The Web Platform on Linux devices with WebKit: where are we now?

Mario Sánchez-Prada
mario@igalia.com

FOSDEM 2026
Brussels, 31st January 2026

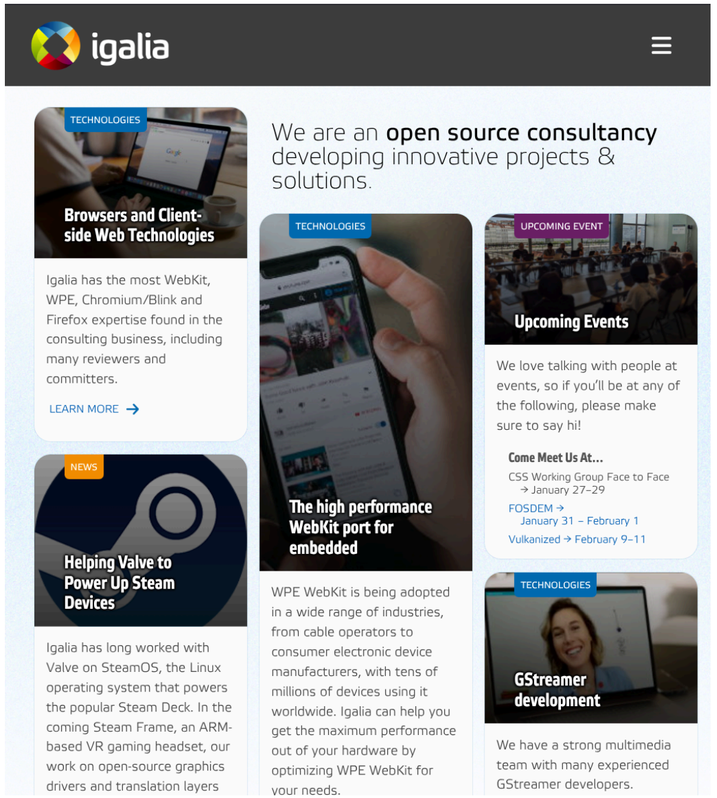
igalia

About Me

- **Software Engineer** and partner at **Igalia**.
- **Open Source work**: GNOME, Chromium/Blink, WebKit.
- **Other**: Maemo, Endless OS, Samsung Smart TV.
- Currently **coordinating** Igalia's **WebKit team**.

About Igalia

- **Founded in A Coruña (Spain)** in 2001.
- Specialized **Open Source consultancy**.
- **Fully remote** and with a **flat structure**.
- Second-largest **contributor** to the main Open Source **Web Rendering Engines**.
- **Other OSS work**: kernel, compilers, multimedia, graphics, drivers...
- Members of different **Working groups**:
  - W3C, WHATWG, TC39, Test262, Khronos...



https://www.igalia.com

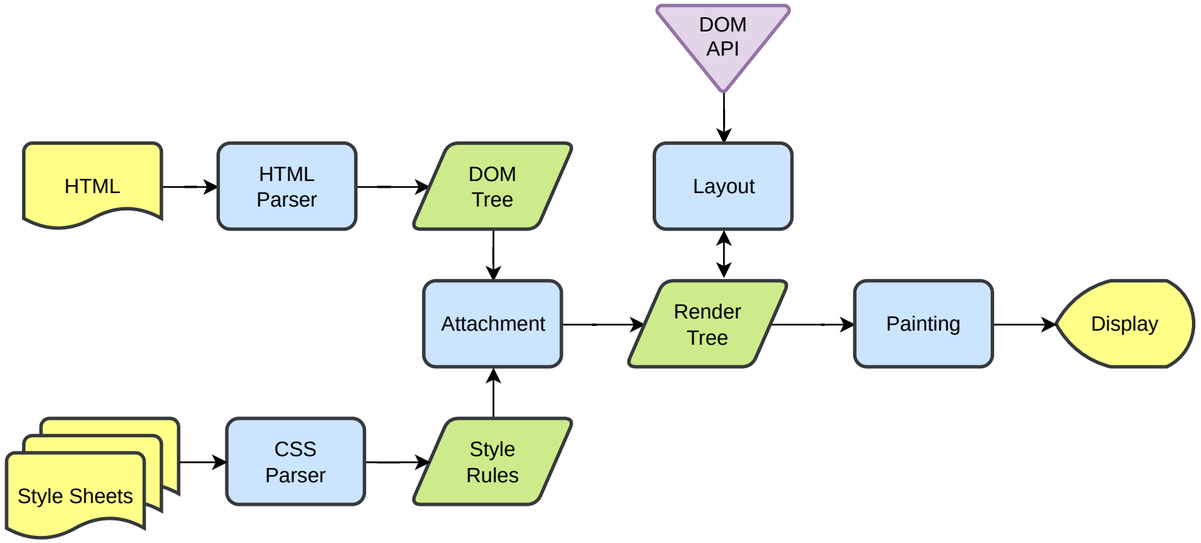
Outline

1. Web Rendering Engines
2. What is WebKit?
3. WebKitGTK & WPE WebKit
4. History of WebKitGTK & WPE WebKit
5. Latest updates
6. Next steps

Web Rendering Engines

What is a Web rendering engine?

- **Fetches** HTML / CSS / JavaScript content from multiple sources.
- **Interprets** the web content to create an internal representation.
- **Renders a result** that users can **interact with**.



Main Web rendering engines

Main Web rendering engines

servo

What is WebKit?

https://webkit.org

What is WebKit?

- Open Source **Web rendering engine** since 2005.
  - Forked from KHTML and KJS by Apple in 2001.
  - Forked again by Google in 2013 (*Blink*).
- **Main goals**:
  - Performance, portability, stability, compatibility, standards compliance, security, hackability and *embeddability*.
- Support for **different platforms**:
  - **Desktop & Mobile**: Mac, iOS, Linux, Windows.
  - **Embedded**: set-top-boxes, gaming consoles, smart home appliances, IVI systems, GPS navigation, digital signage...
- **Multi-process** architecture:
  - UI Process, Web Process, Network Process, GPU Process...

Advantages of WebKit

🕸️ **Complete implementation** of the Web Platform

🔌 **Embeddable** as top priority

🧩 **Flexible and modular** architecture

🚀 **Performance** and **stability**

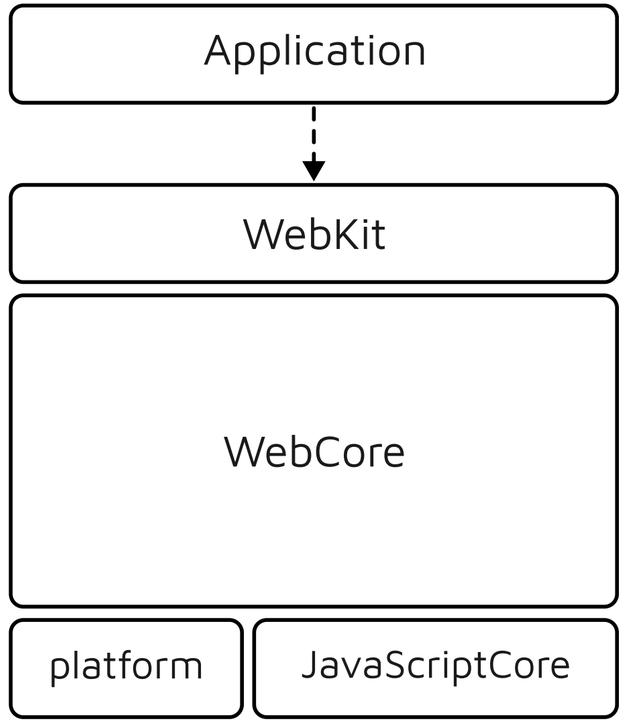
🔒 **Privacy** and **security** by design

🐧 **Independent** Linux-based flavours

- 👌 Not controlled by any big corporation

WebKit architecture

- **Application**:
  - What the end-users interact with.
- **WebKit**:
  - Exposes a public API to applications and implements the multi-process model.
- **WebCore**:
  - HTML/CSS parsing, rendering, layout, painting, network, multimedia, accessibility…
- **JavaScriptCore**:
  - JavaScript engine (also supports WebAssembly).
- **Platform**:
  - Platform-specific hooks and low-level plumbing.

