defined =
-       | AbsolutePath
-       | AdvancedTelemetry
-       | AnnotateSource
-       (* | Analyzer *)
-       | As3
-       | CheckXmlProxy
-       | CoreApi
-       | CoreApiSerialize
-       | Cppia
-       | NoCppiaAst
-       | Dce
-       | DceDebug
-       | Debug
-       | DisableUnicodeStrings
- let infos = function
-       | AbsolutePath -> "absolute_path",("Print absolute file path
-       | AdvancedTelemetry -> "advanced-telemetry",("Allow the SWF t
-       | AnnotateSource -> "annotate_source",("Add additional commen
-       (* | Analyzer -> "analyzer",("Use static analyzer for optimiz
-       | As3 -> "as3",("Defined when outputting flash9 as3 source co
-       | CheckXmlProxy -> "check_xml_proxy",("Check the used fields
-       | CoreApi -> "core_api",("Defined in the core api context",[]
```

```
+ [
+       {
+               "name": "AbsolutePath",
+               "define": "absolute_path",
+               "doc": "Print absolute file path in trace output"
+       },
+       {
+               "name": "AdvancedTelemetry",
+               "define": "advanced-telemetry",
+               "doc": "Allow the SWF to be measured with Monocle tool",
+               "platforms": ["flash"]
+       },
+       {
+               "name": "AnnotateSource",
+               "define": "annotate_source",
+               "doc": "Add additional comments to generated source code",
+               "platforms": ["cpp"]
+       },
+       {
```

Auto-generate defines and metas from JSON files #8195

Edit

Merged Simn merged 19 commits into `HaxeFoundation:development` from `Aurel300:feature/autogen-define-meta` on May 23

