Browser Solutions for GDP
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Browser Architecture

Browser

User Interface

Browser Engine

Rendering Engine

Network
JS Engine
XML Parser
Graphics Backend

Persistence
Web Runtime Architecture

Application

API

Browser Engine

Rendering Engine

Network  JS Engine  XML Parser  Graphics Backend

Persistence

Web Runtime
Choices

• Chrome
  – Complete browser with API extensions for web applications
  – UI layer that includes history, bookmarks, incognito, etc.
• Chromium Embedded Framework (CEF)
  – Core web runtime based on Chromium without UI layer and API extensions for web applications
  – Preserves and interfaces the multi-process architecture of Chromium
  – API for development of applications
• Crosswalk
  – Web application runtime based on Chromium developed by Intel
  – Adapts Chromium’s multi-process architecture to its needs
  – Designed to run applications not web pages. Buildout to browser requires large development effort.
• QtWebEngine
  – Evolution of QtWebKit but based on Chromium
  – Integrated with the Qt framework
  – Open-source version is GPLv3 licensed
Requirements for GDP

• Web browser that is compatible with any web applications so that users can surf the web as they would on a PC or mobile device.
• Simple web viewer that can integrate with native platform applications to render HTML and execute JavaScript.
• Dbus API

Chrome and/or CEF with a common API
Graphics Backend

- Ozone is Chromium’s graphics abstraction layer for different OS platforms. Google maintains Ozone implementations for X11, Windows, MacOS, ChromeOS.

- GDP uses Weston compositor which implements the Wayland protocol. Much simpler than X11 but Chrome does not support it out of the box.

- XWayland is an X Server running as a Wayland client to provide backwards compatibility for X Clients. However, that is a very heavyweight solution just to support a web browser.
Ozone-Wayland

- Ozone-Wayland is an Ozone implementation for Wayland-compatible compositors.
- Originally developed by Intel.
- Currently provides the most of the Ozone functionality.
- Google engineers do not agree with the Ozone-Wayland architecture and developed their own implementation but it is far from being production-ready.
Integrating Chromium with GDP

• Ozone Wayland Completion
  – Multi-seat / Multi-screen
  – Window Resize/Move/Minimize/Maximize
  – Drag-and-Drop
  – Copy-and-Paste
  – Text Selection

• GDP Integration
  – Build Chromium with Yocto for GDP
  – Configure Chromium for GDP platform
  – Create and maintain Yocto recipes
DBus Interface

- Current GENIVI specification details interfaces for page window, browser settings, bookmark management, certificate management, etc.

- Integration of Chrome allows the use of the Chrome Extensions API for application development.

- Reduces the set of GENIVI APIs and replaces them with standard Chrome APIs.

- Chrome and CEF can both be controlled using the simplified dbus API for window control.
Summary

• The Networking Expert Group considers Chrome and CEF as the best suitable solutions for GDP.
• Chrome offers complete browser support with JavaScript APIs where web applications require them.
• CEF provides a bare-bones HTML and JavaScript engine but without API support.
• Basic functionality can be controlled through a common dbus API.
• OEMs and Tier 1 can choose either one or both for their target platforms without GENIVI prescribing a specific solution.
Thank you!

Weekly Networking Expert Group Call
Mondays 0800 PT / 1700 CET
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