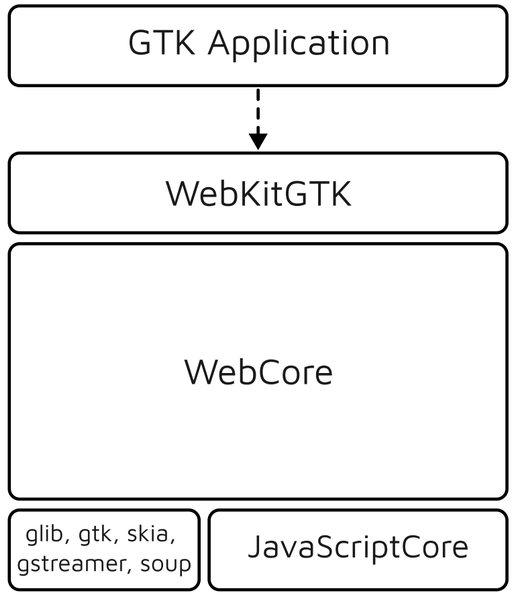


WebKit ports

WebKit port: adaptation of WebKit to a platform.

Official WebKit Ports (*upstream* ports):

- **Mac**: Safari, Apple Mail, iTunes, App Store...
- **iOS**: Web browsers on iOS devices (also Chrome).
- **Windows**: Microsoft Playwright, PlayStation SDK.
- **PlayStation**: PlayStation 4 & PlayStation 5.
- **WebKitGTK**: GNOME Web, Evolution, Shotwell...
- **WPE WebKit**: Custom "browsers" for embedded devices.



e.g. WebKitGTK port

https://docs.webkit.org/Ports/Introduction.html

WebKitGTK & WPE WebKit

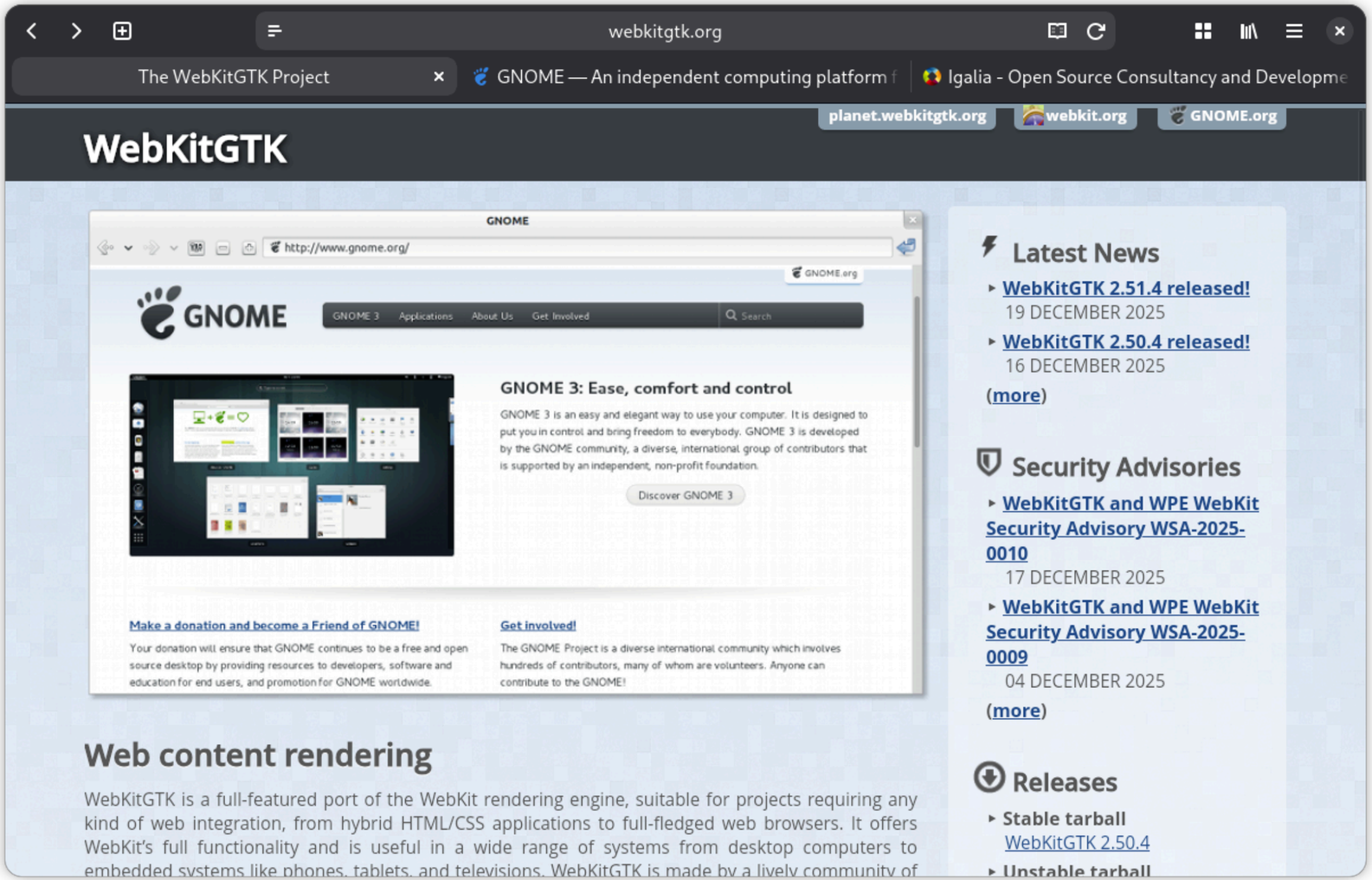
What is WebKitGTK?

WebKitGTK: port of **WebKit** for Linux-based **GTK applications**.

- **Fully-featured** implementation of the **Web Platform**
  - Support for **HW-accelerated graphics** and **multimedia**.
- **Used** in a wide variety of **GTK applications**:
  - GNOME Web (browser), Evolution (mail client), GNOME Builder (IDE)...
- **Provides a *widget*** to be used in GTK applications: `WebKitWebView`
  - Offers a public API to interact with the Web engine and respond to events.
  - Platform-specific functionality is implemented on top of other components (e.g. Skia, OpenGL, EGL, GStreamer, libsoup, fontconfig, harfbuzz...).
- Fully operational **JavaScript engine** (JavaScriptCore)

ℹ️ **https://webkitgtk.org**

What is WebKitGTK?



