Greenfield

The in-browser Wayland compositor

Introduction

- $ whoami
  - Erik De Rijcke
  - Self employed ; udev.be
  - [Kotlin, Java] @ Day ; [JavaScript, C, …] @ Night
- $ which greenfield
  - Wayland compositor
  - JavaScript
    - ES6
    - File per class
    - JSDoc type comments
  - WebAssembly
    - Native libraries available in the browser

What does Greenfield offer?

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- A resumable screen forwarding solution à la VNC/RDP/Citrix
- Something finished

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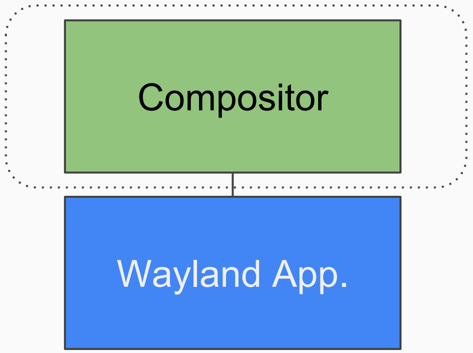
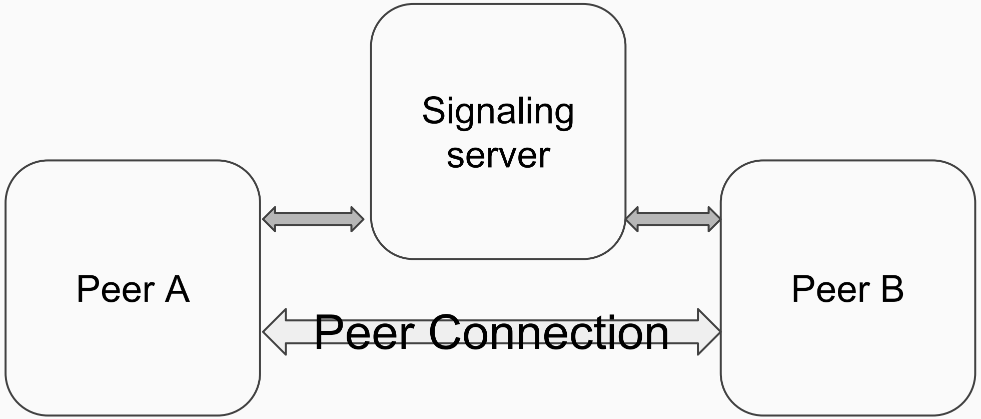
- Something super awesome!
- Pure JavaScript and a wee bit of WebAssembly. No plugins required, all HTML5.
- A per application remote rendering solution - but not limited to that...
- A true cloud desktop environment
- A work in progress.

First some basic concepts explained

- A Wayland compositor
  - binary wire protocol
  - also FDs

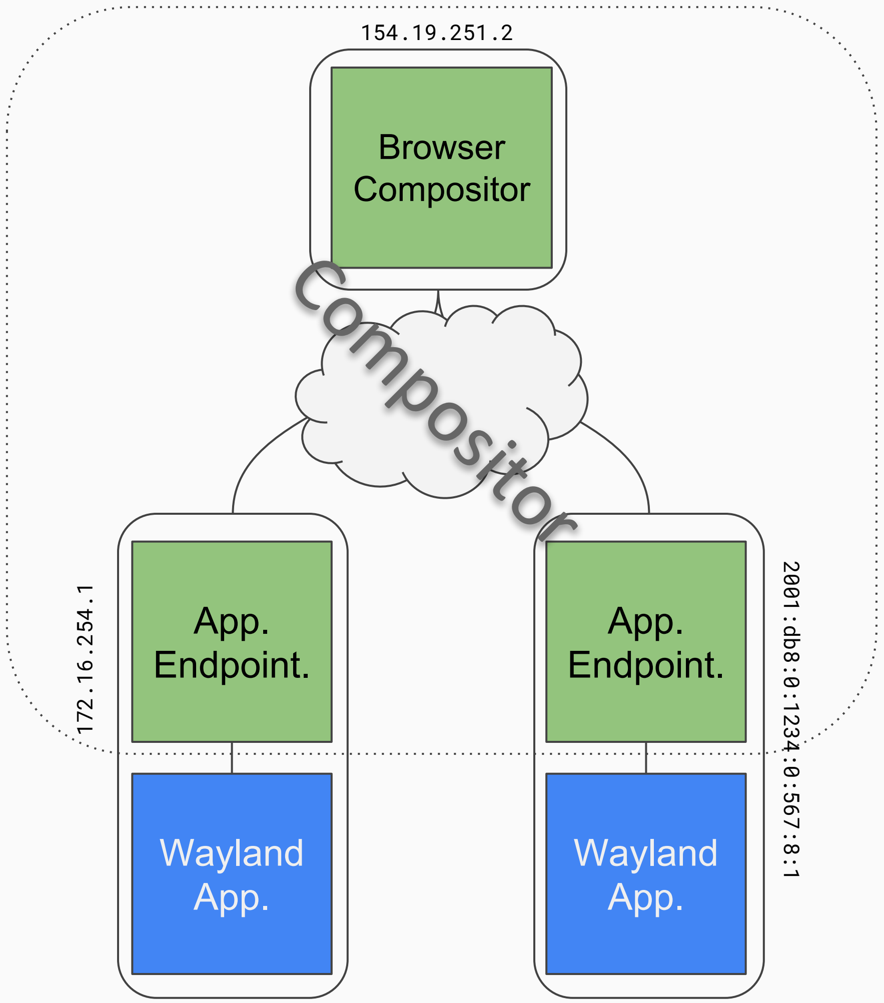
- WebRTC
  - p2p communication
  - needs central signaling/broker





