Wayland Compositors for Fun and Profit

Erin Kalousková

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About Me

Erin (she/they)

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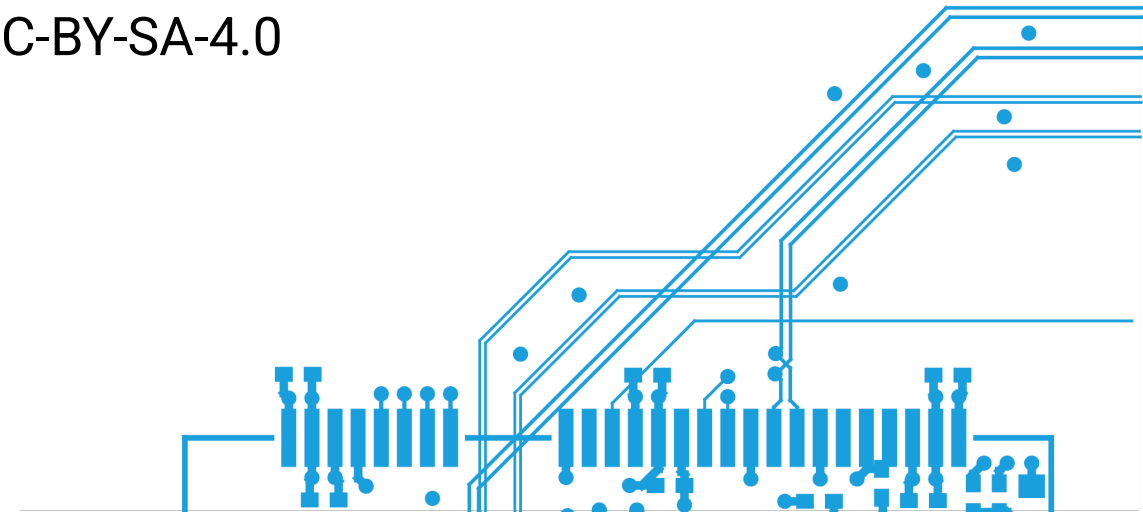
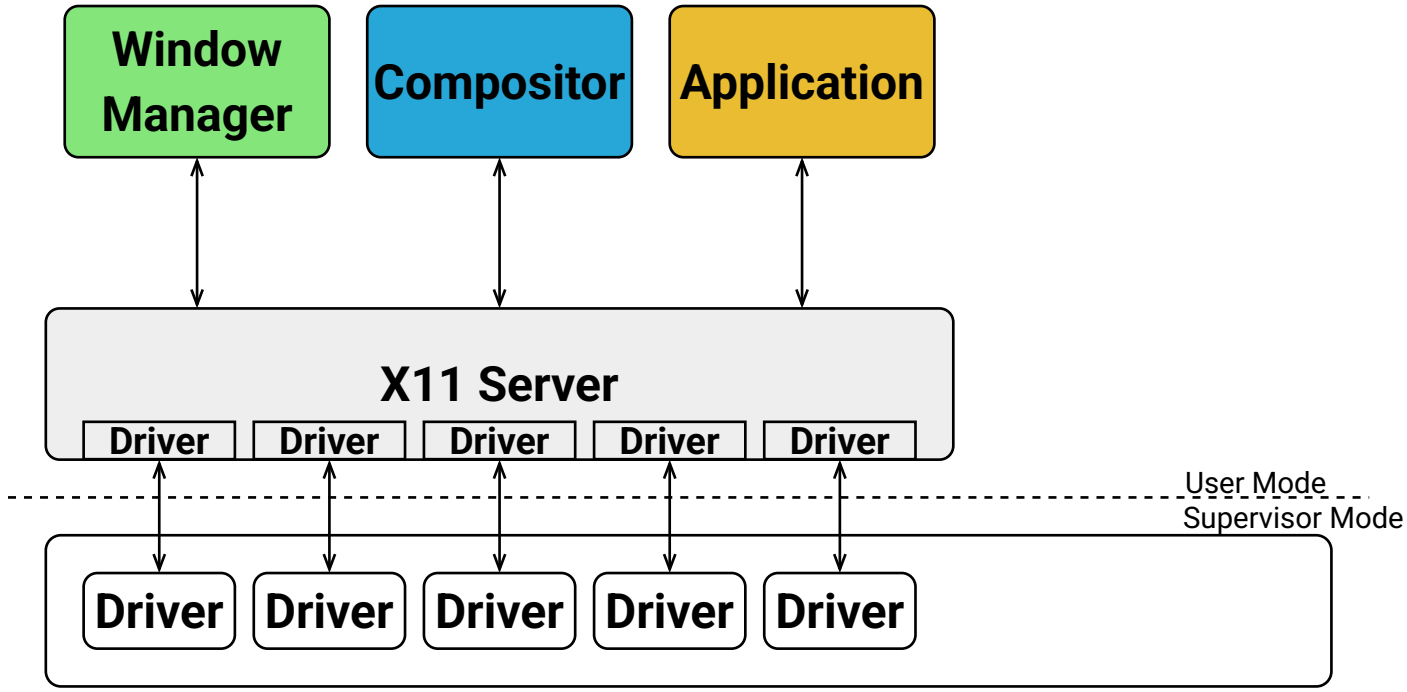
Disclaimer

