
# Enlightenment Foundation Libraries

## An UI Toolkit Designed for the Embedded World

**Cedric BAIL – Senior Open Source Developer**

**Samsung Research America (Silicon Valley)**

**cedric@osg.samsung.com**

# Enlightenment Foundation Libraries

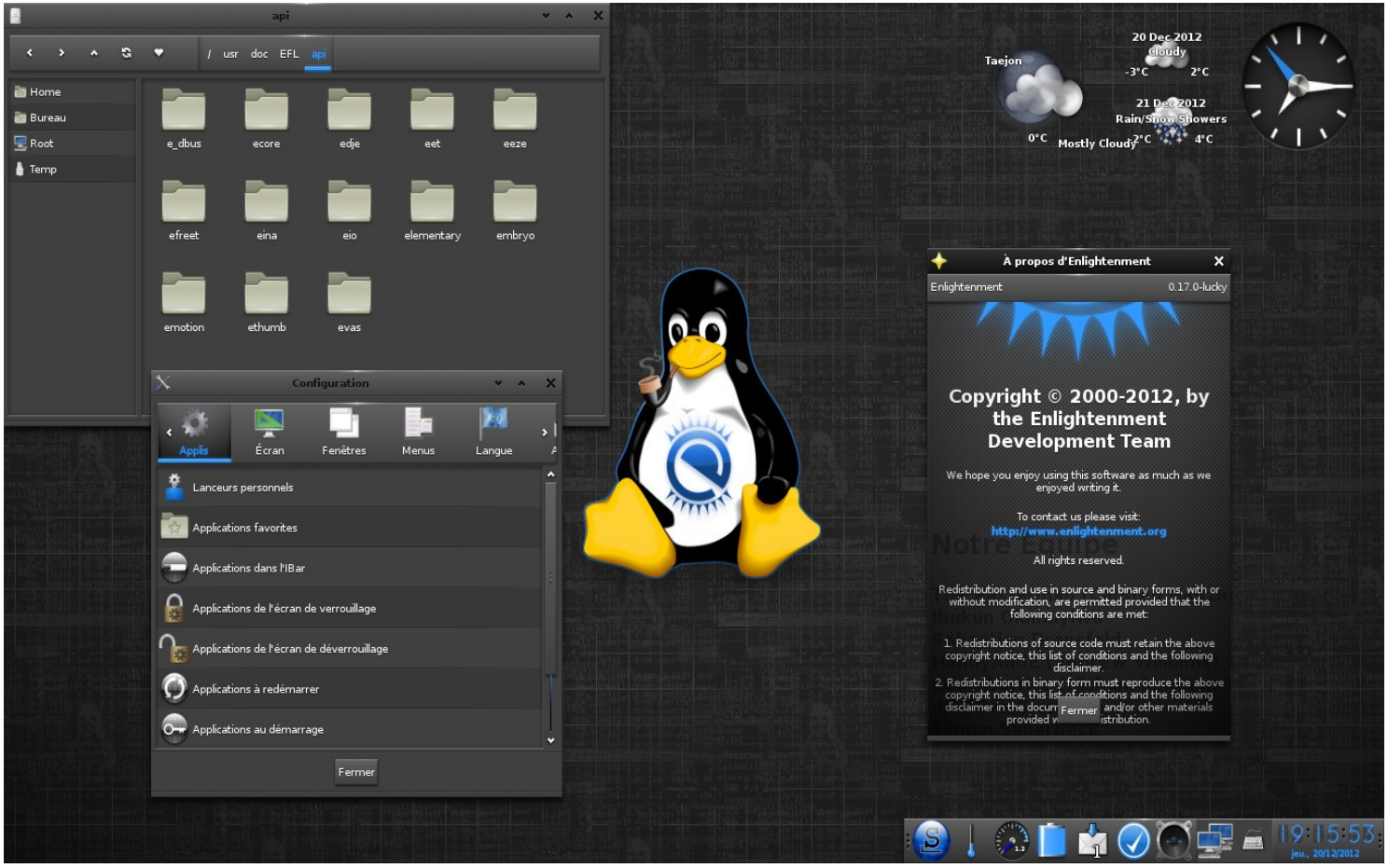
- Who am I ?
- What is this “Enlightenment Foundation Libraries” ?
- Where are they used ?
- Where it is going ?
- Questions ?