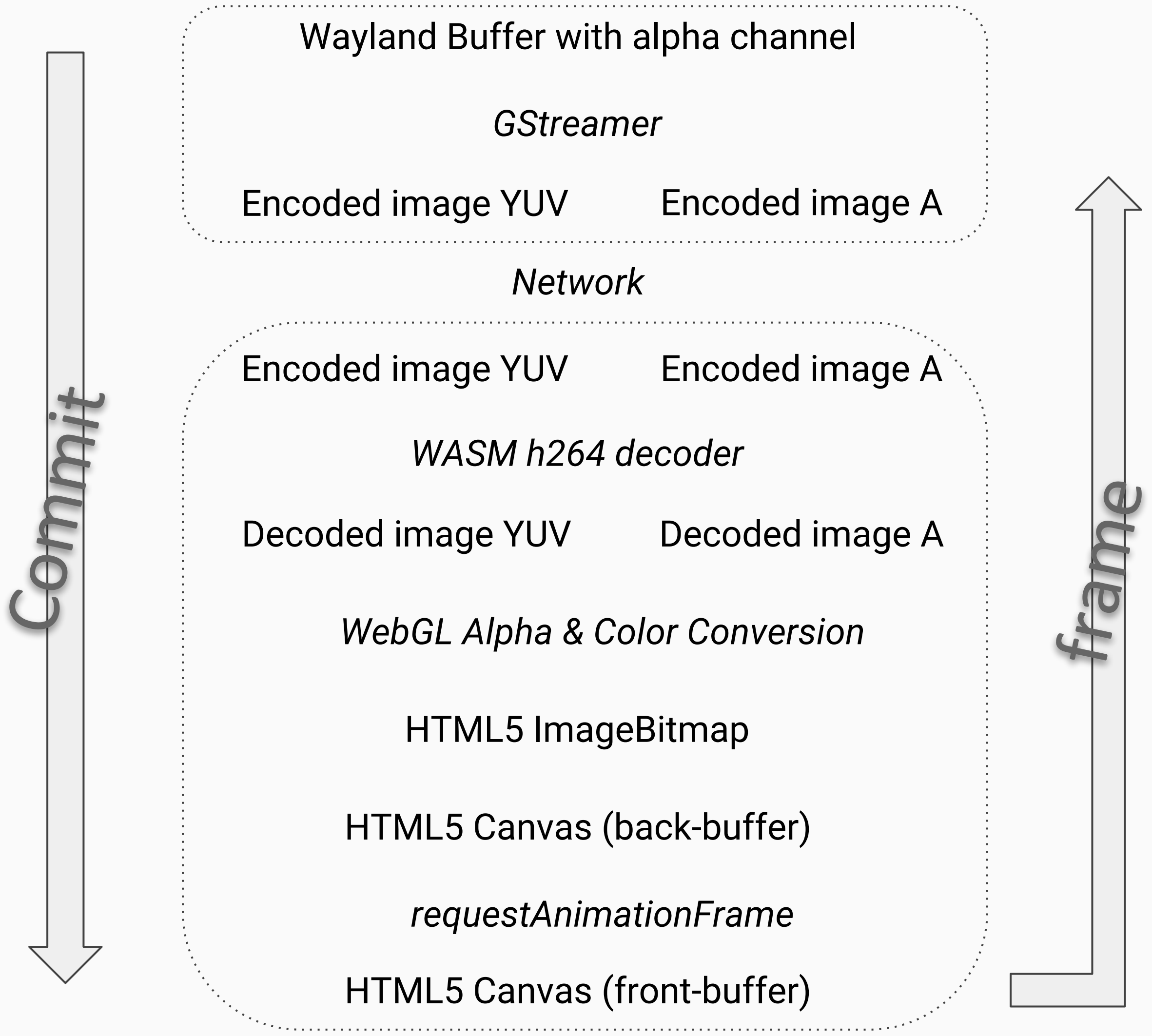
How does Greenfield work?

