Cake: a tool for adaptation of object code

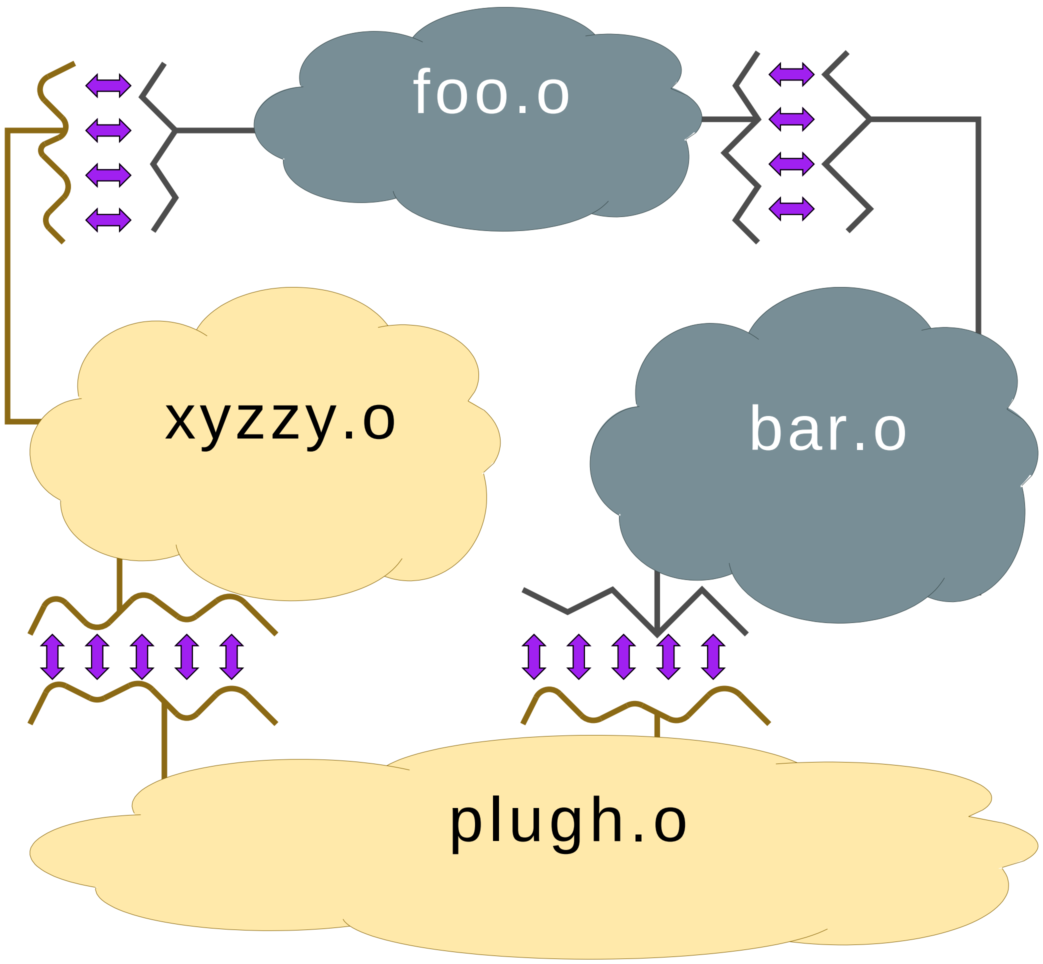
Stephen Kell

Stephen.Kell@cl.cam.ac.uk

Computer Laboratory

UNIVERSITY OF CAMBRIDGE

Starting point: Cake’s big picture



- new programming languages → mismatch
- decentralised development → mismatch
- unanticipated composition → mismatch

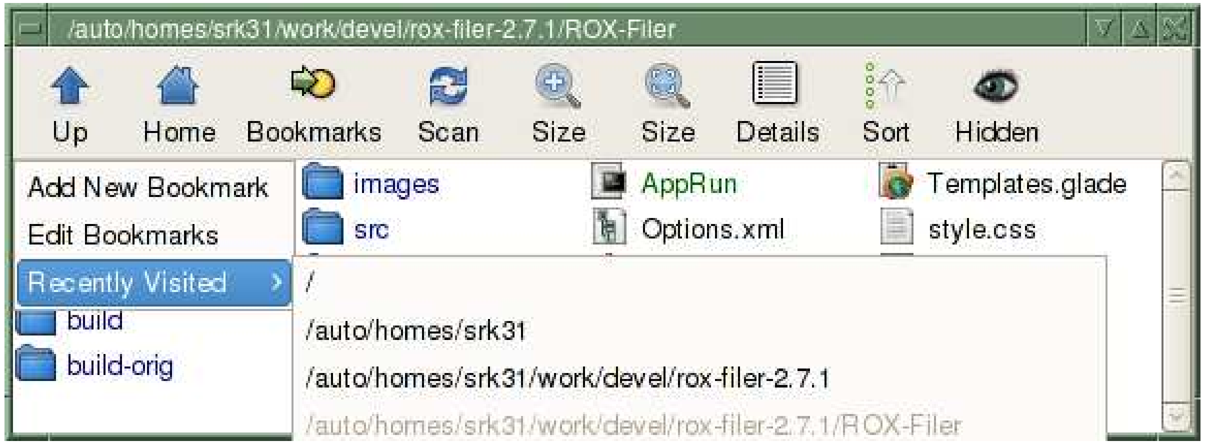
Cake in one slide

Cake is

- a language expressing *compositions* of software
- a productive tool for overcoming *mismatch*
- operating on *binaries*
- a *black-box* approach
- designed around practical experience
- ongoing work