# Enlightenment Foundation Libraries

- 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

# Enlightenment Foundation Libraries

- What is this “Enlightenment Foundation Libraries” ?
  - Toolkit created for Enlightenment 17



# Enlightenment Foundation Libraries

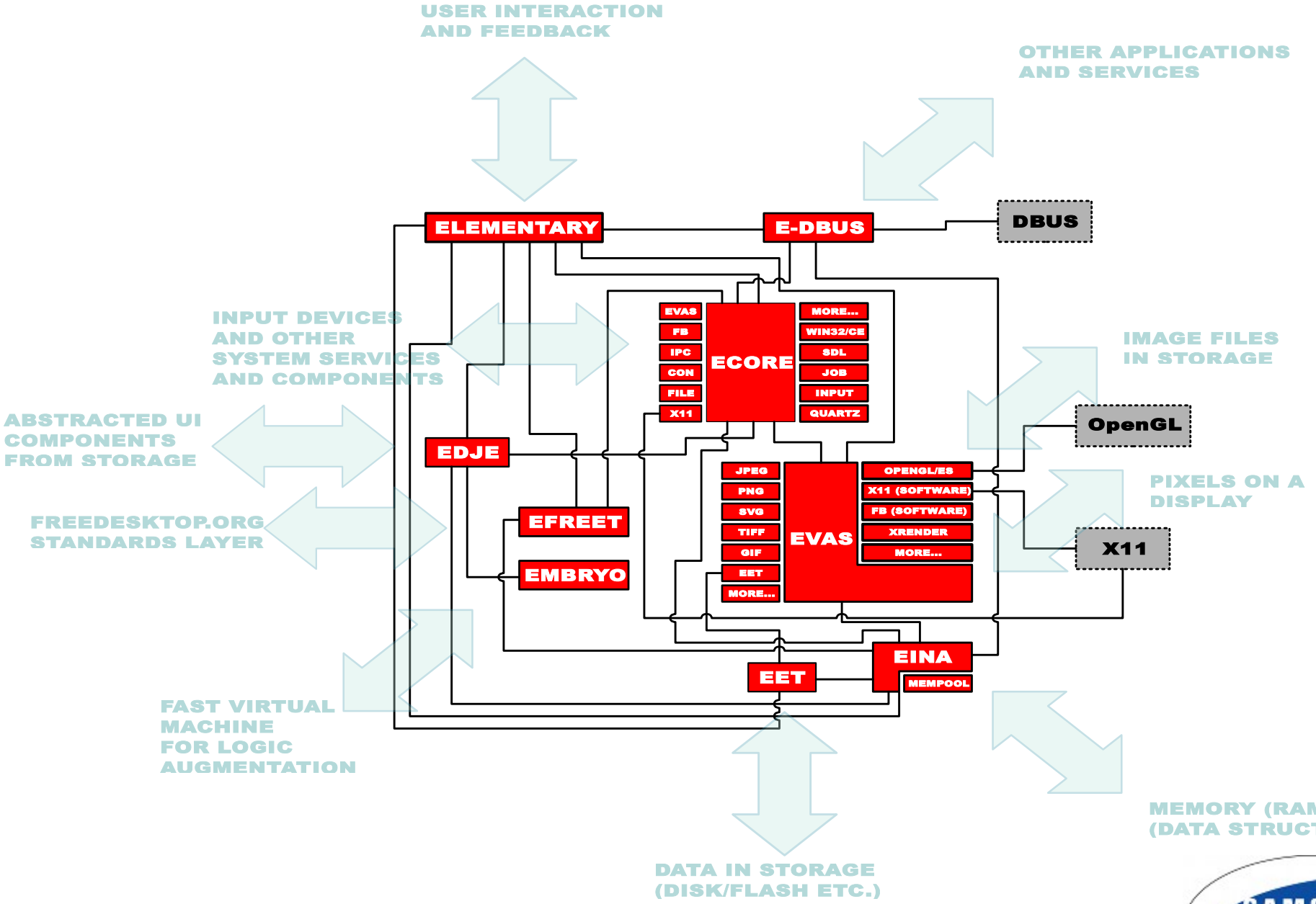
- Enlightenment 17 ?
  - Enlightenment project started in 1997
  - Windows Manager
  - First Windows Manager of GNOME
  - Full rewrite started in 2001
  - Main believe was that their will never be :
    *“a year of the Linux desktop”*
  - Enlightenment is first trying to serve its developers base

