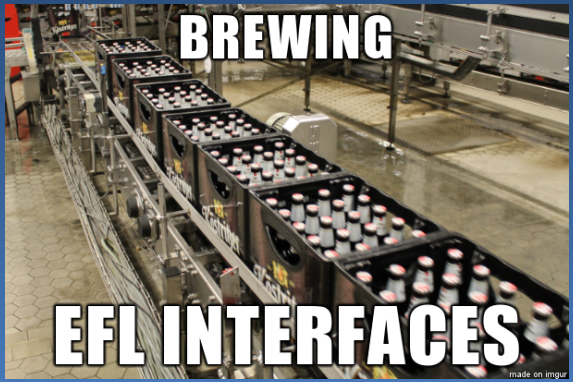
Review of Eolian, Eo, Bindings, Interfaces and What's to Come



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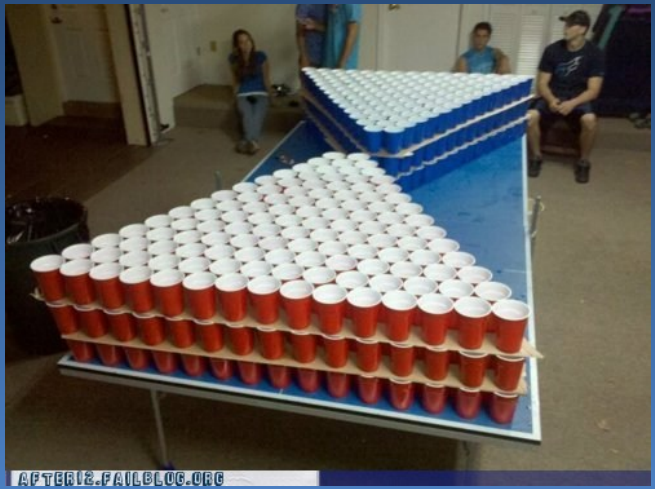
What is Eo?



Existing solutions?

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- GObjecct

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- libobjc

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- libobjc
- systemd

Why roll our own?

How we did it?

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- A lot of prototyping $\rightarrow$ Eo1

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- A lot of complaints and hate-mail $\rightarrow$ Eo2

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- Got annoyed with writing boiler-plate $\rightarrow$ Eolian

How we did it?

- A lot of prototyping → Eo1
- A lot of complaints and hate-mail → Eo2
- Got annoyed with writing boiler-plate → Eolian
- Eolian didn't cover everything we needed → Eolian (current iteration)

Unifying the EFL API (AKA EFL Interfaces)

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Before:

```
evas_object_image_file_set(obj, "blah.png", "key");
edje_object_file_set(obj, "blah.edj", "group");

evas_object_del(obj);
ecore_timer_del(obj);
ecore_animator_del(obj);
```

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evas_object_image_file_set(obj, "blah.png", "key");
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evas_object_del(obj);
ecore_timer_del(obj);
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```

After:

```
eo_do(obj, efl_file_set("blah.file", "key"));

eo_del(obj);
```

Object lifetime

Object lifetime

- `eo_add()` has a C friendly refcount handling

Object lifetime

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- `eo_add()` $\leftrightarrow$ `eo_del()`

Object lifetime

- `eo_add()` has a C friendly refcount handling
- `eo_add()` $\leftrightarrow$ `eo_del()`
- `eo_ref()` $\leftrightarrow$ `eo_unref()`

Safety features

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For example:

```
ERR<32099>:eo eo_ptr_indirection.x:287 ↩
    _eo_obj_pointer_get() obj_id 0x13371337 is not ↩
    pointing to a valid object. Maybe it has already been ↩
    freed.
ERR<32124>:eo eo_private.h:283 _eo_unref() Object ↩
    0xDEADBEEF already deleted.
```

Class types

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- Normal class

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- Normal class
- Non instantiate-able class

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- Non instantiate-able class
- Interface

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- Non instantiate-able class
- Interface
- Mixin

Using Eo

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- `eo_do(obj, efl_file_set("file.eet", "key"));`

Using Eo

- `eo_do(obj, efl_file_set("file.eet", "key"));`
- `if (eo_do(obj, elm_widget_enabled_get()))`

Using Eo

- `eo_do(obj, efl_file_set("file.eet", "key"));`
- `if (eo_do(obj, elm_widget_enabled_get()))`
- `eo_do(obj, visible = elm_widget_visibility_get(), ↩ elm_widget_visibility_set(!visible));`