I am not payed by IBM / Red Hat / … to shill Wayland.

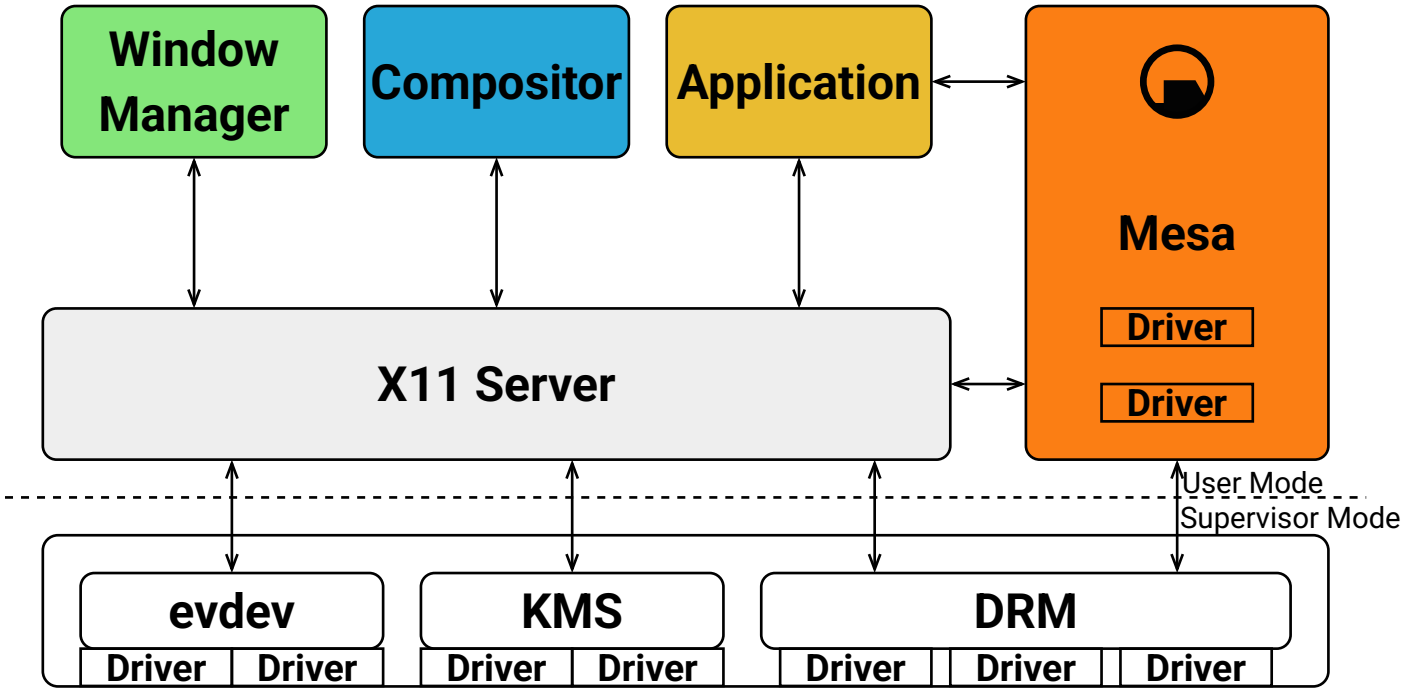
No generative AI was used for this talk.