What is WPE WebKit?

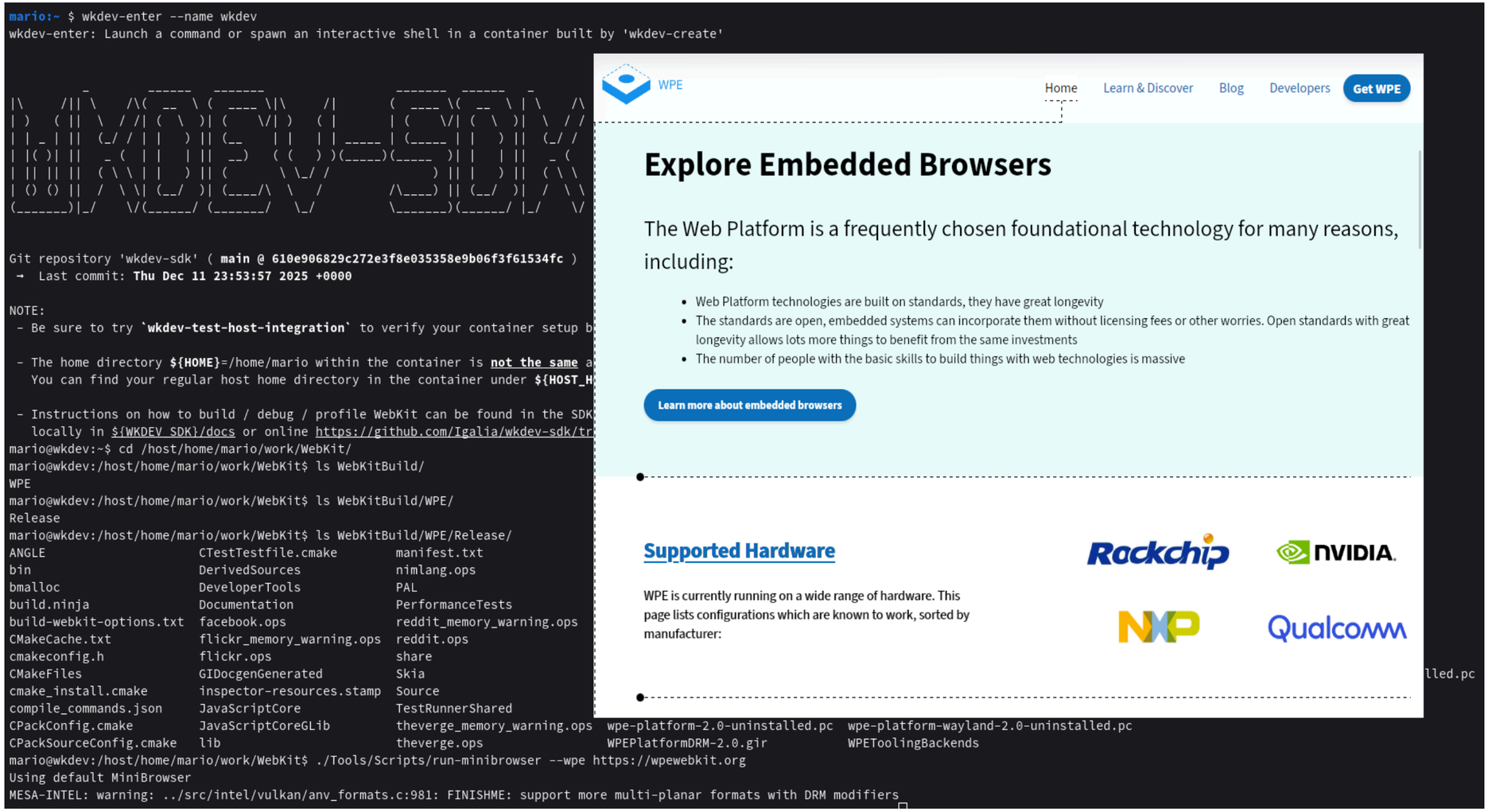
WPE WebKit: port of **WebKit** for Linux-based **embedded devices**

- **Shared architecture with WebKitGTK**
  - **Common parts**: GLib, Skia, GStreamer, libsoup, fontconfig...
  - **Key differences**: **no UI toolkit**, graphics stack, input handling.
- Focus on **flexibility**, **security** and **performance**
- **Minimal** set of **dependencies**
- **Backend-based** architecture for I/O
- **Low memory** and **storage footprint**
- Platform-specific **HW-acceleration**

WPE

ℹ️ **https://wpewebkit.org**

What is WPE WebKit?

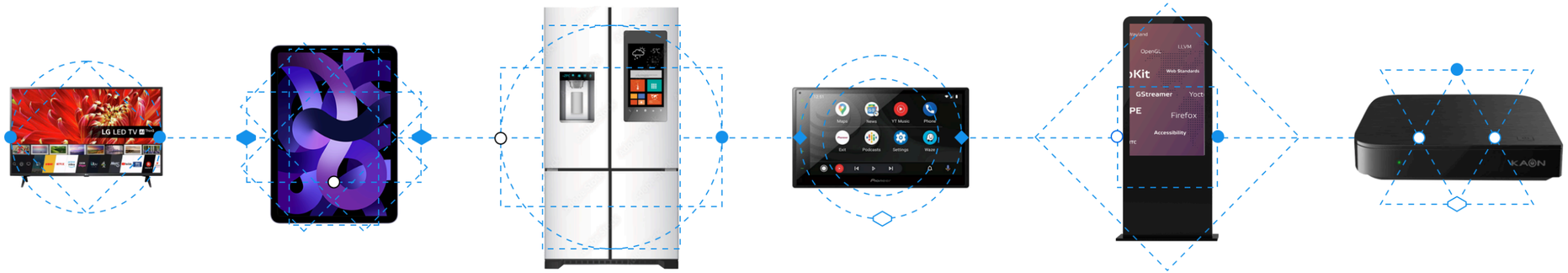


Why do Web rendering engines matter in embedded devices?

- **Strategic role in the software stack** of embedded devices
  - Rendering, networking, security sandbox, media, I/O, accessibility...
- The **Web Platform allows building all sorts of applications**
  - Flexibility for designing, implementing and testing your product.
- **Known development stack**
  - Massive pool of web developers that could implement applications.
- **Useful to implement all kinds of products**
  - Smart home, In-Vehicle/Flight Infotainment, digital signage...

