Towards running a Wayland Compositor on OpenBSD

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About the author

1988

- during my PhD thesis, got my hands on a X window system release 10 source code tape, built it on the Sun 3 workstations of the lab and started developing on X.
- later I also experimented with NeWS, before it was part of OpenWindows.

August 1993 I got a PC with a 486 CPU and 16 MB of RAM, with an S3 SVGA card,
- installed NetBSD 0.9
- tried to build and run the XFree86 2.1 X XF86_S3 server
- sent patches to XFree86 for that
- became co-maintainer of XFree86 on NetBSD for a while (before OpenBSD)
Wayland?

https://wayland.freedesktop.org/

- a “new” architecture for graphical desktop applications
- applications do direct rendering using a *compositor*
- the compositor is in charge of inputs, outputs, applications windows management and inter-applications communication.
- better application security (no system-wide sharing of screen contents or input)

- no more separate Window Manager
- requires DRI
- input and inter-process communication is Linux centered
Where to start?

Compositors:
- Weston - reference implementation - too many Linux-isms for now
- mutter (Gnome) - tightly coupled with Gnome
- kwin (KDE/Qt) - tightly coupled with KDE
- wlroots + Sway - a toolkit for building compositors + i3 compatible tiling compositor

Components:
- **output (display)**: DRM + Mesa - already there (thanks jsg@ and kettenis@)
- **input (keyboard, mouse,...)**: libinput - libinput port by mpi@ and rsadowski@
- **Linuxisms**: epoll-shim, udev,... already there or possible
- wayland-libs and protocol: quite portable - already there (thanks sadowski@)
- Xwayland: enabling legacy X applications to run on Wayland.
Porting wlroots, Sway and small applications...

Work started during g2k23 in Tallinn 2-9 july 2023.
- in the ports tree (because of the dependencies)
- some easy parts: `sysutils/libdisplay-info`, `graphics/libliftoff`
- `sysutils/seatd`: “seat” management: for now stub with the `noop` backend
- `sysutils/libinput`: more code needed:
  - keyboard translation table for wscons
  - handling of scrolling events for touchpads
  - symbols hiding
- `wayland/wlroots` the Wayland helper library
- `wayland/sway` the composite manager
- `wayland/havoc` a simple terminal emulator
- `wayland/wev` xev(1) for Wayland.
Other Wayland applications have More dependencies...

- char32_t and `<uchar.h>` added to base
  work done by schwarze@

- C11 threads
  added `sysutils/libstdthreads`

  → `wayland/foot` a better Wayland native terminal emulator

Patches to enable Wayland in `x11/gtk-3`, `x11/gtk-4` and `www/mozilla-firefox`

  → `firefox` works with Wayland

Work done at Summer 2023 HAM in Massiac (11-16 august 2023).
More work...

- Input handling, two possible ways:
  - libinput: need support for pointer acceleration, gestures, multiple devices,...
  - wlroots: fully wscons-based backend for input

- Linux / Posix / ISO C compatibility:
  - Thread Local Storage
  - memfd

- Gnome and Qt/KDE support
  - Wayland native applications

- Packaging and installer integration
  - choose a Wayland desktop at install time
  - Wayland xenodm?

- What about other architectures (non amd64)?
Demo...
How to help ?

Skills :

- C language and debugging with gdb
- OpenBSD’s ports tree
- the Meson build system
- a look at the wscons console driver
- optionnally Rust programming language for the tools written in Rust

Look at the Wayland page of the Arch Linux wiki and choose an application or a topic to work on.

...And submit patches / ports / questions to the ports@ mailing list.
Conclusion

- X11 is fading away
- Wayland is the way to go for graphical desktops
- This is possible and not too far away
- Already a number of contributors, need more help
- Feedback to upstream (Freedesktop.org) as much as possible
- Even on Linux, Wayland still has a number of rough edges

/usr/ports/wayland/TODO-Wayland.md