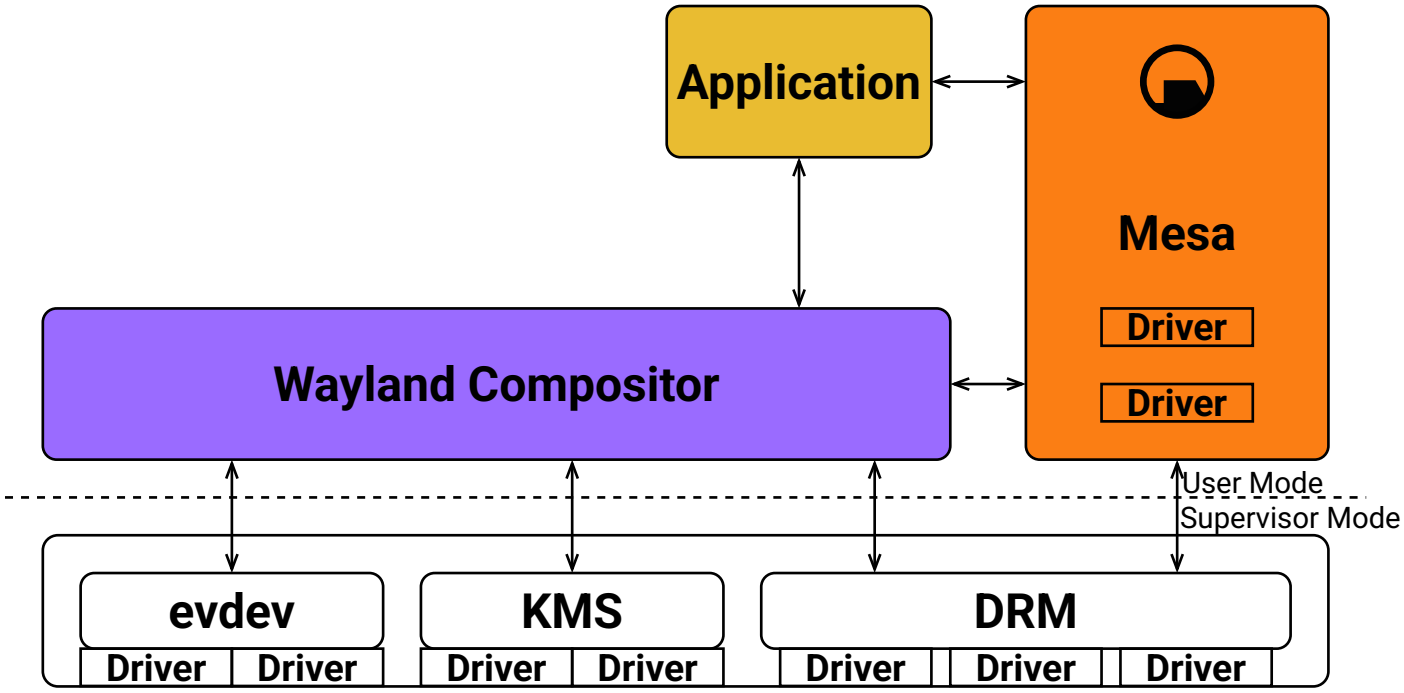
Linux Desktop Stack (Long Time Ago)



Linux Desktop Stack (X11)



Linux Desktop Stack (Wayland)



Desktop Tech on Embedded

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Situation

- 240x240 SPI
- D-Pad + button on the back
- No GPU, LLVMPipe is slow
- No session management
- OpenWrt
  - No (e)udev[1]

