Wayback
A wayland compatibility layer for X desktop environments

XDC 2025 - Vienna

About me

- Security engineering and SRE background (2006-present)
- Alpine Linux, late 2009 to present
  - pkgconf, ifupdown-ng, libucontext, gcompat, …
- Alpine's security team 2021 to present
- Focus on long-term sustainability
- Socials:
  - Mastodon: ariadne@treehouse.systems
  - Bluesky: @ariadne.space

Agenda

- What is Wayback?
- Why make it?
- How does it work?
- ~~Demo~~ (technical problems with AV, sorry)
- Needs from the greater community

What is Wayback?

- Something vaguely shaped like an X Server that uses Wayland components
  - Standalone minimalist compositor based on wlroots/tinywl (not publicly accessible)
  - Xwayland is used to handle the X11 side
  - Supplemental tools to glue everything together

Distribution-scale engineering

- Community-based distributions have a large cohort of stakeholders
- Using Alpine for production services: government, NGOs, large enterprises, SOHO, hobbyists, embedded (e.g. postmarketOS)
- Security teams must plan around all of these stakeholders and find appropriate balances.

X11 maintenance situation

- Maintenance upstream is shifting towards Xwayland as a compatibility layer for legacy apps
- X11 maintenance mostly focused on security fixes
- Xwayland outperforms standalone X on modern hardware like Apple M1

X11 and distros

- Distribution users still want X DEs to work, cloning them (e.g. i3 → sway) isn't always enough
- Users are highly invested in their desktop configurations, worried about regressions
- Users want features provided by Wayland compositors like tear-free rendering
- Users also want direct rendering too (e.g. for gaming)
- Embedded users want improved GPU power management, which X doesn't support (e.g. SXMO → sway)

Options for distros

- Continue to support standalone X for as long as possible
  - Low development cost, but user experience degrades over time
- Fork standalone X and maintain it
  - High cost, user experience likely still degrades over time
- Leverage Xwayland fullscreen mode to keep X11 DEs working
  - High initial cost, low maintenance cost, UX improves with time
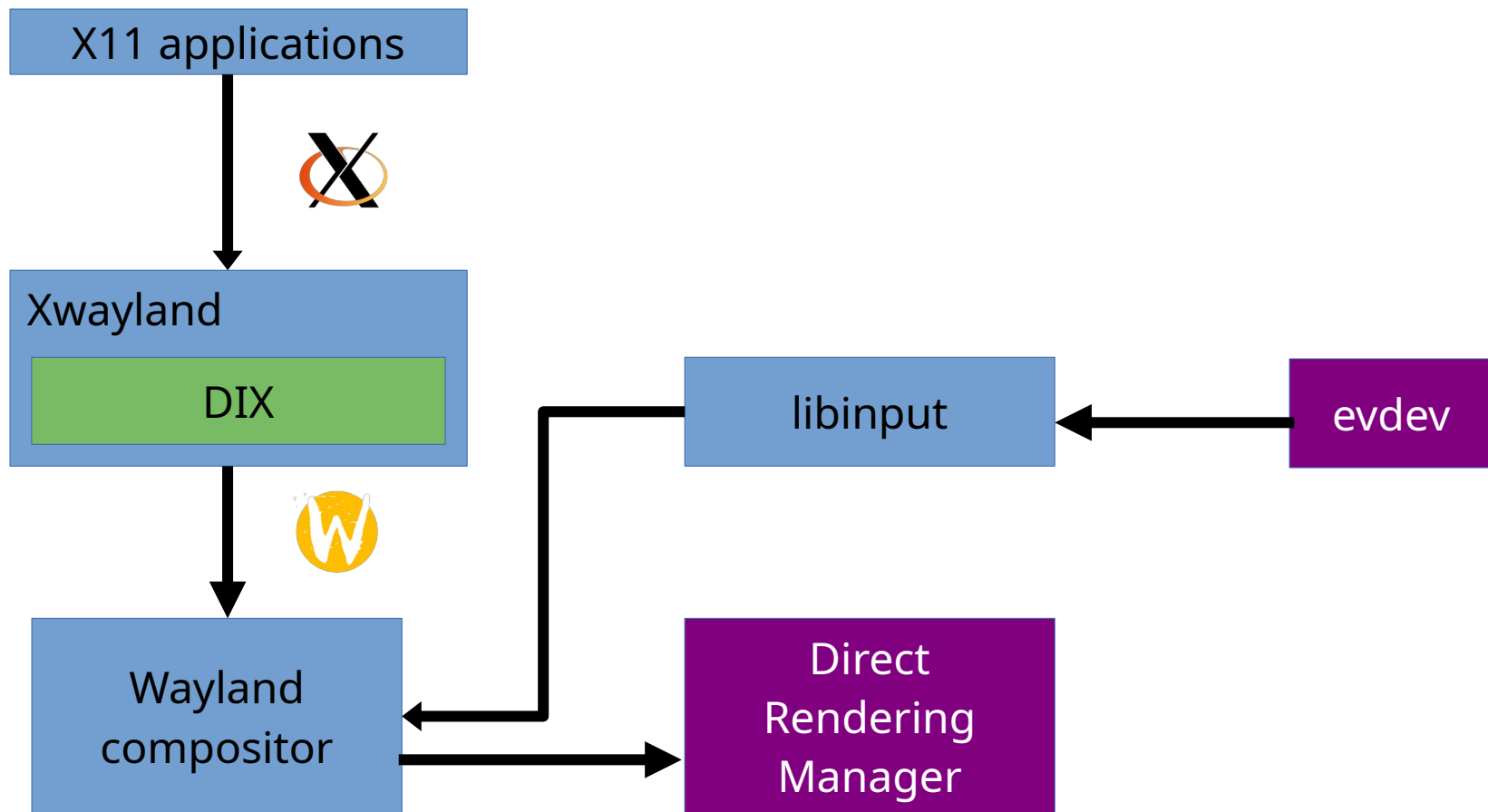 - Prior art: Xweston proof of concept - https://github.com/ackalker/Xweston

