Reinventing the Enlightenment Object System

stosb.com/talks

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Unify Code

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- Many different object systems $\rightarrow$ one

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- Many different event/callback implementations $\rightarrow$ one

Unify Code

- Many different object systems $\rightarrow$ one
- Many different event/callback implementations $\rightarrow$ one
- Make objects compatible

Reducing our API

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We have:

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

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```

Bindings Generation

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- Be able to automatically generate for most popular languages

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- Be able to automatically generate for most popular languages
- Correctly handle ref counting, buffer ownership and etc.

Not Hurt Performance

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- Not easily measurable – many changes in EFL

Other Languages

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Other Languages

- C++ – our developers hate it
- Objective C – quite ugly and not really common in OSS world
  - We considered using just the runtime

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- Has a “C feel”

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GObject

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- Has a "C feel"

Bad:

- Doesn't offer a stable ABI
- Funny, full of casting syntax
- "G tech" dependencies
- Didn't exactly fit our needs

systemd-objectd

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Good:

- Exposes a dbus API

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- Exposes a dbus API
- Clean isolated daemon

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Bad:

- Linux only

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- API/ABI stable
- Portable

Using Eo

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- `eo_do(obj, visible = elm_widget_visibility_get(), ↩`
  `elm_widget_visibility_set(!visible));`

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- `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));
```

`eo_do()` – How It's Done (simplified)

eo_do() – How It's Done (simplified)

```
#define eo_do(eoid, clsid, ...)                    \
({                                                 \
    const Eo *_eoid_ EO_DO_CLEANUP = eoid;         \
    _eo_do_start(_eoid_, clsid);                   \
    __VA_ARGS__;                                   \
})
```

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```
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```
#define EO_FUNC_BODY(Name, Ret, DefRet)                \
Ret Name(void)                                         \
{                                                      \
    static Eo_Op op = EO_NOOP;                         \
    if (op == EO_NOOP)                                 \
        op = _eo_api_op_id_get((void*) Name);          \
    if (!_eo_call_resolve(#Name, op, &call))           \
        return DefRet;                                 \
    _Eo_##Name##_func _func_ =                         \
        (_Eo_##Name##_func) call.func;                 \
    return _func_(call.obj, call.data);                \
}
```

Defining New Classes (simplified)

Populating a struct with some metadata

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```
static Eo_Op_Description _edje_object_op_desc[] = {
    EO_OP_FUNC(edje_obj_update_hints_set, ↩
        _edje_object_update_hints_set),
    EO_OP_FUNC_OVERRIDE(eo_constructor, ↩
        _edje_object_eo_base_constructor),
    EO_OP_CLASS_FUNC(eo_event_global_thaw, ↩
        _eo_base_event_global_thaw),
    EO_OP_CLASS_OVERRIDE_FUNC(eo_event_global_thaw, ↩
        _edje_object_eo_base_event_global_thaw)
};
```

Event Identifiers

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```
EOAPI const Eo_Event_Description ↩
    _EO_BASE_EVENT_CALLBACK_ADD = ↩
    EO_EVENT_DESCRIPTION("callback,add");
```

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- How we do constructors (setting properties, no constructors)
- Named ref-counting
- Composite objects
- Default return values

Wash, Rinse, Repeat

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- Eo1

Wash, Rinse, Repeat

- Eo1
- Eo2

Wash, Rinse, Repeat

- Eo1
- Eo2
- Eolian

Wash, Rinse, Repeat

- Eo1
- Eo2
- Eolian
- Eolian (improved)

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- We caught a lot of errors that were not noticed before
- Single point of access for type checking makes it impossible to forget

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Now:

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

eo_del(obj);
```

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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 → easy bindings
- Familiar syntax → 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 {}
    }
}
```

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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

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- Not only for generators (IDEs...)

The Eolian library

- 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. . .

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- Some things still missing

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- Documentation?

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- Value ownership

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- Generic

However...

- Some things still missing
- Documentation?
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And yet...

- Very useful
- Generic
- I'd like to get it adopted by others (non EFL)

Clouseau

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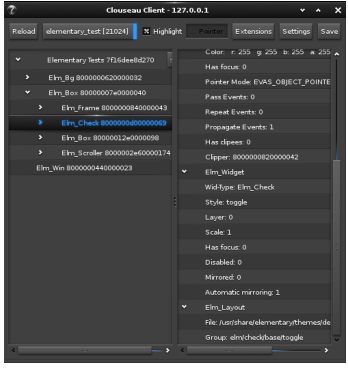
- Application state inspector for the EFL



Clouseau

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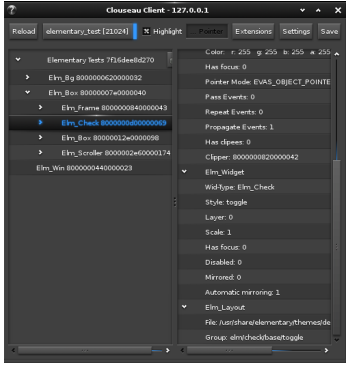

Clouseau

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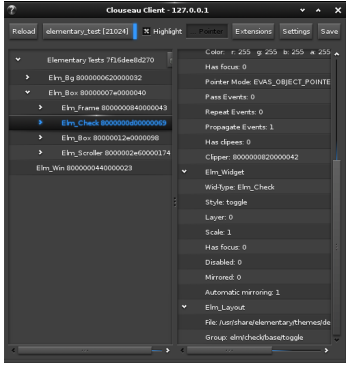
- Will get even better with Eolian



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  - Supports widgets that it has no notion of
- Has it's own format that is processed by language specific code generators

Questions?

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- Nothing