[1] https://github.com/illiliti/libudev-zero

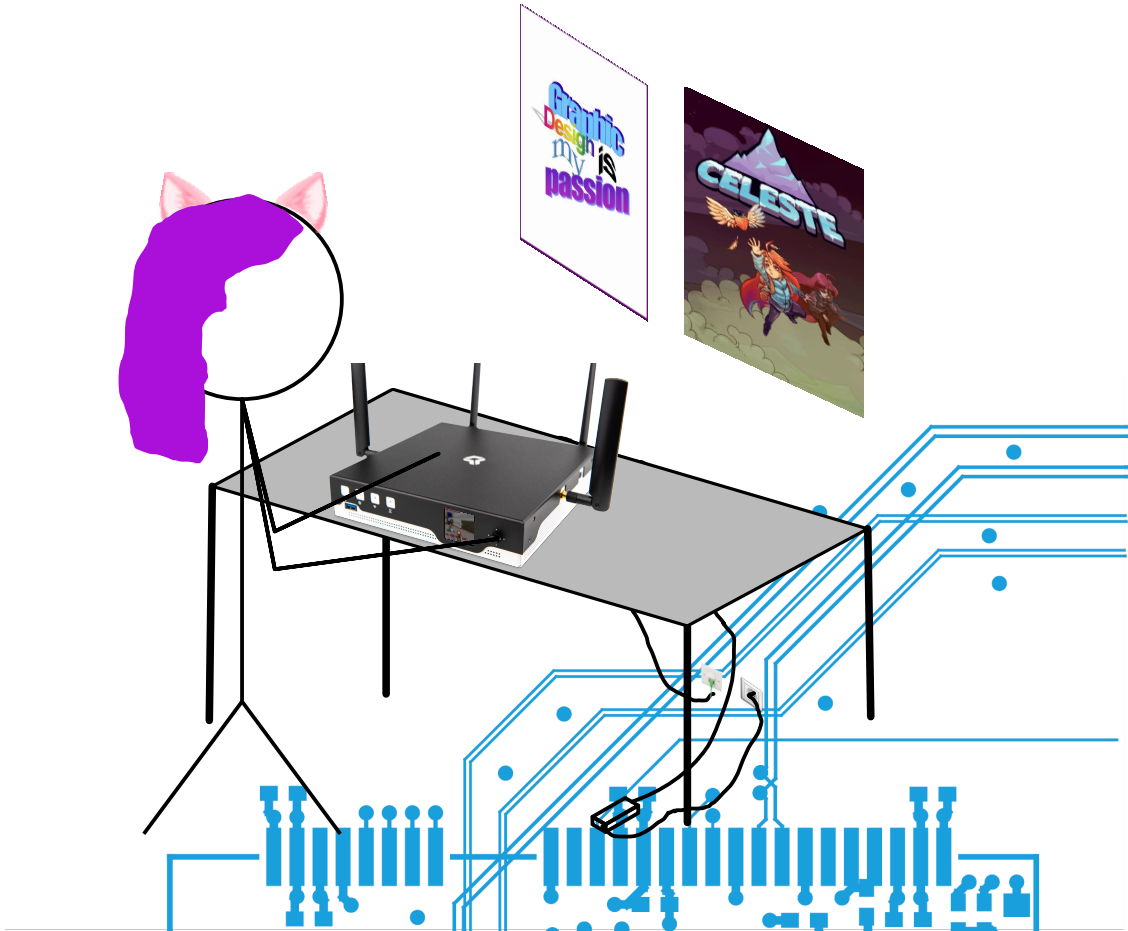
Problems

- Easter-egg
- DOOM
- Extensibility

»Also, the (display) peacockr process is using a lot of CPU (15 %, total sysload 40 %) generates heat, had to kill that process.«

Peacomp

- https://gitlab.nic.cz/turris/peacomp
- ~1.3k of Rust
- Lightweight
  - 5 MiB system memory
  - 2.1 MiB executable image
- DRM + Pixman
- Smithay
- Window switcher?



Domain Specific Compositors

Case Study – PowerMac G4

- Motorola 7400 CPU
- 128 MiB (upgraded to 896 MiB)
- ATI Rage 128 Pro
  - No DRM, only fbdev
- Debian, Chimera

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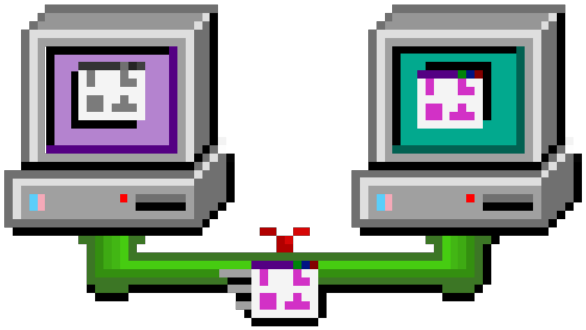
Wayland on FbDev

- https://codeberg.org/erin/fbcomp/
- Compositor nesting
- 670 lines of Rust
- Can run GNOME Shell