Xlibre from the distro perspective

- A fork of X that someone else is doing?
  - Sounds great in theory! In practice, distros are rejecting it because...
- The project is reactionary...
  - Deleted everything relating to Wayland, meaning distros still have to ship Xwayland anyway
  - No formal plan, no roadmap, development is discussed in an effectively unmoderated telegram group chat
  - High risk of divergence between X.org X11 protocol and Xlibre X11 protocol (e.g. pointless Xnamespace extension)
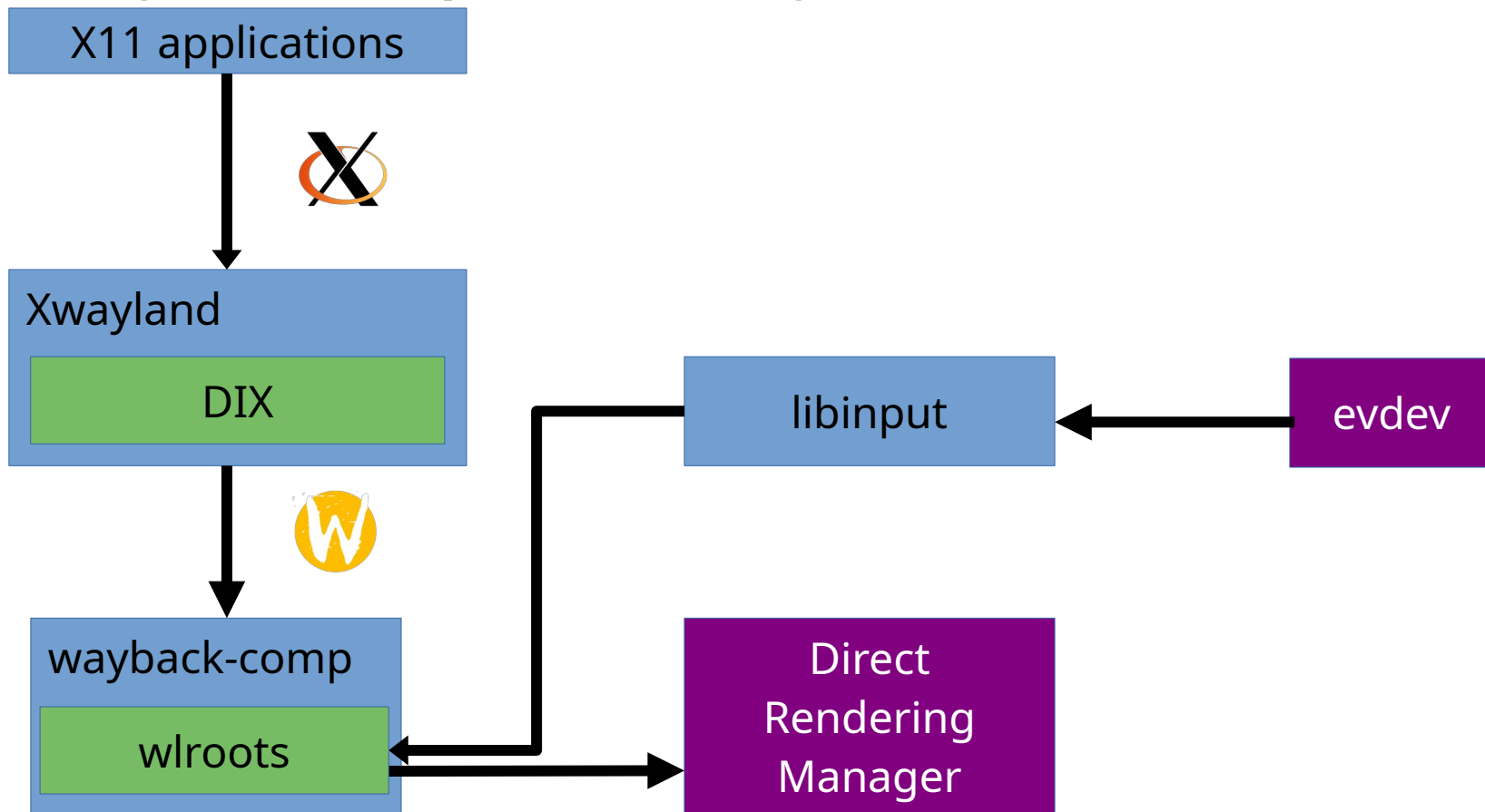 - Basic C programming mistakes that are CVE-worthy have been identified...