```
0 example . haxe --server-listen 1234 &
[1] 1014
0 example . haxe --main Main.hx --js out.js --connect 1234
0 example .
```

`hxb` file format

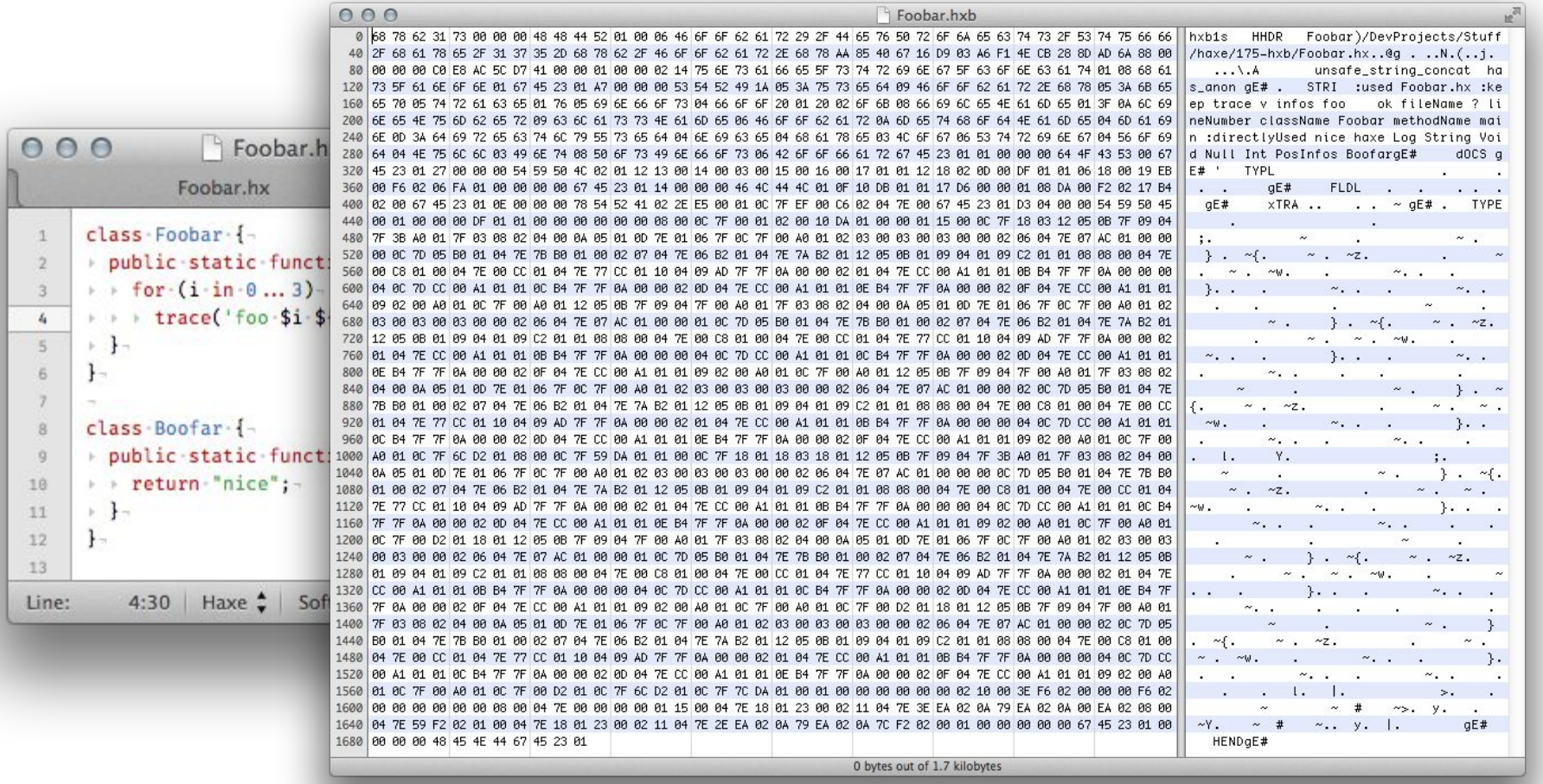
A `hxb` file has the following structure:

- : `"hxb1"` (magic bytes and version)
- Header : header chunk
- Chunk... : data chunks:
  - StringPool
  - DocPool
  - TypeList
  - FieldList
  - TypeDeclarations
  - ModuleExtra
- End : end chunk

A `hxb` file corresponds to exactly one Haxe module (`module_def` in `type.ml`).

Chunk

The general structure of a chunk is based on PNG chunks. See PNG Chunks and PNG Structure - Chunk naming


Foobar.h
Foobar.hx
1 class Foobar {
2 public static funct
3 for (i in 0 ... 3)
4 trace('foo $i $
5 }
6 }
7
8 class Boofar {
9 public static funct
10 return "nice";
11 }
12 }
13
Line: 4:30 | Haxe
Foobar.hxb
0 bytes out of 1.7 kilobytes

hxb → Haxe 4.1 ?

Binary format for serialising modules, AST, and typed AST

Specification:

github.com/Aurel300/hxb

WIP compiler branch:

github.com/HaxeFoundation/haxe/tree/hxb

asys

asynchronous system APIs

Current system APIs

No asynchrony (have to create threads manually)

Lacking file system functionality (e.g. chmod)

Hard-to-use TCP/UDP sockets

Hard-to-use processes

No IPC sockets

Solutions?

How to design the API?

How to implement it consistently across many different sys targets?

How to represent asynchrony?


node
JS
®

fs.rename(oldPath, newPath, callback) [src]

▸ History

- `oldPath` `<string>` | `<Buffer>` | `<URL>`
- `newPath` `<string>` | `<Buffer>` | `<URL>`
- `callback` `<Function>`
    - `err` `<Error>`

Asynchronously rename file at `oldPath` to the pathname provided as `newPath`. In the case that `newPath` already exists, it will be overwritten. If there is a directory at `newPath`, an error will be raised instead. No arguments other than a possible exception are given to the completion callback.

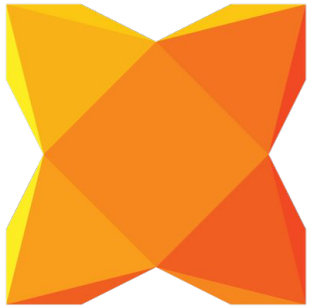
See also: `rename(2)`.

