

Integration of the Chromium Browser in the GENIVI Platform

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- Open Source experts and consultants
- 15 years of experience
- Important contributions to:
 - Client-side web technologies: WebKit, Blink/Chromium, Servo
 - Graphics & Multimedia: Mesa, GStreamer
 - Compilers: V8, JavaScriptCore, SpiderMonkey, Guile
 - Software-defined networking: Snabb
 - ...



Introduction

Goals of the project

- Integrate full-featured Chromium browser in GDP
 - Use Intel's [Ozone-Wayland](#) project, most complete implementation of Wayland so far
 - Get latest possible version of the browser working
- Analyze and fix multi-seat implementation, if required
- Funding: GENIVI challenge grant and Igalia contributions

Elements and versions

- Chromium: latest stable release was 54 at that point
- Ozone-Wayland: latest branch supports Chromium 53
- Meta-browser: supporting Chromium 48
- GENIVI BSPs

Rebase & integrate Chromium browser

Work on meta-browser

- Simplify configuration
 - Obsolete CHROMIUM_ENABLE_WAYLAND detection
- Build chromium+wayland version 53
 - Recipe was pointing to version 48
 - Required patch backport
- Fix specific build scenarios
 - x86 32 bit, mixed x11+wayland libs
- Contributed to upstream [meta-browser](#) project

Integration in GDP

- Integration with HMI: .app and .service files
 - .desktop for GDP12/master
- Force window size to get the proper aspect ratio
- Fix compilation on different platforms: Raspberry Pi 3, R-Car Gen 3
- Backport upstream chromium patch to fix issues with kernel ≥ 4.5 (GDP master)
- Under revision on [PR#53](#) (GDP master)
 - GDP 11 patches available in [branch](#)

Current status

- GDP integration under revision on [PR#53](#) (GDP master)
- Supported hardware:
 - Minnowboard: up and running
 - R-Car Gen. 3: up and running
 - Raspberry Pi 3: work in progress
- HMI integration in GDP 12/master
 - Detected some issues in HMI side, hopefully fixed in master

Multi-seat implementation

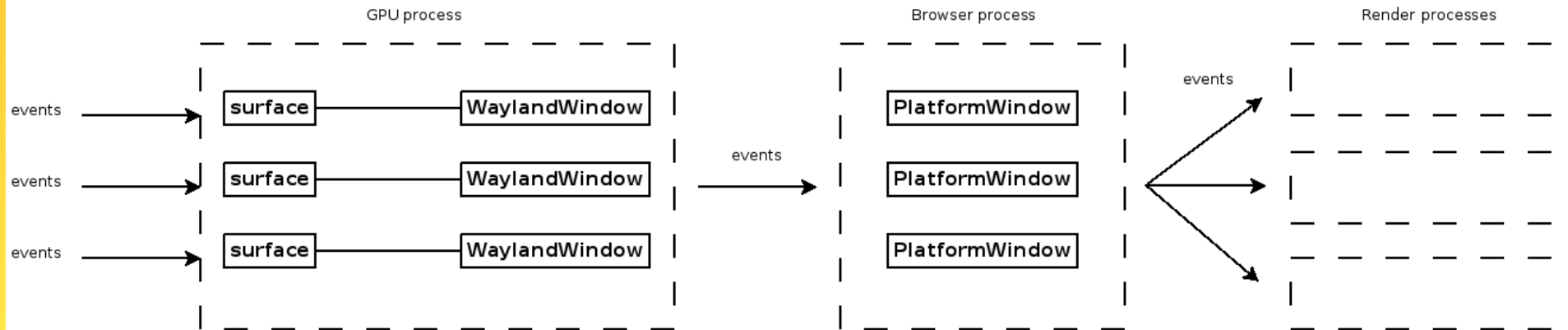
Analysis

- Check status of multi-seat features in Ozone-Wayland
- Issues found:
 - Keyboard focus can be stolen
 - Only one browser window receives all input events on a multi-seat configuration

Keyboard focus can be stolen

- Underlying cause: no independent keyboard and pointer focus
 - Window with pointer focus also receives keyboard events
- Solution:
 - Split keyboard and pointer focus
 - Modify window focus logic
 - Enable window focus on keyboard events
 - Break assumption of only one focused window

Flow of events in Chromium processes



Multi-seat configuration problems

- Underlying cause: assumption there is only one focused window
 - Focused window receives all events
 - Chromium browser process gathers all events and sends them to the focused window
 - No awareness of the different seats sending events

Parts of the solution

- Input device abstractions must be aware of the seat they belong to
 - Add extra information to internal IPC messages related to events
- Browser process must be aware of the concept of “seat”
 - New IPC signal to sync seat objects between GPU and browser processes
- GPU process must check seat assignment
 - Sync with browser process using a new IPC signal

Current status

- WIP implementation available in [branch wip/multi-seat](#)
- Implementation is feature complete
- Requires some additional work & clean-up
- Goal: contribute back to main Ozone-Wayland project
 - Probably required to remove IVI input bits



Next steps

GENIVI future plans

- Short term: hardware support, Raspberry Pi
- CEF on Wayland
 - Will provide a stable API to build upon
 - Will provide API for embedders
- Browser API implementation
 - Start with a small subset of operations

GENIVI future plans

- Integration with GENIVI subsystems:
 - Audio Manager
 - Persistence API
- Longer term: replace Ozone-Wayland
 - Wait until upstream catches up



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