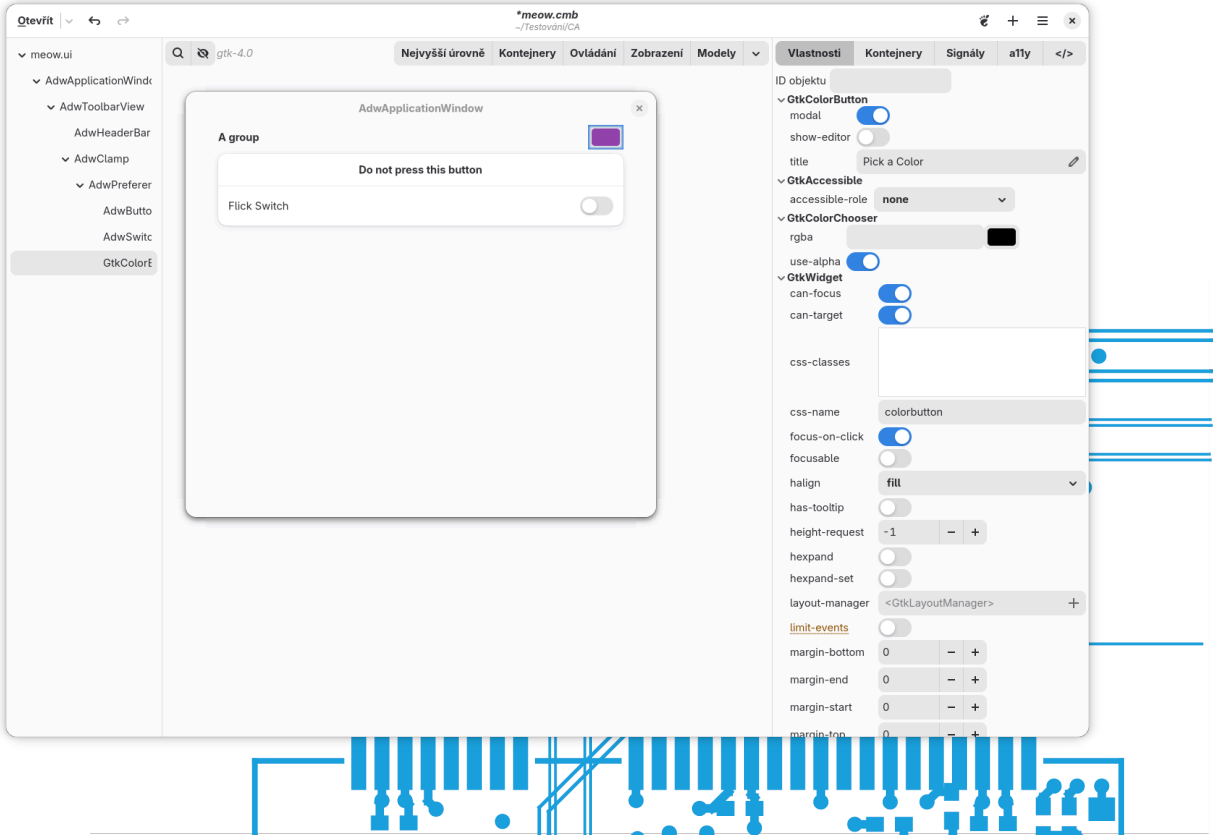
Waypipe

- https://github.com/neonkore/waypipe
- Wayland forwarding
- Memory buffer sync
- Replacement for X forwarding



Casilda

- https://gitlab.gnome.org/jpu/casilda
- Gtk 4 Widget
- Cambalache



System Compositors

- Replacement for Linux Kernel VTs
- https://lists.freedesktop.org/archives/wayland-devel/2012-July/004204.html
- https://wayland.freedesktop.org/docs/html/ch02.html#sect-Compositors-System-Compositor

Implementation

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Libraries

- **Smithay** (Rust; Niri, COSMIC, PeaComp)
- wlroots (C; Sway, Casilda, phoc)
- libweston (C; Weston)
- Mir (C++; Miracle, Miraway) – Higher Level

Wayland Core Protocols

- `wl_compositor`
- `wl_shm`
- `wl_data_device_manager`
- `wl_shell`[1]
- `wl_seat`
- `wl_output`
- `wl_subcompositor`
- `wl_fixes`

[1] Deprecated by `xdg_shell`

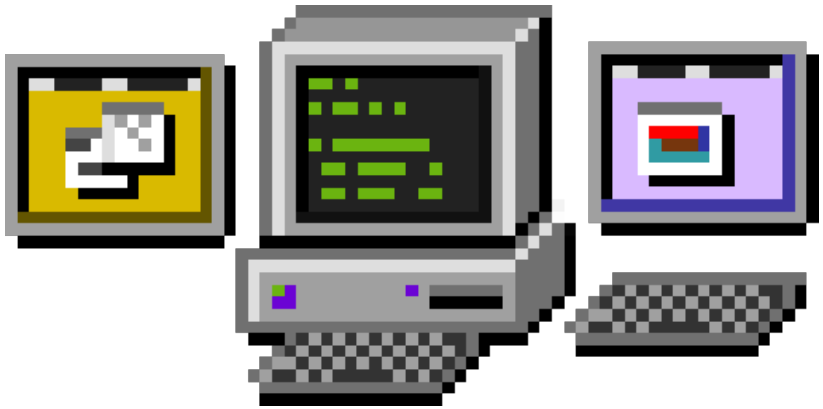
Extensions

- `xdg_shell`
- `ext_session_lock_v1`
- `zwp_linux_dmabuf_v1`
- `zxdg_decoration_manager_v1`
- Compositor specific
  - `zwlr_layer_shell_v1`

…

Backend

- Presenting, buffer allocations
- Rendering (Vulkan, Pixman)
- Input (libinput)
- Seat (logind, udev)



Questions?

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