What is the X server anyway?
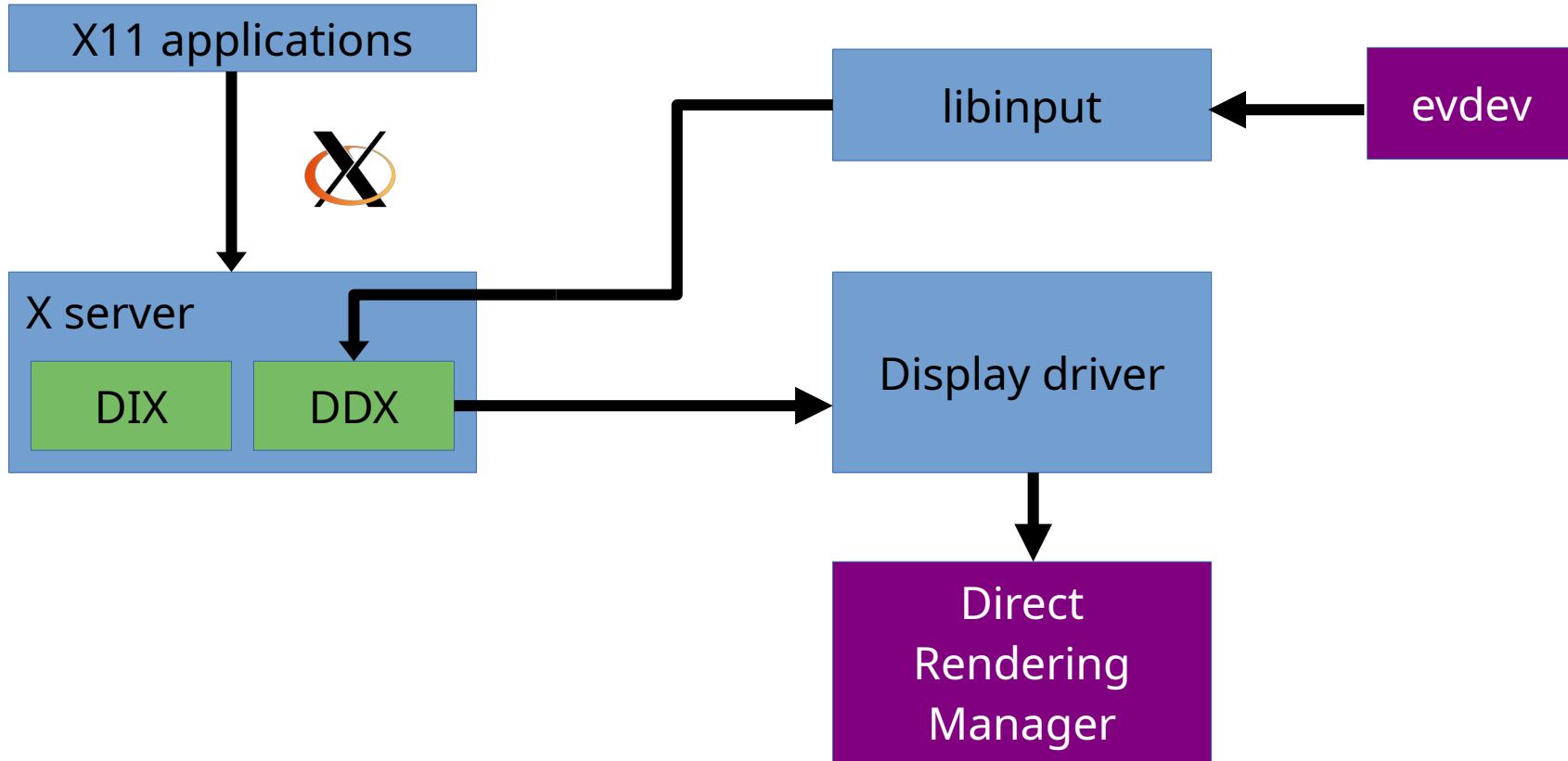
Xwayland, by comparison

Wayback specifically

X11 applications

Xwayland

DIX

wayback-comp

wlroots

libinput

evdev

Direct Rendering Manager

Wayback's components

- ## wayback-compositor
  - Minimal Wayland compositor to support Xwayland, not publicly accessible by applications, stripped down tinywl

- ## wayback-session
  - Starts a Wayback session (like startx)
  - Deprecated in favor of normal startx + xinit + xwayback

- ## Xwayback
  - Provides a stub implementation of /usr/bin/X that launches wayback-compositor and Xwayland, designed to be used with other X tools

Wayback's primary needs from Xwayland

- XRandR (resize and rotate), Xinerama extensions
  - We need Xwayland to properly reflect display topology from Wayland in fullscreen mode and forward XRandR requests back to the compositor
- Colorspace management
  - We need some way to relay colorspace configuration requests to Wayland from X applications
- DPMS (power management)
  - We need some way to allow applications like Xscreensaver to tell the compositor to turn on and off the screen

Where can I get Wayback?

Warning: these packages may not include the latest fixes, this is still alpha-quality software!

- Alpine Linux edge
  `apk add wayback@community`
- Fedora rawhide
  `dnf install wayback`
- Arch Linux
  `wayback-x11-git` in AUR

Questions?

IRC: #wayback on irc.libera.chat
Matrix: #wayback:catircservices.org
WWW: wayback.freedesktop.org