  - Needed a toolkit that scale from the embedded to high end desktop
  - Needed a stack that will serve multiple application on embedded device

# Enlightenment Foundation Libraries

- Enlightenment Foundation Libraries ?
  - GUI toolkit targetting 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

# Enlightenment Foundation Libraries



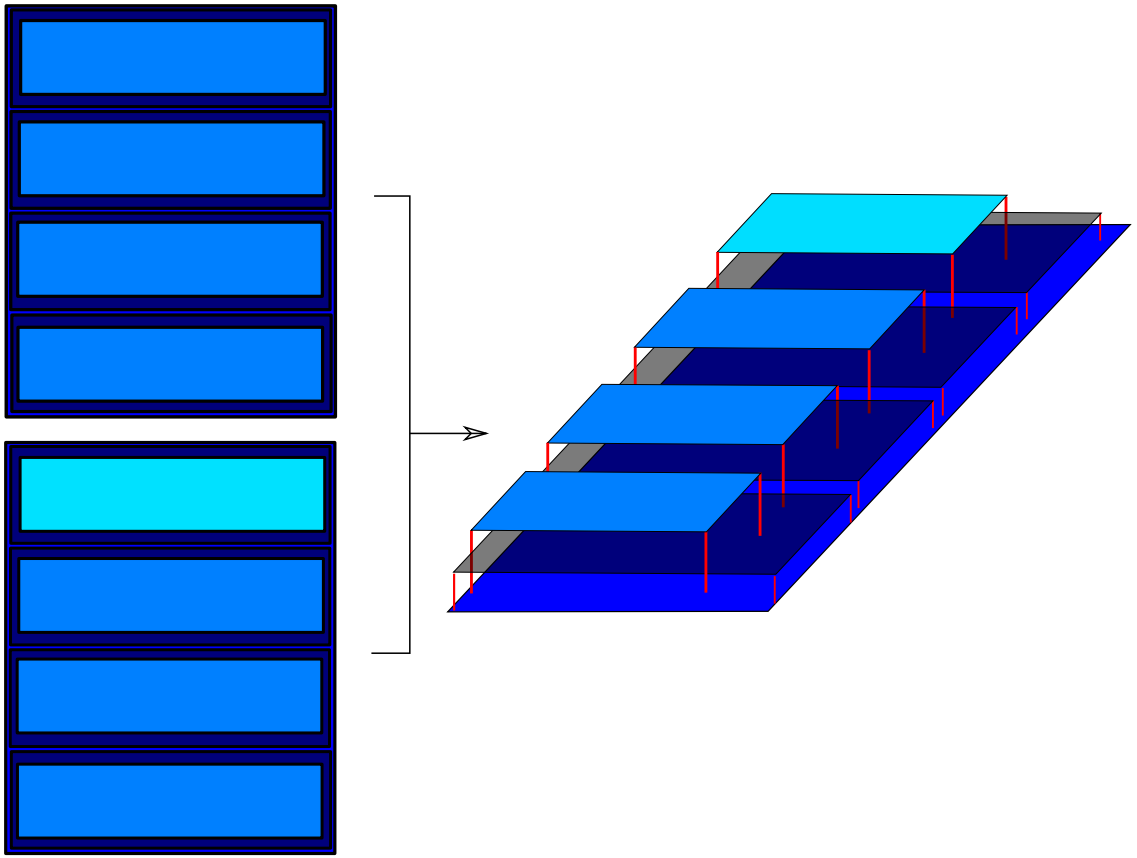
# Enlightenment Foundation Libraries

- 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

# Enlightenment Foundation Libraries

- 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

# Enlightenment Foundation Libraries



# Enlightenment Foundation Libraries

- 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

# Enlightenment Foundation Libraries


# Enlightenment Foundation Libraries

- 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

# Enlightenment Foundation Libraries

Many other useful component :

