GTK+ 4 Status Update

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History

1998 — 1.0
- really the Gimp toolkit

1999 — 1.2
- GObject

2002 — 2.0
- Pango
- ATK
- cairo

2011 — 3.0
- client-side windows
- client-side decorations
- CSS
- touch, gestures
- GL rendering
- broadway, wayland
Present

3.22
- the final, stable 3.x series

3.90 — since mid-2016
- integrate GSK, fully GL/Vulkan based rendering
- build with meson
- modernize GDK APIs
- fully switch to event controllers
- composite widgets

4.0 — 2018 ?
Drawing in GTK+ 3

Window

Button

Label: hello world
Drawing in GTK+ 3

Create a cairo surface
Drawing in GTK+ 3

Call draw() on each widget...
Drawing in GTK+ 3

Call draw functions to render CSS background, border, shadow...
Drawing in GTK+ 3

Call Pango to render text...

Window

Button

Label: hello world

hello world
Drawing in GTK+ 3

Send the completed frame to the display server
Drawing in GTK+ 4

[Diagram showing a window with a button and a label: "hello world"]
Drawing in GTK+ 4

Call snapshot() on each widget to create render nodes...
Create render nodes for CSS background, border, shadow...
Call snapshot functions to create render nodes for text
Drawing in GTK+ 4

GSK translates render nodes into backend operations
Drawing in GTK+ 4

Upload textures and use Pango to render glyphs
Drawing in GTK+ 4

Send the render operations to the GPU
Render nodes in the Inspector
Input in GTK+ 3

An event arrives
Input in GTK+ 3

Route it by matching the window
Input in GTK+ 3

Emit event signals
Input in GTK+ 3

...and propagate up
Input in GTK+ 4

An event arrives
Input in GTK+ 4

Route it by matching coordinates, top-down (capture)
Input in GTK+ 4

...and back up (bubble)
Input in GTK+ 4

Pass the event to event controllers at each step
Composite Widgets in GTK+ 3

Custom drawing – not the CSS box model
Custom event handling
Code duplication
A spinbutton is an entry
Composite Widgets in GTK+ 4

Any widget can have children.

Widgets are close to CSS boxes.

Composition instead of subclassing.

A switch is composed of:
- two labels
- a slider

A spinbutton has:
- an entry
- two buttons
What’s done

Vulkan renderer
GL renderer
New GDK apis
Event controllers
Composite widgets
What’s left to do

- Write cool examples
- Complete API cleanups
- Expose shaders for applications
- Transformations for widgets
- ‘Complicated’ widgets: treeview, textview
How you can help

Write cool examples

Port an application

Convert custom widgets to new APIs

Find what doesn’t work, or is too complicated
Porting?

Widgets are now visible by default

gtk_box_pack_start/end has less arguments

No more event->button
Heroes of GTK+ 4

Benjamin Otte
Emmanuele Bassi
Timm Bäder
Carlos Garnacho
Jonas Ådahl

Daniel Boles
Alexander Larsson
Chun-wei Fan
Руслан Ижбулатов
References

GTK+ 4 roadmap: https://wiki.gnome.org/Projects/GTK+/Roadmap/GTK4

GTK+ sources: https://git.gnome.org/browse/gtk+

GTK+ blog: https://blog.gtk.org/

GTK+ docs, migration guide: https://developer.gnome.org/gtk4/
Questions?
Thanks!