```
fs.rename('oldFile.txt', 'newFile.txt', (err) => {
  if (err) throw err;
```

libuv

int **uv_fs_rename**(uv_loop_t* *loop*, uv_fs_t* *req*, const char* *path*, const char* *new_path*, uv_fs_cb *cb*)

Equivalent to rename(2).



HAXE

eval

```
static function rename(oldPath:FilePath, newPath:FilePath):Void;
```

```
let rename = vfun2 (fun oldPath newPath →
  let oldPath = decode_string oldPath in
  let newPath = decode_string newPath in
  wrap_sync (Uv.fs_rename_sync (loop ()) oldPath newPath);
  vnull
)
```

```
external fs_rename : t_loop → string → string → unit_cb → unit uv_result = "w_fs_rename"
```

```
FS_WRAP2(rename, String_val, String_val, handle_fs_cb);
```

```
#define FS_WRAP(name, sign, locals, precall, call, handler) \
  CAMLprim value w_fs_ ## name(value loop, sign, value cb) { \
    CAMLparam2(loop, cb); \
    locals; \
    UV_ALLOC_REQ(req, uv_fs_t, cb); \
    precall \
    UV_ERROR_CHECK_C(uv_fs_ ## name(Loop_val(loop), Fs_val(req), call, handler), UV_FREE_REQ(Fs_val(req))); \
    UV_SUCCESS_UNIT; \
  } \
  CAMLprim value w_fs_ ## name ## _sync(value loop, sign) { \
    CAMLparam1(loop); \
    locals; \
    UV_ALLOC_CHECK(req, uv_fs_t); \
    precall \
    UV_ERROR_CHECK_C(uv_fs_ ## name(Loop_val(loop), Fs_val(req), call, NULL), free(Fs_val(req))); \
    UV_ERROR_CHECK_C(Fs_val(req)→result, { uv_fs_req_cleanup(Fs_val(req)); free(Fs_val(req)); }); \
    CAMLlocal1(ret); \
    ret = handler ## _sync(Fs_val(req)); \
    uv_fs_req_cleanup(Fs_val(req)); \
    free(Fs_val(req)); \
    UV_SUCCESS(ret); \
  }
```

And similarly on HL and Neko

demo

Asynchronous file reading

demo

Asynchronous DNS and IP address manipulation

demo

TCP echo server

demo

Process communication with ffmpeg

demo

UDP video stream

asys

File system operations

TCP/UDP/IPC sockets

DNS

Processes

Message passing (including open sockets) across Haxe processes

soon™

asys*

→ Haxe 4.1 ?

Haxe API: feedback welcome! (PR #8832)

Targets mostly finished™:

HashLink	(#306)
Eval	(#8831)
Neko	(#201)

* better name?

Side project

ammer

$250 - Common HL/HXCPP native C API binding format #2

Closed larsiusprime opened this issue on Oct 3, 2018 · 29 comments

larsiusprime commented on Oct 3, 2018 • edited Owner

Introductory Information:

Hashlink is basically the successor Neko in terms of Haxe VM targets, with the added advantage of having both a compiled-C and a bytecode target.

HXCPP is the traditional workhorse of Haxe native C++ targets.

Hashlink promises some advantages to workflow -- particularly faster compilation speed during development, but it's still relatively new and most of the C/C++ bindings for existing libraries for Haxe native targets are still written for HXCPP, and HXCPP is a solid well-maintained target that will surely see continued use alongside HashLink. This puts native extension library maintainers in a dilemma, do we support HXCPP or Hashlink, or both? Right now supporting both means maintaining two parallel sets of bindings, which is not only double the work, but also fertile ground for subtle duplication/oops-I-forgot-to-update-the-other-one errors.

This bounty is for developing a *common format* for writing native extensions to C API's for Haxe, that is compatible with both HXCPP and HashLink.

This is a separate issue from *automatically* generating native extensions with minimal effort from, say, raw C files. It's okay for the sake of this bounty if the accepted solution requires a bit of manual labor in writing the bindings themselves, so long as each binding doesn't have to be written *twice*, once for HXCPP and once for HashLink.