Using Eo

- `eo_do(obj, efl_file_set("file.eet", "key"));`
- `if (eo_do(obj, elm_widget_enabled_get()))`
- `eo_do(obj, visible = elm_widget_visibility_get(), ↩ elm_widget_visibility_set(!visible));`
- `eo_do(obj, elm_widget_visibility_set(!elm_widget_visibility_get()));`

Using Eo

- `eo_do(obj, efl_file_set("file.eet", "key"));`
- `if (eo_do(obj, elm_widget_enabled_get()))`
- `eo_do(obj, visible = elm_widget_visibility_get(), ↩`
  `elm_widget_visibility_set(!visible));`
- `eo_do(obj, elm_widget_visibility_set(!elm_widget_visibility_get()));`
- ```
  static void _size_multiply(double f)
  {
      int w, h;
      evas_object_geometry_get(NULL, NULL, &w, &h);
      evas_object_geometry_set(NULL, NULL, w * f, h * f);
  }
  eo_do(obj, _size_multiply(3.5));
  ```
  ```

The Eolian library

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- Eolian allows for automated binding generators

But writing objects in C is tedious!

- The answer: Eolian
- Eolian parses Eo API declarations
- Eolian allows for automated binding generators
- Eolian is meant to be familar for everyone

A new format?

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A new format?

- Language independent $\rightarrow$ easy bindings
- Familiar syntax $\rightarrow$ easy to pick up
- Easy to read and write
- Declarative and descriptive

```
class Namespace.Class (inherits) {
    methods { ... }
    properties { ... }
    events { ... }
    implements { ... }
    constructors { ... }
}

type Type_Name: Type_Def;
struct Struct_Name { ... }
enum Enum_Name { ... }
```

```
methods {
    method_name @class @protected {
        params {
            @in int x;
            @out const(char) *y;
        }
        return: own(char*);
    }
}
```

```
properties {
    property_name {
        keys {
            list<int> *x;
        }
        values {
            int v;
        }
        get {}
        set {}
    }
}
```

Generators!

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- Further generators in core EFL: C++ and Lua

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- Initial generator: C
- Further generators in core EFL: C++ and Lua
- Third party generators: Python, efforts being put into Rust, OCaml
- Future generators include JavaScript and others

The Eolian library

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- C API: simple and easy to use
- Minimum of non-standard data types $\rightarrow$ easy to bind
- Not only for generators (IDEs...)
- Simple database

However…

However...

- Some things still missing

However...

- Some things still missing
- Documentation?

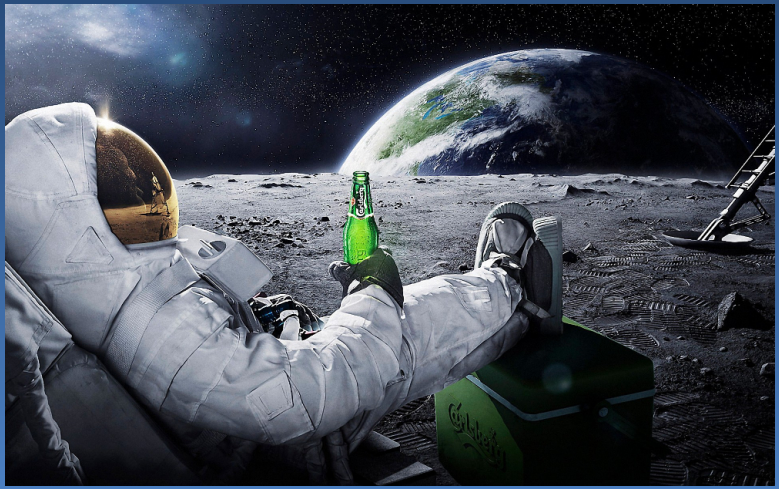
However...

- Some things still missing
- Documentation?
- Value ownership

However...

- Some things still missing
- Documentation?
- Value ownership
- And possibly others

Lua review



The Lua generator

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- Third generator (after C and C++) $\rightarrow$ Lua
- Built around our Elua application runtime
- Itself a Lua application
- Helped the Eolian C library go forward

The FFI

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- LuaJIT C FFI $\rightarrow$ simple bindings

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- Simple bindings $\rightarrow$ easy debugging

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- Also, no compiled modules

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- LuaJIT C FFI $\rightarrow$ simple bindings
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- Also, no compiled modules
- Also, simple generation

The infrastructure

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The infrastructure

- Handwritten Eo bindings
- No object wrappers, FFI metatypes instead
- Builtin method dispatch via metatables
- Eo inheritance and reference management
- No wrappers $\rightarrow$ fast, simple, no tracking

