Enlightenment Foundation Libraries
An UI Toolkit Designed for the Embedded World

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Enlightenment Foundation Libraries

• Who am I?
• What is this “Enlightenment Foundation Libraries”?
• Where are they used?
• Where it is going?
• Questions?
Who am I?

- Cedric Bail <c.bail@partner.samsung.com>
- Working on embedded technology since 2004 (mobile, set top box, ...)
- Working on Enlightenment technology since 2007
- Working for Samsung since 2011
- Gained some experience along the way on:
  - Optimization (CPU, memory, battery)
  - Rendering pipeline
What is this “Enlightenment Foundation Libraries”?

- Toolkit created for Enlightenment 17
Enlightenment 17?

- Enlightenment project started in 1997
- Windows Manager
- First Windows Manager of GNOME
- Full rewrite started in 2001
- Main believe was that their will never be: "a year of the Linux desktop"
- Enlightenment is first trying to serve its developers base

- Needed a toolkit that scale from the embedded to high end desktop
- Needed a stack that will serve multiple application on embedded device
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- GUI toolkit targeting embedded device
- Licensed under a mix of LGPL and BSD license
- Optimized to reduce CPU, GPU, memory and battery usage
- Support international language requirement (LTR/RTL, UTF8)
- Support all variation of screen and input device (scale factor)
- Full themability (layout of the application included)
- Profile support
- Could be made to fit in 8MB with a minimal set of dependencies included
- Modular design
Eet:

- Something very specific to EFL
- Fast serialisation library for file storage and network communication
- Store image, sounds, font
- Reduced overhead to load the same data across multiple application
- Provide tools to convert from and to a human readable form
- Configuration and theme are done with that library
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Evas:

- The brain of EFL
- Scene graph library with more than 10 years of optimization in it
- Glytch free rendering
- Reduce overdrawing
- Reduce waste of memory by deduplicating as much as possible
- Compressed glyph rendering
- Portable (SDL, X11, Wayland, FB, DRM, Windows, Mac OS X, ...)
- Optimized software renderer (MMX, SSE*, Neon)
- Optimized use of GPU (optional)
  - Support partial update if driver do
  - Reduce context and texture switch as much as possible
  - Reduce memory overhead
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Edje:

- The heart of EFL
- Theme and layout engine
- Descriptive language
- Use Evas for rendering logic (fully independent from the system)
- Doesn't require a FPU
- Optimized load time (time to first frame) and run time
- Reduced memory fragmentation
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Buttons

- Icon sized to button
- Icon no scale
- Disabled Button
- Label Only

Anchor style
- Icon sized to button
- Icon no scale
Elementary:

- Widgets toolkit
- Use Edje and Evas infrastructure
- Screen and input independence achieved by:
  - Scale factor
  - Finger size
- Profile support (define configuration on a per Window basis)
- Fully themable
- Support touchscreen
Many other useful components:

- **Eina**: C data types library and various system helper
- **Ecore**: main loop, events, network and threads infrastructure
- **Eio**: asynchronous Input/Output
- **Embryo**: scripting language for Edje
- **Eeze**: hot plug and device detection
- **Eldbus**: dbus integration library
- **Efreet**: Freedesktop library
- **Eo**: safe, fast and light object infrastructure
- **Eolian**: compilation time introspection infrastructure
And there is more component:

- Emotion: video support
- Ephysics: apply physics force on Evas object
- Ethumb: thumbnailing library
- C++11 bindings (beta)
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Many other users not from Samsung:
- Fridge
- Printer
- Medical device
- Set top box
- Home automation
- Navigation system
- ...
Where is EFL heading:

- Faster, lighter, better
- Add more object and property to Evas canvas (3D world, Effect, …)
- Vector graphics
- Improve portability (Windows, Mac OS X)
- More bindings and always up to date (C++, Lua, Python)
- Better support for MMU less system
- Improve speed of software renderer
- Improve speed of GPU renderer
- Improve quality by improving our tests and automatic build system
- Better documentations
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Where is Enlightenment heading:

- Remove dependency on X11 by being a KMS/DRM Wayland Compositor
- Different from Qt logic that provide a library to do your own compositor, Enlightenment will be the base to put your module in for your specific needs
- Improve support for HiDPI
- Better modularity
- Support for more profile (Tiling, mobile, ...)

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Short list:

- Fast release cycle every 3 months (work upstream until you get close
to release date and switch to a stable release)
- Used in Tizen
- Always going to support system with no GPU and limited ressource
- Keep benchmarking EFL, to make sure that next release is at least as
  fast as current one, if not better
- Every part that benefit everyone are under LGPL
- Backend are under MIT
- World wide community
Clouseau: widgets property debugging
GUI’s editor

Adding Widgets to Box
Eflete : Elementary Theme editor
WE ARE HIRING!

Twitter: @SamsungOSG
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Questions ?
Thank you.