- 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

# Enlightenment Foundation Libraries

And there is more component :

- Emotion: video support
- Ephysics: apply physics force on Evas object
- Ethumb: thumbnailing library
- C++11 bindings (beta)

# Enlightenment Foundation Libraries

# Enlightenment Foundation Libraries

# Enlightenment Foundation Libraries

# Enlightenment Foundation Libraries

Many other users not from Samsung :

- Fridge
- Printer
- Medical device
- Set top box
- Home automation
- Navigation system
- ...

# Enlightenment Foundation Libraries

Where is EFL heading :

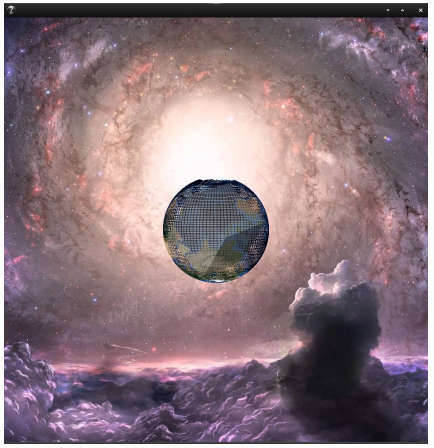
- Faster, lighter, better
- Add more object and property to Evas canvas (3D world, Effect, …)
- Vector graphics
- Improve portability (Windows, Mac OS X)
- More bindings and always up to date (C++, Lua, Python)
- Better support for MMU less system
- Improve speed of software renderer
- Improve speed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

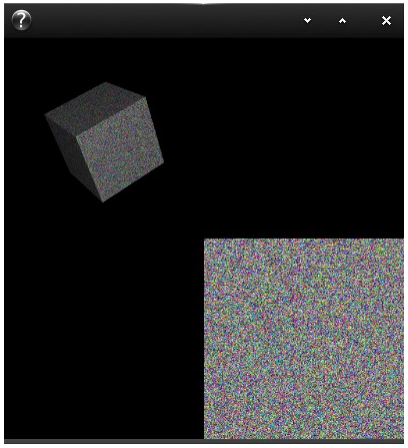
# Enlightenment Foundation Libraries

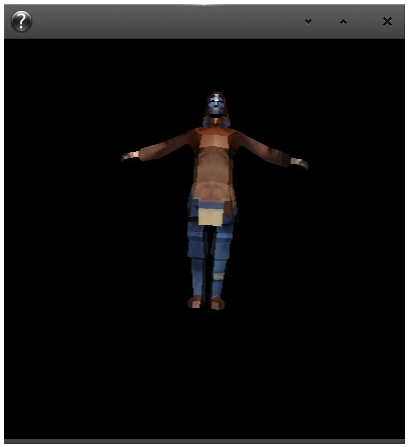
Evas Filters

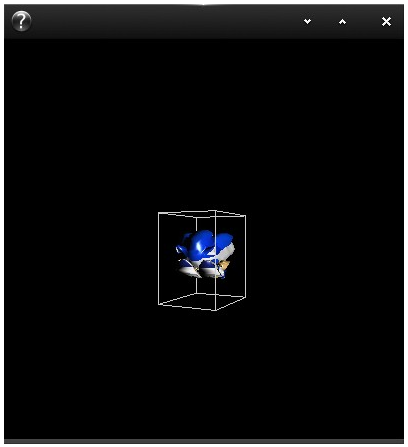
Bump

# Enlightenment Foundation Libraries













SAMSUNG
Open Source Group

# Enlightenment Foundation Libraries

Where is Enlightenment heading :