```
local util = require("util")
... more utils follow ...

local M, __lib = ...

local __class, __body

-- init func registers the class with __body
cutil.init_module(init_func, shutdown_func)

ffi.cdef [[ C API definitions in C syntax ]]

__body = { ... wrapper funcs over C API funcs ... }

M.My_Class = function(parent, ...)
    ... construct the instance and return it, like C ↩
        would ...
end
```

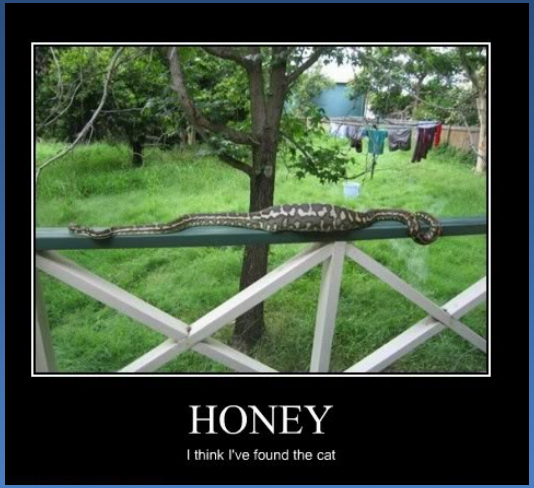
```
local elm = require("elm")

local win = elm.Window(nil, "mywin", elm.win_type.BASIC)
win.autodel = false
win.size = { 500, 500 }

win:connect("delete,request", function() ... event ... ↩
    end)
win:resize_object_add(obj)

...
```

Python



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The Python bindings

- Native Python classes and inheritance
- Native Python properties
- Native Python modules
- Everything feels native

How to use?

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- Native Python...

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- Native Python...
- Properties

```
from elementary import Win
win = Win(parent, "win name", Win.ELM_WIN_BASIC)
win.size = (600, 600)
win.visibility = True
```

How to use?

- Native Python...
- Properties

```
from elementary import Win
win = Win(parent, "win name", Win.ELM_WIN_BASIC)
win.size = (600, 600)
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- Methods

```
win.resize_object_add(obj)
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```

- Methods

```
win.resize_object_add(obj)
```

- Callbacks

```
obj.connect("mouse,down", some_callable)
```

But what about the current bindings?

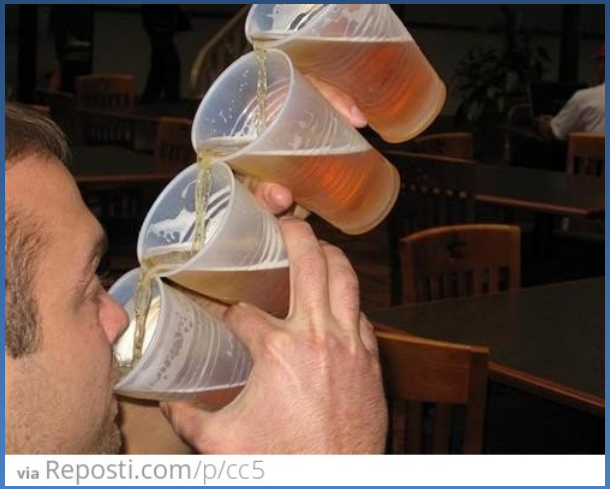
But what about the current bindings?

- Incompatible. :(

But what about the current bindings?

- Incompatible. :(
- Kai wants to write a compatibility layer

DEMOS



What's next?

More bindings!

Making bindings embeddable

Use Eolian to do more

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- Clouseau - not yet

Use Eolian to do more

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- Ideas?

EFL interfaces

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  - Common interfaces for highly redundant functions

EFL interfaces

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- Improve existing API
  - Common interfaces for highly redundant functions
  - Correct classification by inheritance

Documentation

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- Support Eolian features

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- Editable online? Comments like php.net?

Questions?

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Resources Attributions

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