WebKit on embedded devices

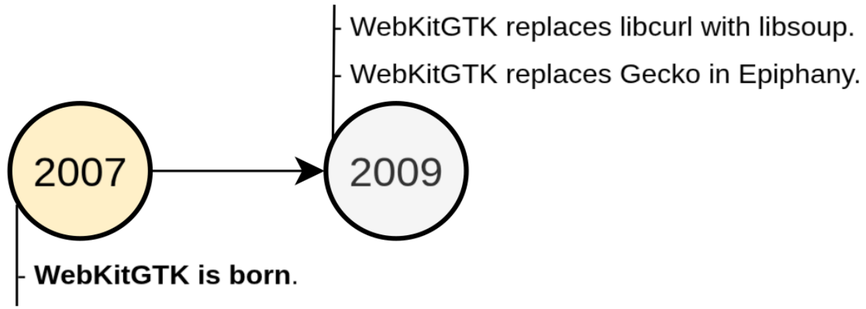
- Phones & tablets
- Set-top boxes & TVs
- Smart home appliances
- GPS navigation devices
- Audio/video conferencing
- Hi-Fi sound systems
- Audio streaming
- Digital signage
- Server-side rendering
- QA and testing



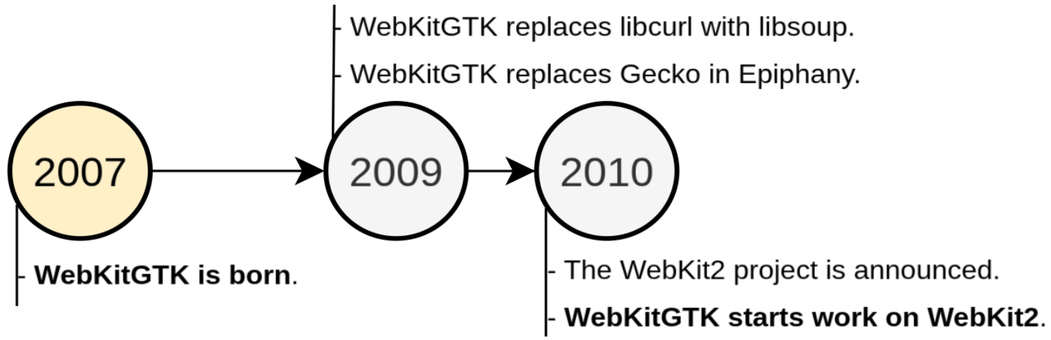
History of WebKitGTK & WPE WebKit

History of WebKitGTK & WPE WebKit

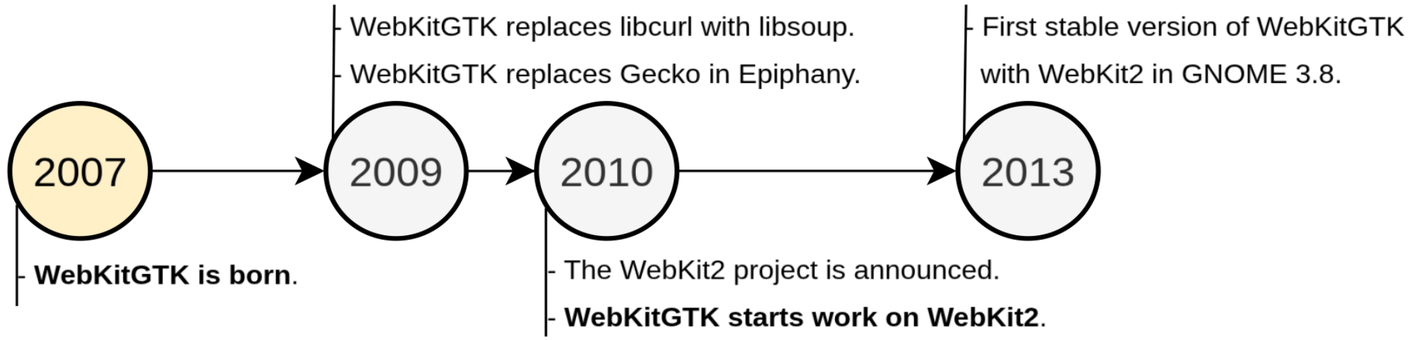
History of WebKitGTK & WPE WebKit



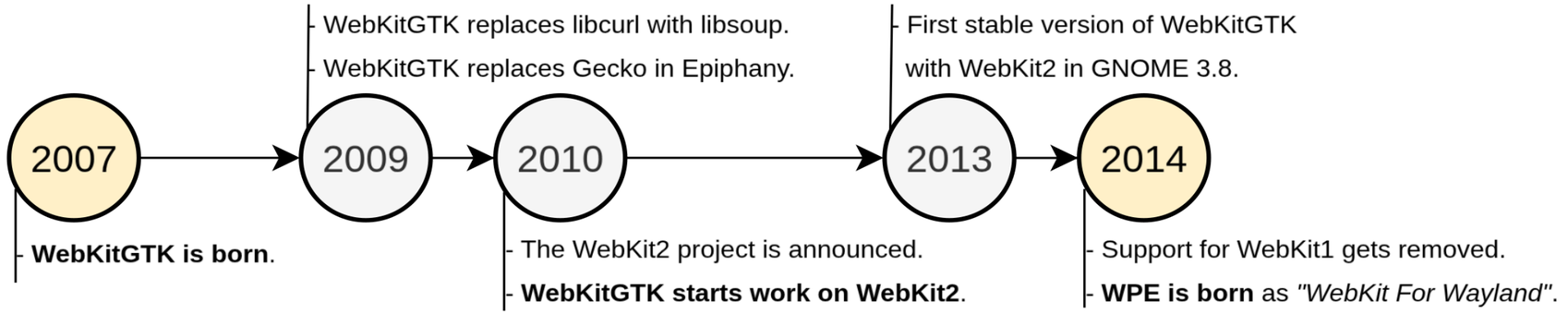
History of WebKitGTK & WPE WebKit