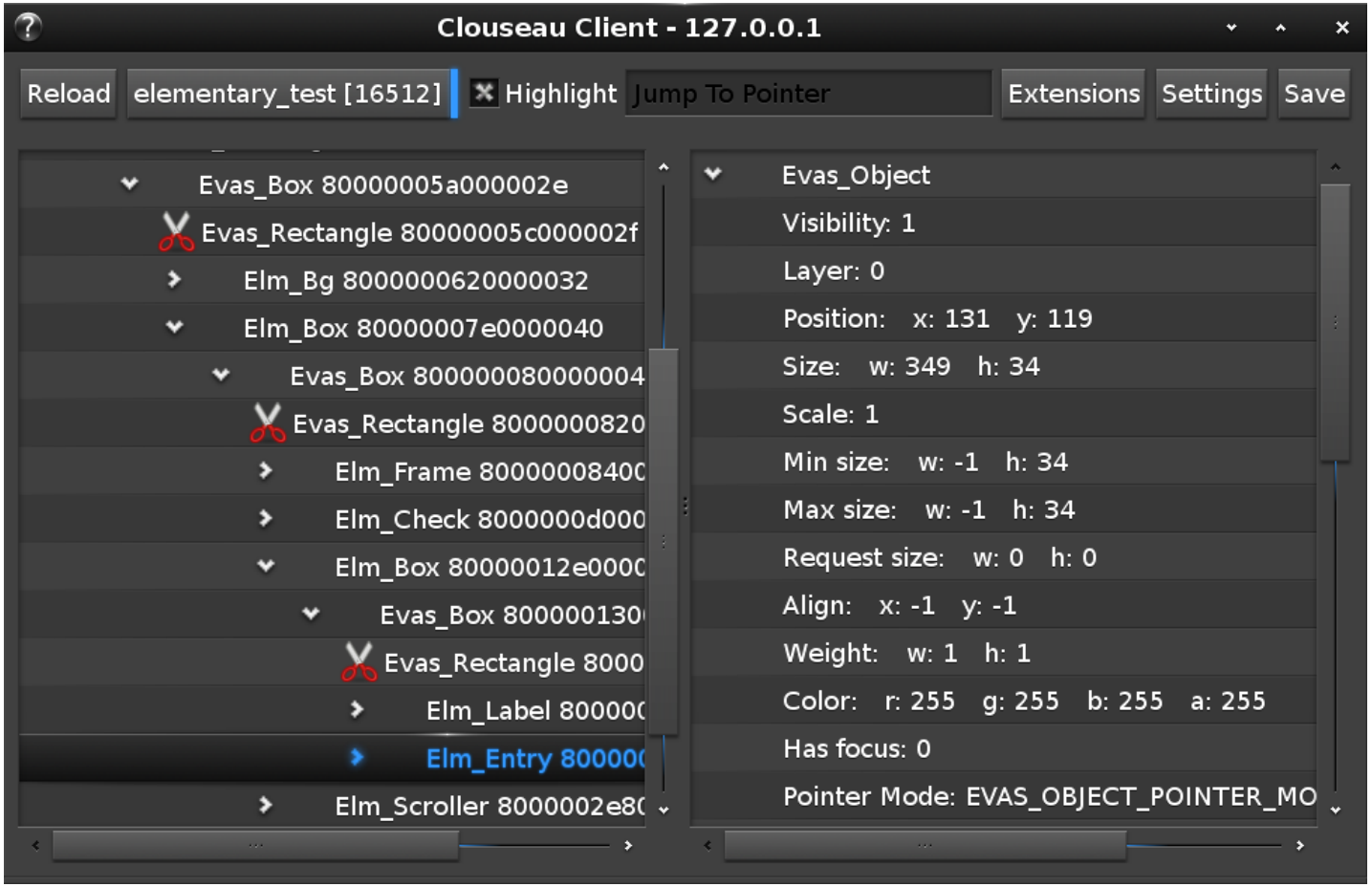
- Remove dependency on X11 by being a KMS/DRM Wayland Compositor
- Different from Qt logic that provide a library to do your own compositor, Enlightenment will be the base to put your module in for your specific needs
- Improve support for HiDPI
- Better modularity
- Support for more profile (Tiling,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