```
//--------------PIPES--------------------------------

CAMLprim value w_pipe_init(value loop, value ipc) {
  CAMLparam2(loop, ipc);
  UV_ALLOC_CHECK(handle, uv_pipe_t);
  UV_ERROR_CHECK_C(uv_pipe_init(Loop_val(loop), Pipe_v
  if ((UV_HANDLE_DATA(Pipe_val(handle)) = alloc_data()
    UV_ERROR(0);
  UV_SUCCESS(handle);
}

CAMLprim value w_pipe_open(value pipe, value fd) {
  CAMLparam2(pipe, fd);
  UV_ERROR_CHECK(uv_pipe_open(Pipe_val(pipe), Int_val(
  UV_SUCCESS_UNIT;
}

CAMLprim value w_pipe_accept(value loop, value server)
  CAMLparam2(loop, server);
  UV_ALLOC_CHECK(client, uv_pipe_t);
  UV_ERROR_CHECK_C(uv_pipe_init(Loop_val(loop), Pipe_v
  if ((UV_HANDLE_DATA(Pipe_val(client)) = alloc_data()
    UV_ERROR(0);
  UV_ERROR_CHECK_C(uv_accept(Stream_val(server), Strea
  UV_SUCCESS(client);
}

CAMLprim value w_pipe_bind_ipc(value handle, value pat
  CAMLparam2(handle, path);
  UV_ERROR_CHECK(uv_pipe_bind(Pipe_val(handle), String
  UV_SUCCESS_UNIT;
}

CAMLprim value w_pipe_connect_ipc(value handle, value
  CAMLparam3(handle, path, cb);
  UV_ALLOC_REQ(req, uv_connect_t, cb);
```

Eval

```
//--------------PIPES--------------------------------

static value w_pipe_init(value loop, value ipc) {
  UV_ALLOC_CHECK(handle, uv_pipe_t);
  UV_ERROR_CHECK_C(uv_pipe_init(Loop_val(loop), Pipe_va
  UV_HANDLE_DATA(Pipe_val(handle)) = alloc_data();
  if (UV_HANDLE_DATA(Pipe_val(handle)) == NULL)
    UV_ERROR(0);
  return handle;
}
DEFINE_PRIM(w_pipe_init, 2);

static value w_pipe_open(value pipe, value fd) {
  UV_ERROR_CHECK(uv_pipe_open(Pipe_val(pipe), val_int(f
  return val_null;
}
DEFINE_PRIM(w_pipe_open, 2);

static value w_pipe_accept(value loop, value server) {
  UV_ALLOC_CHECK(client, uv_pipe_t);
  UV_ERROR_CHECK_C(uv_pipe_init(Loop_val(loop), Pipe_va
  UV_HANDLE_DATA(Pipe_val(client)) = alloc_data();
  if (UV_HANDLE_DATA(Pipe_val(client)) == NULL)
    UV_ERROR(0);
  UV_ERROR_CHECK_C(uv_accept(Stream_val(server), Stream
  return client;
}
DEFINE_PRIM(w_pipe_accept, 2);

static value w_pipe_bind_ipc(value handle, value path)
  UV_ERROR_CHECK(uv_pipe_bind(Pipe_val(handle), val_str
  return val_null;
}
DEFINE_PRIM(w_pipe_bind_ipc, 2);

static value w_pipe_connect_ipc(value handle, value pat
```

Neko

```
//--------------PIPES--------------------------------

HL_PRIM uv_pipe_t **HL_NAME(w_pipe_init)(uv_loop_t **lo
  UV_ALLOC_CHECK(handle, uv_pipe_t);
  UV_ERROR_CHECK_C(uv_pipe_init(Loop_val(loop), Pipe_va
  if ((UV_HANDLE_DATA(Pipe_val(handle)) = alloc_data())
    UV_ERROR(0);
  return handle;
}
DEFINE_PRIM(_PIPE, w_pipe_init, _LOOP _BOOL);

HL_PRIM void HL_NAME(w_pipe_open)(uv_pipe_t **pipe, int
  UV_ERROR_CHECK(uv_pipe_open(Pipe_val(pipe), fd));
}
DEFINE_PRIM(_VOID, w_pipe_open, _PIPE _I32);