- Browser
  - Wayland compositor
- Westfield
  - Underlying library
  - JavaScript protocol generator
- Application Endpoint
  - Node.js ⇒ Rust?
  - Stateless proxy compositor
  - Libwayland-server fork
  - Forwards to browser or to native libraries
  - Encodes application frames
- Connection per wayland application
  - WebRTC data channel
  - (WebSocket)
- Encoded application content
  - h264
  - jpeg



Life of an h264 application frame

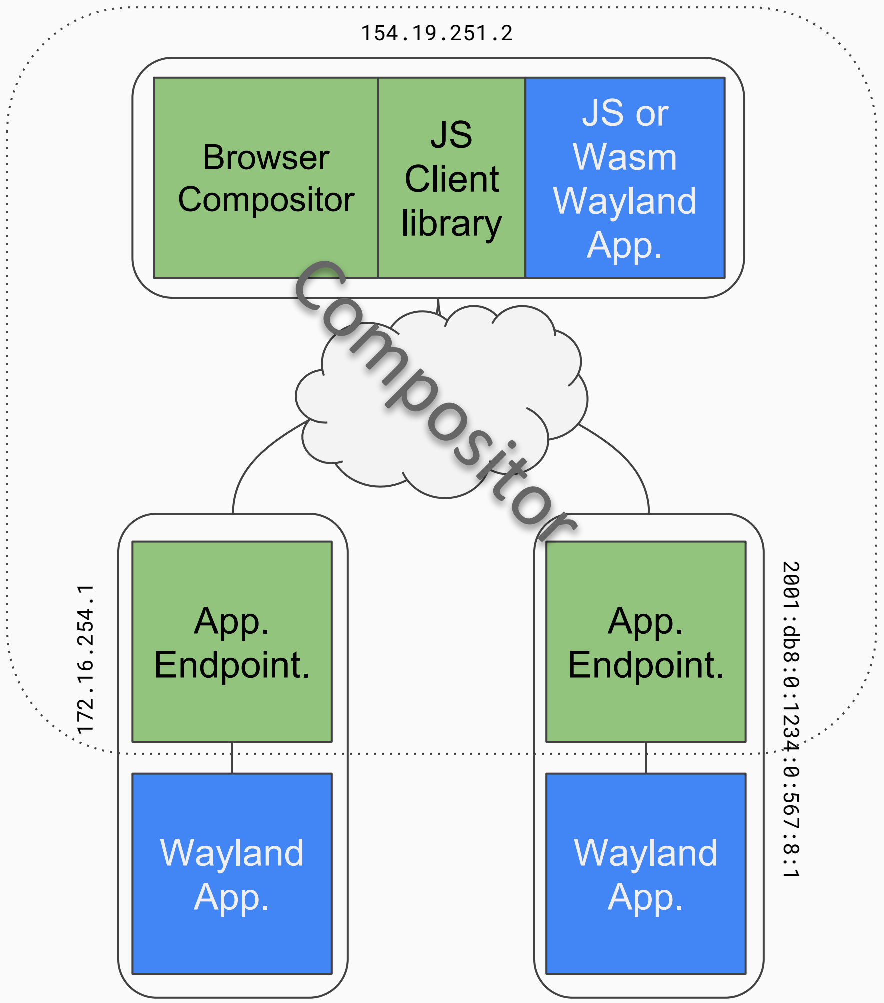
- Need precise encoding/decoding semantics
  - Video streaming solutions unsuited!
- Encoding
  - Gstreamer
- Decoding
  - WebAssembly h264 software decoder
- Frame rendering is throttled
  - long pipeline
  - full round-trip takes a lot of time
- Possibility to “parallelize” pipeline
  - hard to predict speed of frame in pipeline



Running applications in a web worker*

- Web worker runs a JavaScript or WebAssemly Wayland app.
    - No network latency
    - Zero copy data transfer
    - All the good stuff!
- Offscreen WebGL
    - Needs special protocol, much like wl_drm
    - App. toolkit
        - Skia WASM
    - Apps. to WASM
- Cloud desktop environment
    - Account based application access
    - WebApp. store
    - WebApp. repositories

*work in progress



Demo Time!

KThxBye!

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You have questions!