# Enlightenment Foundation Libraries

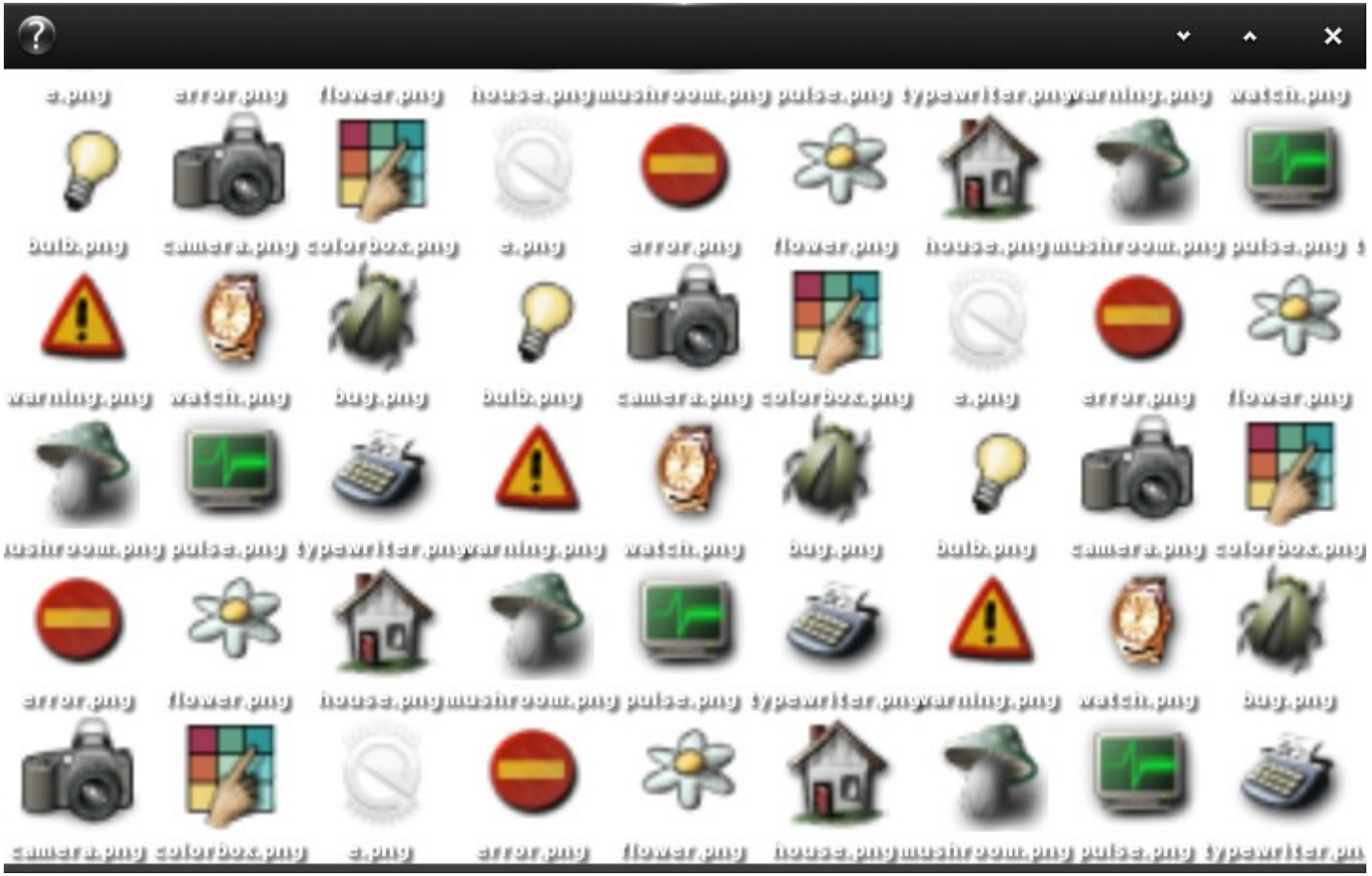
Short list :