HL_PRIM uv_pipe_t **HL_NAME(w_pipe_accept)(uv_loop_t **
  UV_ALLOC_CHECK(client, uv_pipe_t);
  UV_ERROR_CHECK_C(uv_pipe_init(Loop_val(loop), Pipe_va
  if ((UV_HANDLE_DATA(Pipe_val(client)) = alloc_data())
    UV_ERROR(0);
  UV_ERROR_CHECK_C(uv_accept(Stream_val(server), Stream
  return client;
}
DEFINE_PRIM(_PIPE, w_pipe_accept, _LOOP _PIPE);

HL_PRIM void HL_NAME(w_pipe_bind_ipc)(uv_pipe_t **handl
  UV_ERROR_CHECK(uv_pipe_bind(Pipe_val(handle), path));
}
DEFINE_PRIM(_VOID, w_pipe_bind_ipc, _PIPE _BYTES);

HL_PRIM void HL_NAME(w_pipe_connect_ipc)(uv_pipe_t **ha
  UV_ALLOC_REQ(req, uv_connect_t, cb);
  uv_pipe_connect(Connect_val(req), Pipe_val(handle), p
}
DEFINE_PRIM(_VOID, w_pipe_connect_ipc, _PIPE _BYTES _CB
```

HashLink

Eval

```
function new(ipc:Bool);
function open(fd:Int):Void;
function connectIpc(path:String, cb:Callback<NoData>):Void;
function bindIpc(path:String):Void;
function accept():Pipe;
function writeHandle(data:Bytes, handle:eval.uv.Stream, cb:Callback<NoData>):V
function pendingCount():Int;
function acceptPending():PipeAccept;
function getSockName():SocketAddress;
function getPeerName():SocketAddress;
function asStream():Stream;
```

Neko

```
static var w_pipe_init:(Loop, Bool)→Dynamic = neko.Lib.load("uv", "w_pipe_ini
static var w_pipe_open:(Dynamic, Int)→Void = neko.Lib.load("uv", "w_pipe_open
static var w_pipe_accept:(Loop, Dynamic)→Dynamic = neko.Lib.load("uv", "w_pip
static var w_pipe_bind_ipc:(Dynamic, neko.NativeString)→Void = neko.Lib.load(
static var w_pipe_connect_ipc:(Dynamic, neko.NativeString, Dynamic→Void)→Voi
static var w_pipe_pending_count:(Dynamic)→Int = neko.Lib.load("uv", "w_pipe_p
static var w_pipe_accept_pending:(Loop, Dynamic)→Dynamic = neko.Lib.load("uv"
static var w_pipe_getsockname:(Dynamic)→neko.NativeString = neko.Lib.load("uv
static var w_pipe_getpeername:(Dynamic)→neko.NativeString = neko.Lib.load("uv
static var w_pipe_write_handle:(Dynamic, neko.NativeString, Stream, Dynamic→V
static var w_pipe_stream:(Dynamic)→Stream = neko.Lib.load("uv", "w_pipe_strea
```

HashLink

```
@:hlNative("uv", "w_pipe_init") static function w_pipe_init(_:Loop, _:Bool):Na
@:hlNative("uv", "w_pipe_open") static function w_pipe_open(_:Native, _:Int):V
@:hlNative("uv", "w_pipe_accept") static function w_pipe_accept(_:Loop, _:Nati
@:hlNative("uv", "w_pipe_bind_ipc") static function w_pipe_bind_ipc(_:Native,
@:hlNative("uv", "w_pipe_connect_ipc") static function w_pipe_connect_ipc(_:Na
@:hlNative("uv", "w_pipe_pending_count") static function w_pipe_pending_count(
@:hlNative("uv", "w_pipe_accept_pending") static function w_pipe_accept_pendin
@:hlNative("uv", "w_pipe_getsockname") static function w_pipe_getsockname(_:Na
@:hlNative("uv", "w_pipe_getpeername") static function w_pipe_getpeername(_:Na
@:hlNative("uv", "w_pipe_write_handle") static function w_pipe_write_handle(_:
@:hlNative("uv", "w_pipe_stream") static function w_pipe_stream(_:Native):Stre
```

Eval