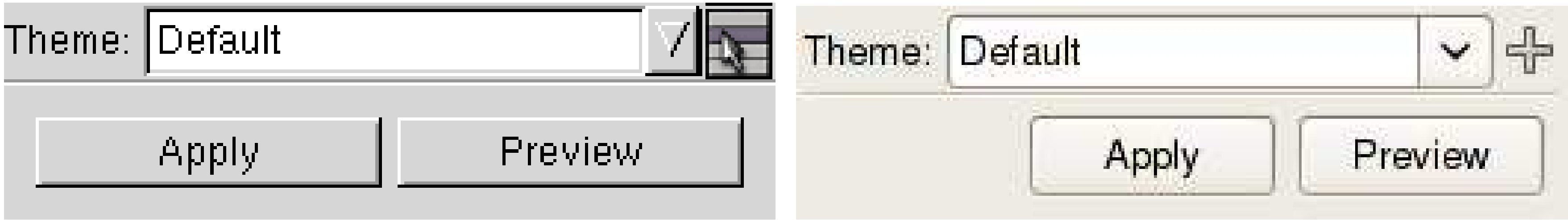
Wanted: a tool for helping with tasks like. . .

Unanticipated composition: port feature P from app X to Y



Case study: Konqueror + ROX-Filer

Evolution: link client version 1 against library version 2


Theme: Default

Theme: Default

Case study: gtk-theme-switch

A taste of the Cake language

Two mismatched structures…

```
struct _GtkWindow {
  GtkBin bin; gchar * title ; // ...
  GtkWindowType type;
  guint window_has_focus:1;
};
```

```
struct _GtkWindow {
  GtkBin bin; gchar * title ; // ...
  gchar *wm_role;
  guint type :4; /* GtkWindowType */
  guint has_focus :1;
};
```

A taste of the Cake language

Two mismatched structures…

```
struct _GtkWindow {
  GtkBin bin; gchar * title ; // ...
  GtkWindowType type;
  guint window_has_focus:1;
};
```

```
struct _GtkWindow {
  GtkBin bin; gchar * title ; // ...
  gchar *wm_role;
  guint type :4; /* GtkWindowType */
  guint has_focus :1;
};
```

```
switch12 ↔ libgtk20 {
  values GtkWindow ↔ GtkWindow {
```

A taste of the Cake language

Two mismatched structures…

```
struct _GtkWindow {
  GtkBin bin; gchar * title ; // ...
  GtkWindowType type;
  guint window_has_focus:1;
};
```

```
struct _GtkWindow {
  GtkBin bin; gchar * title ; // ...
  gchar *wm_role;
  guint type :4; /* GtkWindowType */
  guint has_focus :1;
};
```

```
switch12 ↔ libgtk20 {
  values GtkWindow ↔ GtkWindow {
    void → .wm_role;
```

A taste of the Cake language

Two mismatched structures. . .

```
struct _GtkWindow {
  GtkBin bin; gchar ∗ title ; // ...
  GtkWindowType type;
  guint window_has_focus:1;
};
```

```
struct _GtkWindow {
  GtkBin bin; gchar ∗ title ; // ...
  gchar ∗wm_role;
  guint type :4; /∗ GtkWindowType ∗/
  guint has_focus :1;
};
```

```
switch12 ↔ libgtk20 {
  values GtkWindow ↔ GtkWindow {
    void → .wm_role;
    .type as .GtkWindowType <−−> .type as .GtkWindowType;
```

A taste of the Cake language

Two mismatched structures…

```
struct _GtkWindow {
  GtkBin bin; gchar ∗ title ; // ...
  GtkWindowType type;
  guint window_has_focus:1;
};
```

```
struct _GtkWindow {
  GtkBin bin; gchar ∗ title ; // ...
  gchar ∗wm_role;
  guint type :4; /∗ GtkWindowType ∗/
  guint has_focus :1;
};
```

```
switch12 ↔ libgtk20 {
  values GtkWindow ↔ GtkWindow {
    void → .wm_role;
    .type as .GtkWindowType <−−> .type as .GtkWindowType;
    .window_has_focus ↔ . has_focus ;
  }
}
```

Status and questions

Status:

- case-studies: done, hand-written glue code
  - Gtk+ glue generation is partly automated
- compiler: current work
  - . . .
- runtime library: most developed piece
  - used in the Gtk+ case study

Thanks for your attention. Any questions?