- 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

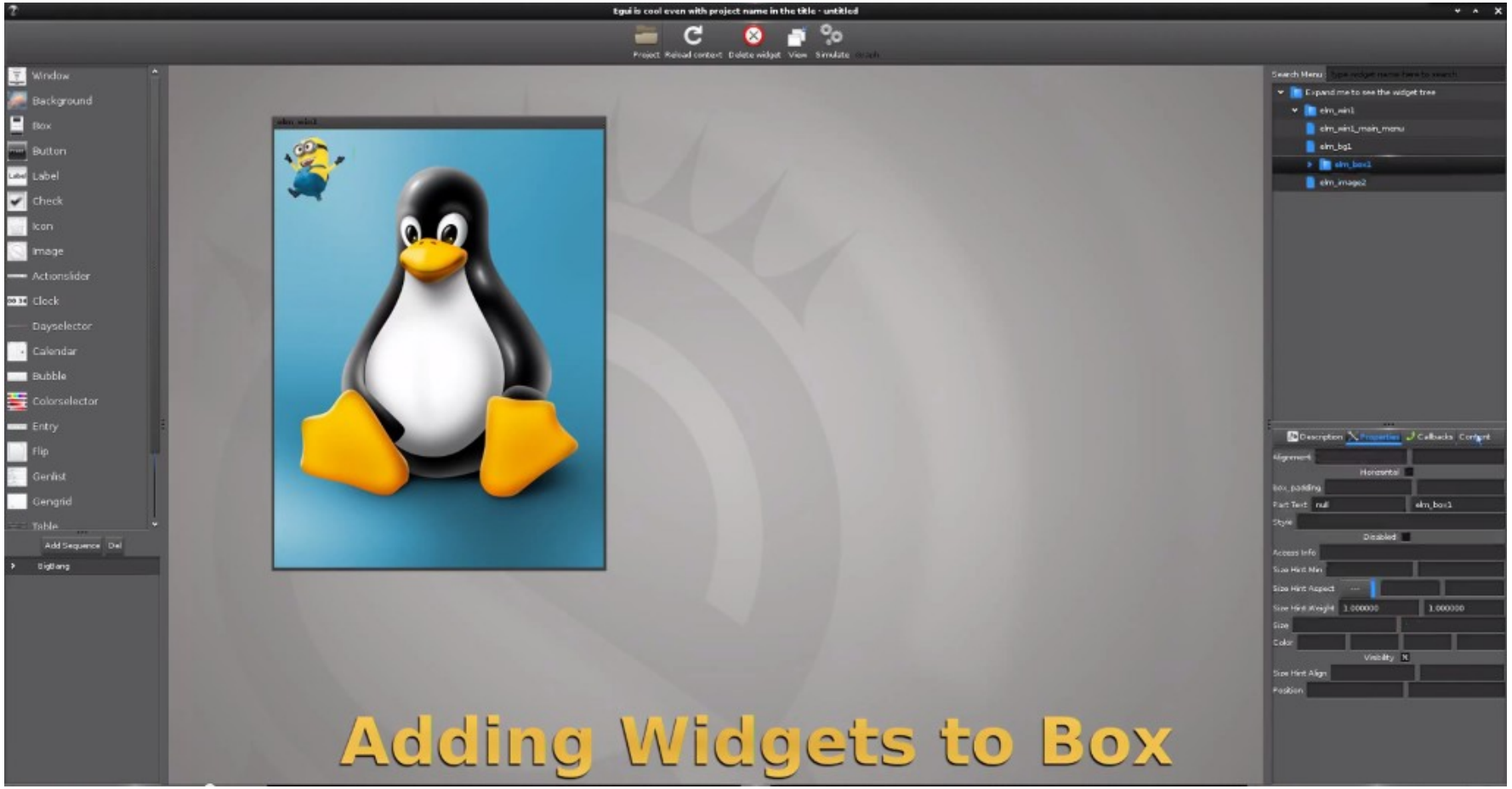
# Clouseau: widgets property debugging



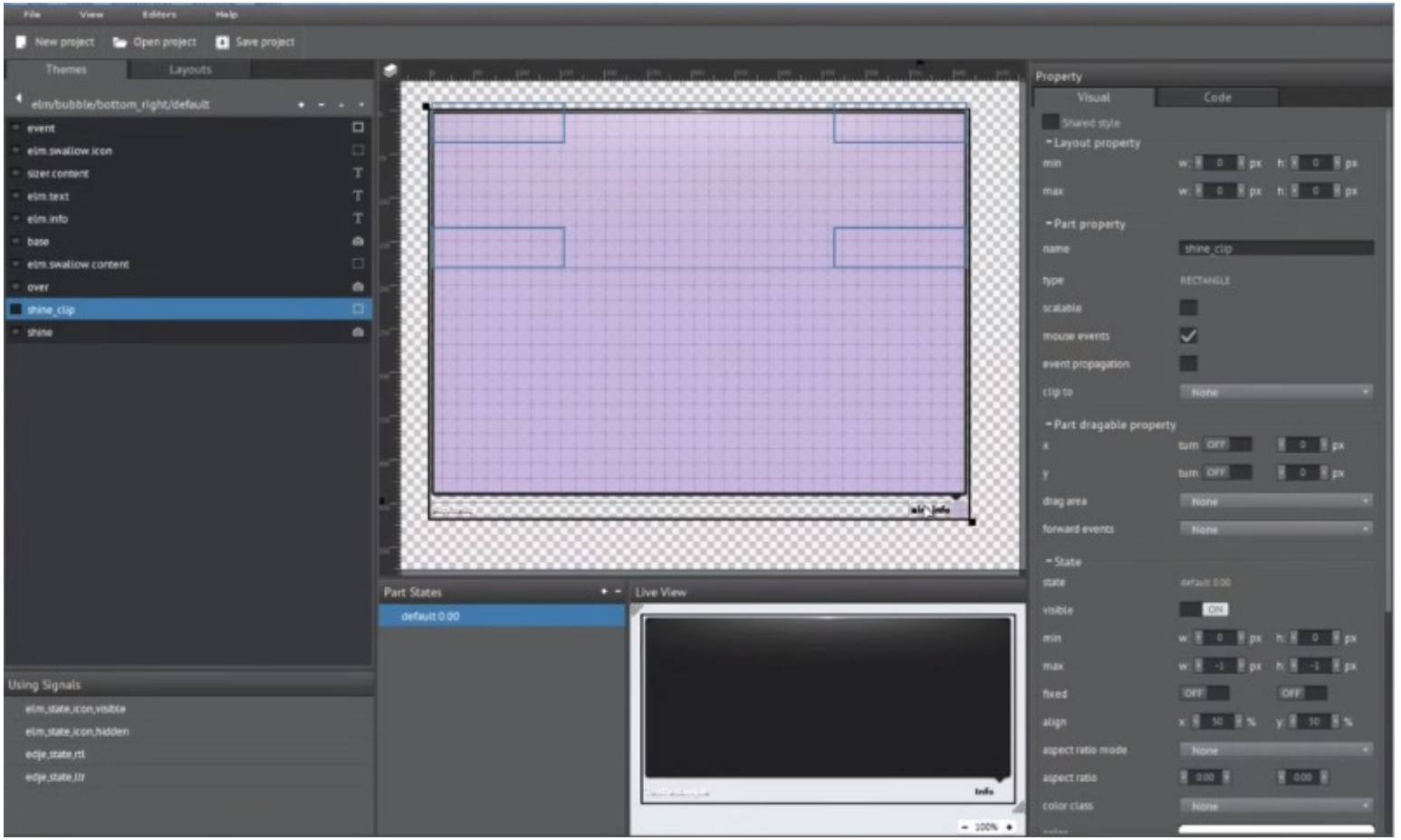
# Enlightenment Foundation Libraries



# GUI's editor



# Eflete : Elementary Theme editor








SAMSUNG
Open Source Group

# WE ARE HIRING !

Twitter: @SamsungOSG

Email: osg@samsung.com

# Questions ?


# Thank you.