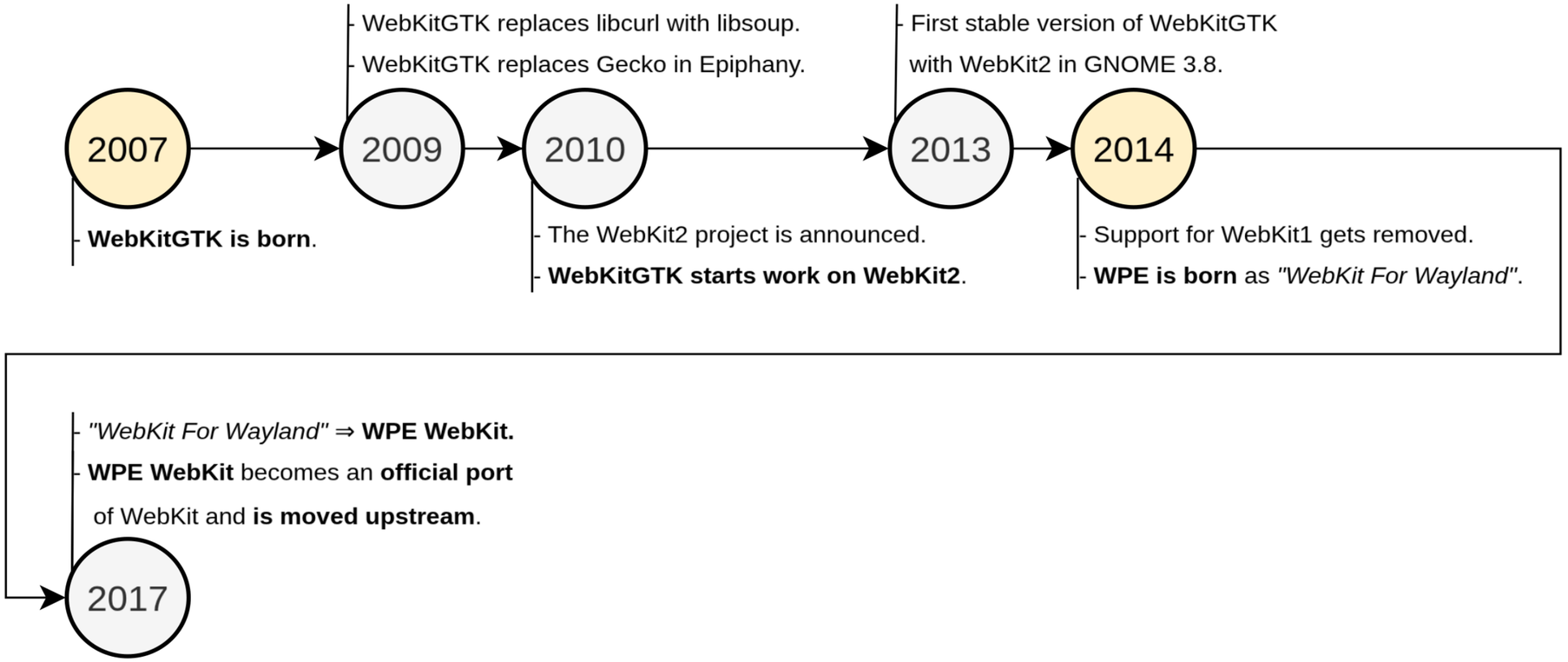
History of WebKitGTK & WPE WebKit



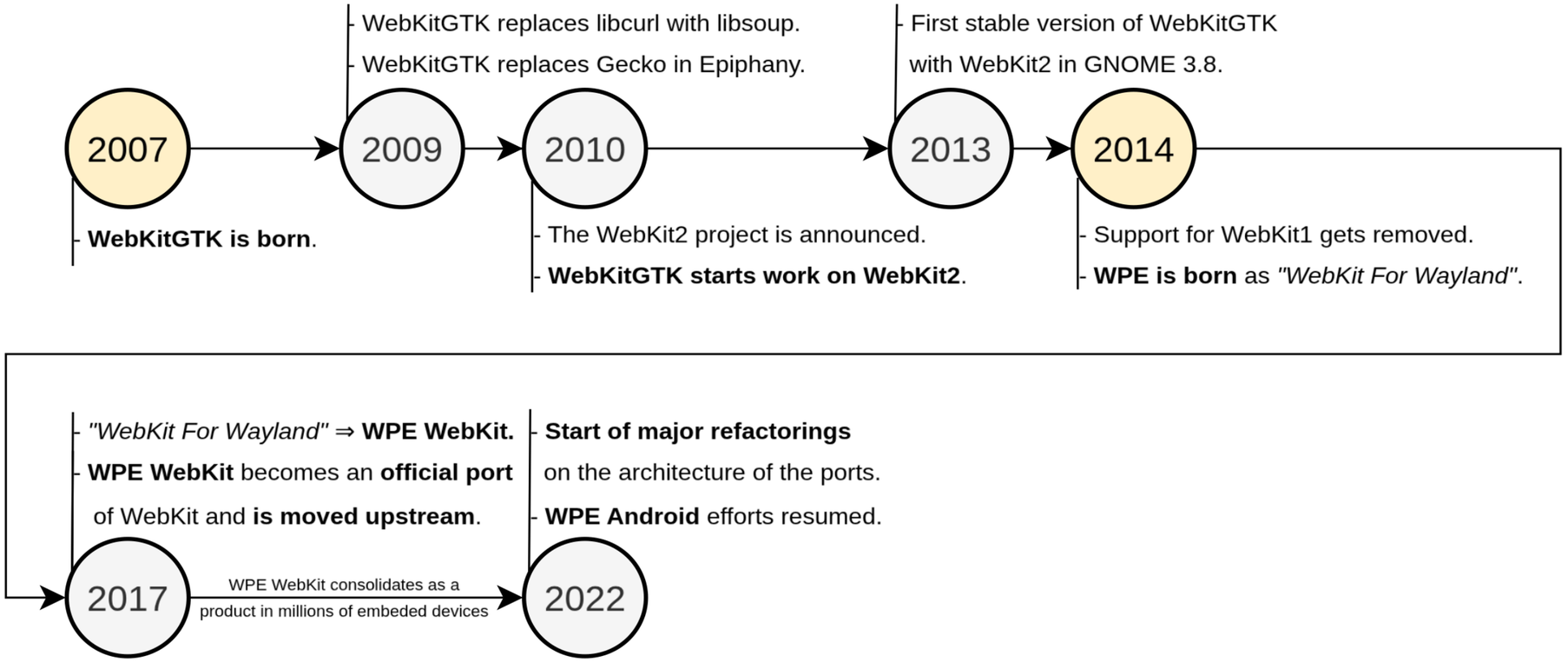
History of WebKitGTK & WPE WebKit



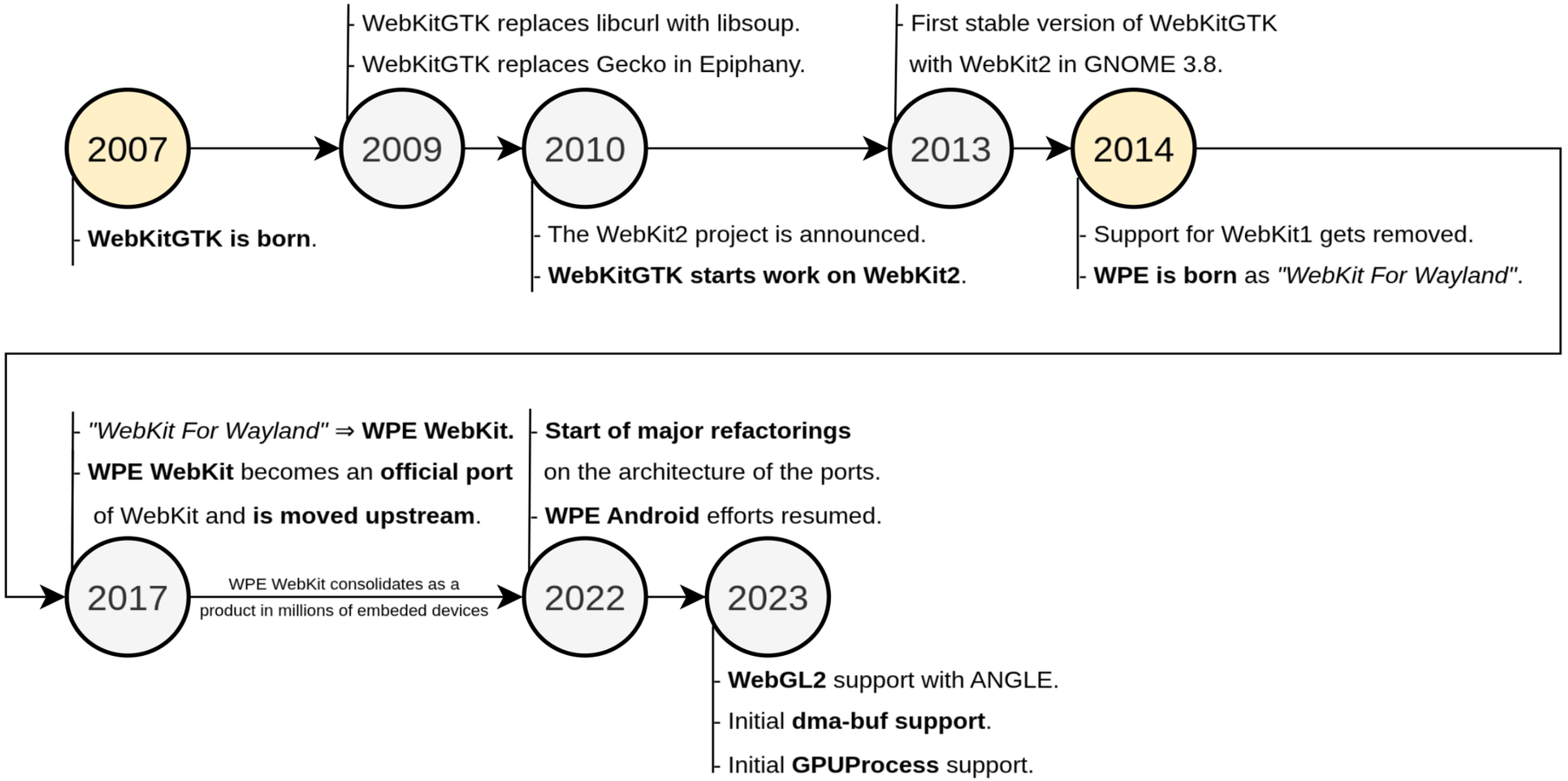
History of WebKitGTK & WPE WebKit



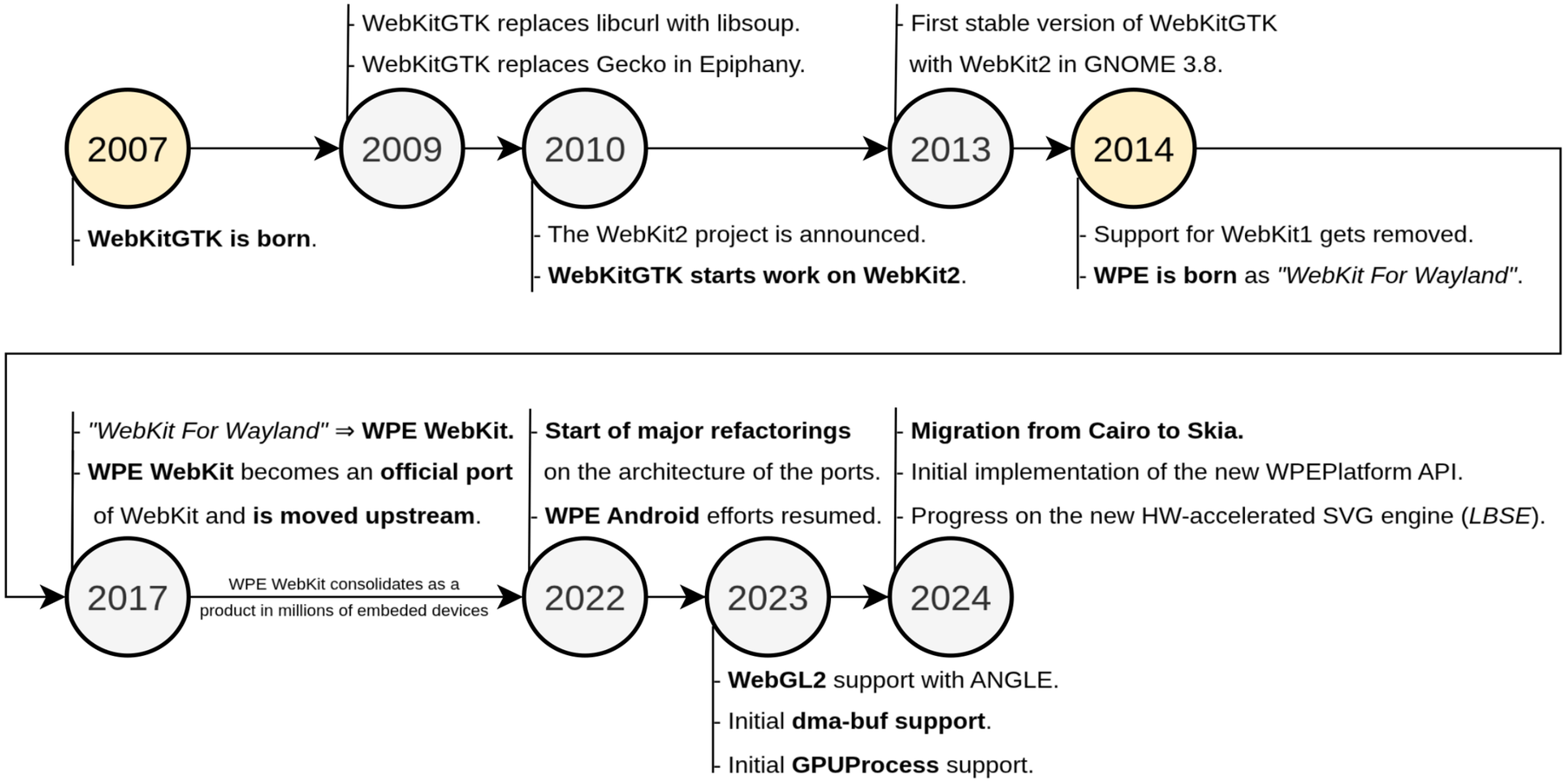
History of WebKitGTK & WPE WebKit



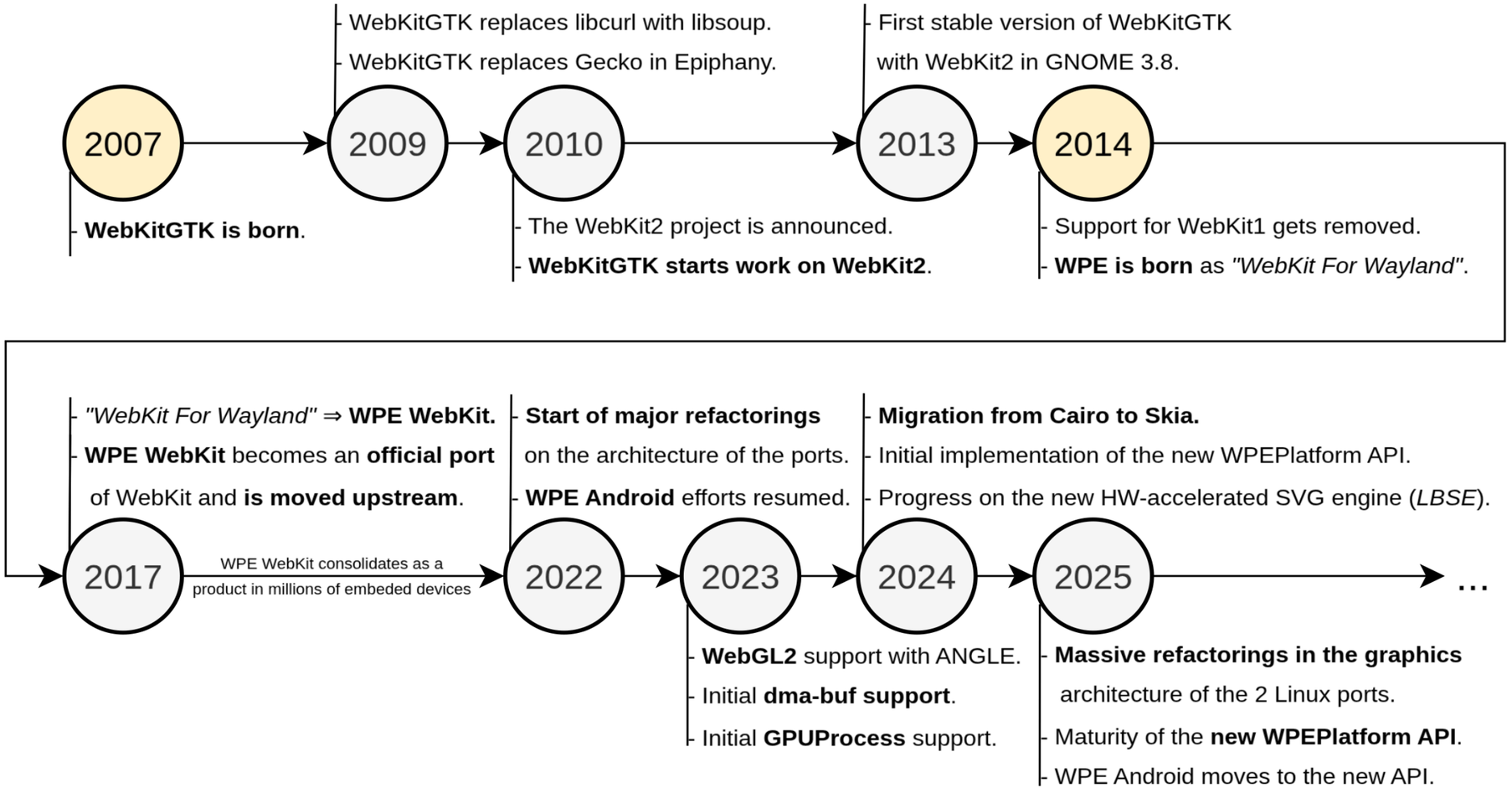
History of WebKitGTK & WPE WebKit



History of WebKitGTK & WPE WebKit



History of WebKitGTK & WPE WebKit



Latest updates

Latest updates

- **2 new stable releases** of WebKitGTK and WPE WebKit:
  - Published in March (2.48) and September (2.50), as usual.
  - Numerous updates and improvements in HTML, CSS, JS and Web features.

Latest updates

- **2 new stable releases** of WebKitGTK and WPE WebKit:
  - Published in March (2.48) and September (2.50), as usual.
  - Numerous updates and improvements in HTML, CSS, JS and Web features.
- **Multimedia-related improvements**
  - WebM support in MediaRecorder, WebAudio fixes, WebCodecs compliance.
  - GStreamer-based WebRTC backends.

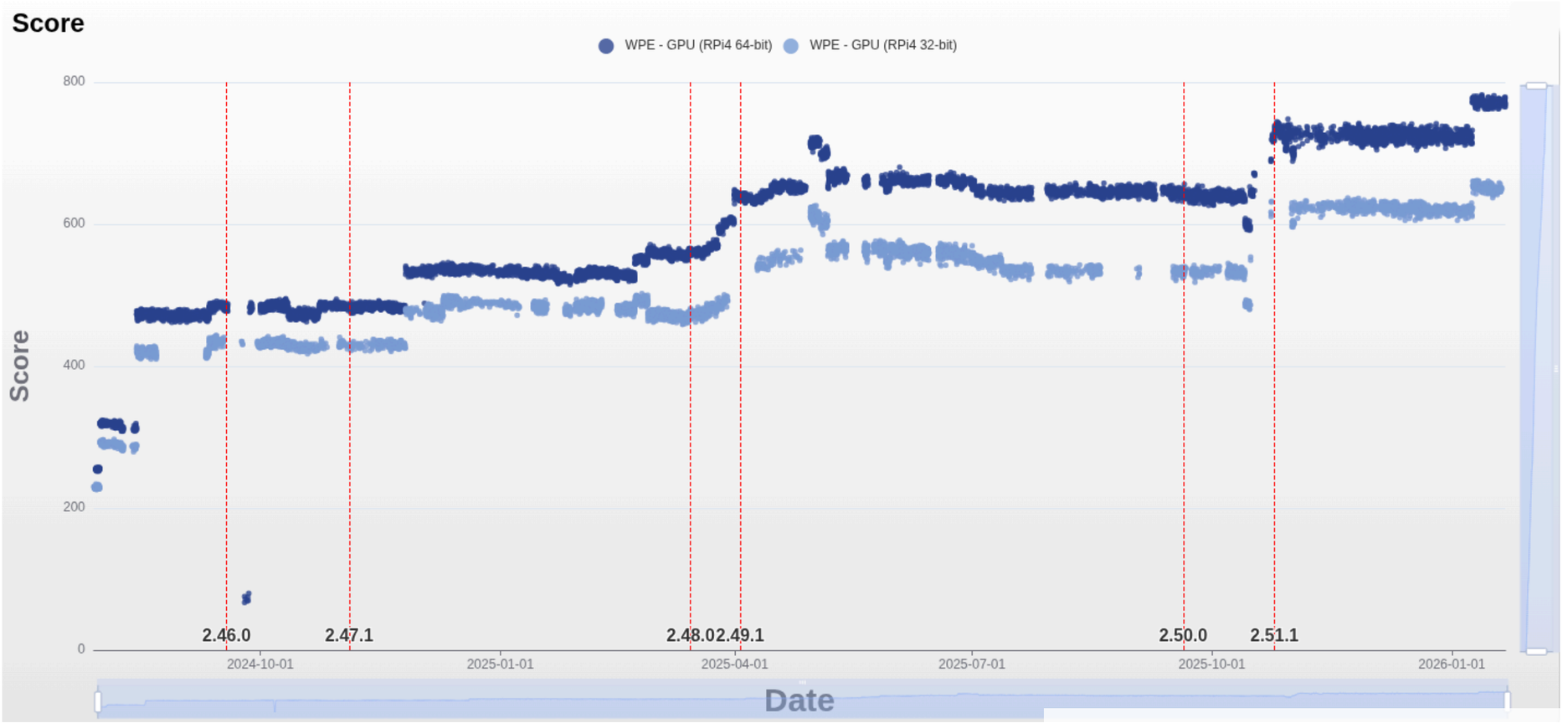
Latest updates

- **2 new stable releases** of WebKitGTK and WPE WebKit:
  - Published in March (2.48) and September (2.50), as usual.
  - Numerous updates and improvements in HTML, CSS, JS and Web features.
- **Multimedia-related improvements**
  - WebM support in MediaRecorder, WebAudio fixes, WebCodecs compliance.
  - GStreamer-based WebRTC backends.
- **Big overhaul** to the **graphics rendering pipeline**
  - Major refactoring and removal of unused abstraction layers.
  - Threaded GPU rendering, GPUProcess for WebGL.
  - Damage tracking and propagation to the compositing stage.