```
function new(ipc:Bool);
function open(fd:Int):Void;
function connectIpc(path:String, cb:Callback<NoData>):Void;
function bindIpc(path:String):Void;
function accept():Pipe;
function writeHandle(data:Bytes, handle:eval.uv.Stream, cb:Callback<NoData>):V
function pendingCount():Int;
function acceptPending():PipeAccept;
function getSockName():SocketAddress;
function getPeerName():SocketAddress;
function asStream():Stream;
```

Neko

```
static var w_pipe_init:(Loop, Bool)→Dynamic = neko.Lib.load("uv", "w_pipe_ini
static var w_pipe_open:(Dynamic, Int)→Void = neko.Lib.load("uv", "w_pipe_open
static var w_pipe_accept:(Loop, Dynamic)→Dynamic = neko.Lib.load("uv", "w_pip
static var w_pipe_bind_ipc:(Dynamic, neko.NativeString)→Void = neko.Lib.load(
static var w_pipe_connect_ipc:(Dynamic, neko.NativeString, Dynamic→Void)→Voi
static var w_pipe_pending_count:(Dynamic)→Int = neko.Lib.load("uv", "w_pipe_p
static var w_pipe_accept_pending:(Loop, Dynamic)→Dynamic = neko.Lib.load("uv"
static var w_pipe_getsockname:(Dynamic)→neko.NativeString = neko.Lib.load("uv
static var w_pipe_getpeername:(Dynamic)→neko.NativeString = neko.Lib.load("uv
static var w_pipe_write_handle:(Dynamic, neko.NativeString, Stream, Dynamic→V
static var w_pipe_stream:(Dynamic)→Stream = neko.Lib.load("uv", "w_pipe_strea
```

HashLink

```
@:hlNative("uv", "w_pipe_init") static function w_pipe_init(_:Loop, _:Bool):Na
@:hlNative("uv", "w_pipe_open") static function w_pipe_open(_:Native, _:Int):V
@:hlNative("uv", "w_pipe_accept") static function w_pipe_accept(_:Loop, _:Nati
@:hlNative("uv", "w_pipe_bind_ipc") static function w_pipe_bind_ipc(_:Native,
@:hlNative("uv", "w_pipe_connect_ipc") static function w_pipe_connect_ipc(_:Na
@:hlNative("uv", "w_pipe_pending_count") static function w_pipe_pending_count(
@:hlNative("uv", "w_pipe_accept_pending") static function w_pipe_accept_pendin
@:hlNative("uv", "w_pipe_getsockname") static function w_pipe_getsockname(_:Na
@:hlNative("uv", "w_pipe_getpeername") static function w_pipe_getpeername(_:Na
@:hlNative("uv", "w_pipe_write_handle") static function w_pipe_write_handle(_:
@:hlNative("uv", "w_pipe_stream") static function w_pipe_stream(_:Native):Stre
```

ammer

```
class Foobar extends ammer.Library<"foobar"> {
  public static function repeat(word:String, count:Int):String;
}
```

```
class Main {
  public static function main():Void {
    trace(Foobar.repeat("hello", 3));
  }
}
```

```
--library ammer
-D ammer.lib.foobar.include=include
-D ammer.lib.foobar.library=lib
--main Main
--hl out.hl
```

ammer

Under the hood:

- Types mapped to target-native analogues
- Functions accessed via automatically generated FFI
- A Makefile is generated that handles native compilation (hdll, ndll)

ammer

API features:

- Functions
- Header defines
- Opaque types (abstract pointers)

More planned, of course, e.g.:

- Callbacks
- Structs

ammer

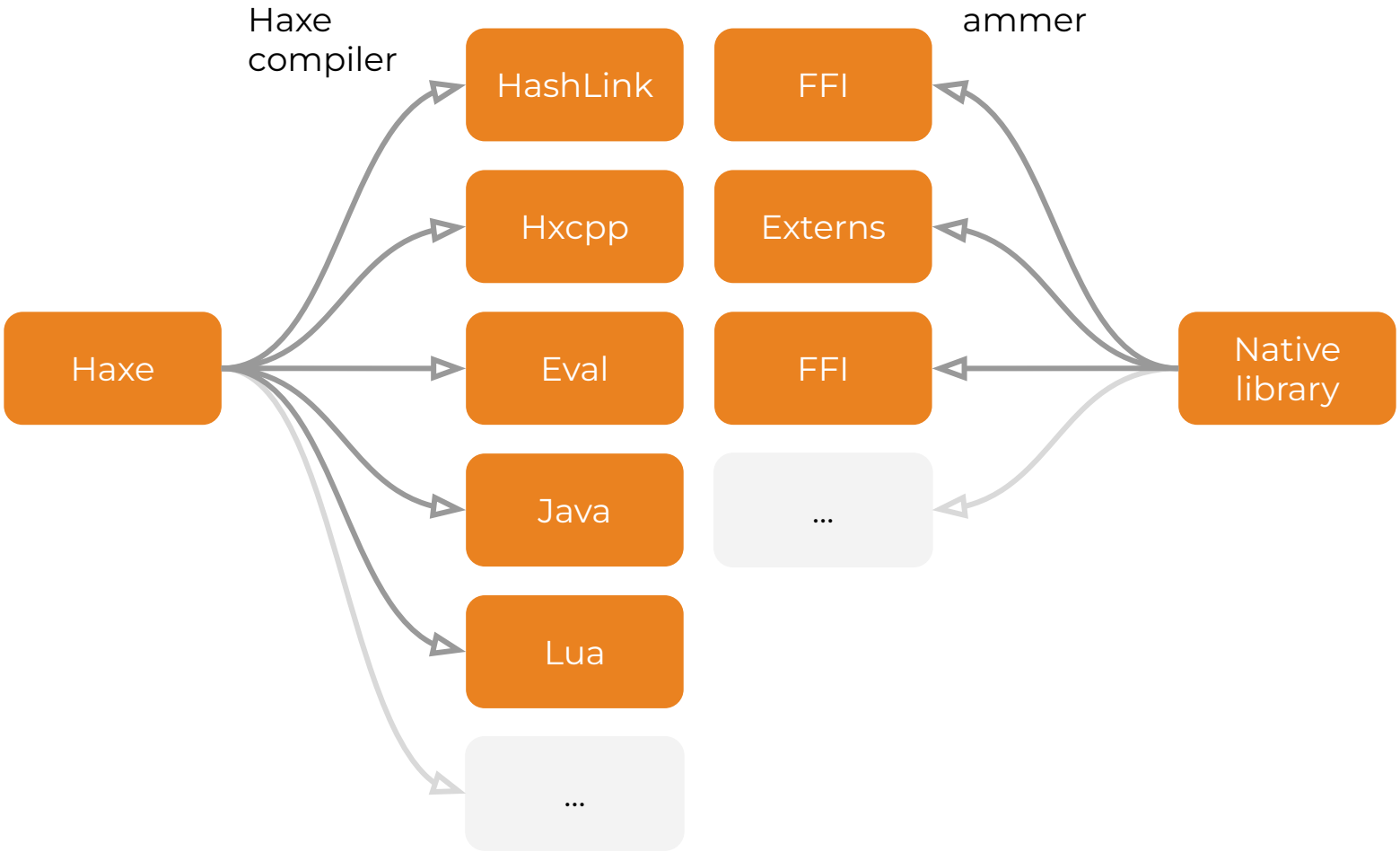
Targets supported:

- Eval *
- HashLink
- Hxcpp

Targets planned:

- All sys targets!

github.com/Aurel300/ammer


Haxe compiler
ammer
HashLink
Hxcpp
Eval
Java
Lua
...
FFI
Externs
FFI
...
Haxe
Native library

demo

ammer in action!

Lua!

SDL?

Libuv?

OpenAL?

Dear-imgui?

Future work

HashLink GC

Thank you.