Latest updates

MotionMark 1.3 improvements on the 32-bit & 64-bit Raspberry Pi 4

Last processed revision — RPi4 32-bit: **305815@main·RPi4** 64-bit: **305924@main**



Latest updates

MotionMark 1.3 improvements on the 64-bit Raspberry Pi 4

Test	Score July 2024	Score April 2025	Score October 2025	Score January 2026
Multiply	501.17	710.75	697.15	678.93
Canvas arcs	140.24	820.64	859.68	859.48
Canvas lines	1613.93	3025.16	4648.54	7508.43
Paths	375.52	4268.87	3953.83	4288.59
Leaves	319.31	480.19	684.72	673.94
Images	162.69	265.14	263.19	267.88
Suits	232.91	444.55	388.62	399.03
Design	33.79	63.99	114.09	100.24
OVERALL	**254.15**	**634.49**	**737.56**	**778.99**

Latest updates

- **JavaScriptCore**
  - Improve memory management for long-running applications.
  - New tooling to detect memory leaks and do profiling.
  - WASM-related work for 32-bit support (i.e. BBQJIT, OMG, IPInt).

Latest updates

- **JavaScriptCore**
  - Improve memory management for long-running applications.
  - New tooling to detect memory leaks and do profiling.
  - WASM-related work for 32-bit support (i.e. BBQJIT, OMG, IPInt).
- **Security**
  - 2 major feature releases + several bug/security fixes releases.
  - Increase use of smart pointers, dropped libsoup2 support.

Latest updates

- **JavaScriptCore**
  - Improve memory management for long-running applications.
  - New tooling to detect memory leaks and do profiling.
  - WASM-related work for 32-bit support (i.e. BBQJIT, OMG, IPInt).
- **Security**
  - 2 major feature releases + several bug/security fixes releases.
  - Increase use of smart pointers, dropped libsoup2 support.
- **Quality assurance**
  - Better infrastructure, improved test coverage.
  - Move the QA bots to the new **WebKit Container SDK**.

Latest updates

- **New `WPEPlatform` API**
  - Support for accessibility, multiple views, touch events in DRM platform.
  - GTK4 platform implementation via an external backend.
  - Multiple API additions and API tests. Integration with QA bots.

Latest updates

- **New `WPEPlatform` API**
  - Support for accessibility, multiple views, touch events in DRM platform.
  - GTK4 platform implementation via an external backend.
  - Multiple API additions and API tests. Integration with QA bots.
- **Android support**
  - Upstreamed all the patches from the WPE-Android project.
  - AHardwareBuffer support for Android in WebKit upstream.
  - Native integration with Android subsystems (e.g. logging).
  - Kept evolving the WPE-Android project (WPE 2.50, NDK r27, `WPEPlatform` API).

Latest updates

- **New `WPEPlatform` API**
  - Support for accessibility, multiple views, touch events in DRM platform.
  - GTK4 platform implementation via an external backend.
  - Multiple API additions and API tests. Integration with QA bots.
- **Android support**
  - Upstreamed all the patches from the WPE-Android project.
  - AHardwareBuffer support for Android in WebKit upstream.
  - Native integration with Android subsystems (e.g. logging).
  - Kept evolving the WPE-Android project (WPE 2.50, NDK r27, `WPEPlatform` API).
- **WebXR support**
  - Implemented WebXR using OpenXR and added support for the WebXR AR module.
  - Enabled WebXR support on both Linux and Android.

Next steps

Next steps

- **Multimedia-related improvements**
  - GStreamer-based WebRTC backend.
  - Screen capture streaming to WebRTC PeerConnection.
  - WebCodecs integration with WebGL and WebAudio.
  - Player suspension (useful in pages with many media elements).

Next steps

- **Multimedia-related improvements**
  - GStreamer-based WebRTC backend.
  - Screen capture streaming to WebRTC PeerConnection.
  - WebCodecs integration with WebGL and WebAudio.
  - Player suspension (useful in pages with many media elements).
- **More work** on the **graphics rendering pipeline**
  - Align the graphics architecture with other ports.
  - Compositor refactor to avoid OpenGL dependency and support new APIs.
  - Improvements around async scrolling animations.
  - Enable GPUProcess in more cases (i.e. WebGL only for now).
  - Remove Cairo support.

Next steps

- **JavaScriptCore**
  - Memory improvements for long-running applications.
  - Better tooling to investigate memory-related problems.

Next steps

- **JavaScriptCore**
  - Memory improvements for long-running applications.
  - Better tooling to investigate memory-related problems.
- **Security**
  - Keep working on the same release cadence and handling Security Advisories.
  - Smart pointer coverage, reduce instances of unsafe buffers access.

Next steps

- **JavaScriptCore**
  - Memory improvements for long-running applications.
  - Better tooling to investigate memory-related problems.
- **Security**
  - Keep working on the same release cadence and handling Security Advisories.
  - Smart pointer coverage, reduce instances of unsafe buffers access.
- **Quality assurance**
  - Better QA infrastructure and improve test coverage.
  - Resume the WebKit *gardening* efforts for the Linux ports.

Next steps

- **New `WPEPlatform` API**
  - Complete the new `WPEPlatform` API.
  - Write more API tests and documentation.
  - Release version 1.0 (aiming for WPE 2.54).

Next steps

- **New `WPEPlatform` API**
  - Complete the new `WPEPlatform` API.
  - Write more API tests and documentation.
  - Release version 1.0 (aiming for WPE 2.54).
- **Android support**
  - Complete migration to the new `WPEPlatform` API.
  - Integrate with the upstream testing infrastructure.

Next steps

- **New `WPEPlatform` API**
  - Complete the new `WPEPlatform` API.
  - Write more API tests and documentation.
  - Release version 1.0 (aiming for WPE 2.54).
- **Android support**
  - Complete migration to the new `WPEPlatform` API.
  - Integrate with the upstream testing infrastructure.
- **WebXR support**
  - Implement more WebXR modules.
  - Implement WebXR layers, hit test, and anchors.

Wrapping up

- **WebKit** keeps being a **complete and embeddable Web engine on Linux**.
  - **WebKitGTK** for GTK-based applications, **WPE WebKit** for embedded devices.

Wrapping up

- **WebKit** keeps being a **complete and embeddable Web engine on Linux**.
  - **WebKitGTK** for GTK-based applications, **WPE WebKit** for embedded devices.
- Both ports provide **mature and actively-maintained Linux ports**.
  - Big push in the past 4 years greatly improved performance and quality.
  - Recent releases delivered major improvements, particularly around graphics.

Wrapping up

- **WebKit** keeps being a **complete and embeddable Web engine on Linux**.
  - **WebKitGTK** for GTK-based applications, **WPE WebKit** for embedded devices.
- Both ports provide **mature and actively-maintained Linux ports**.
  - Big push in the past 4 years greatly improved performance and quality.
  - Recent releases delivered major improvements, particularly around graphics.
- **Next steps** focused on **performance**, **stability**, and **maintainability**.
  - **New possibilities** opening with **Android** and **WebXR support**.

Wrapping up

- **WebKit** keeps being a **complete and embeddable Web engine on Linux**.
  - **WebKitGTK** for GTK-based applications, **WPE WebKit** for embedded devices.
- Both ports provide **mature and actively-maintained Linux ports**.
  - Big push in the past 4 years greatly improved performance and quality.
  - Recent releases delivered major improvements, particularly around graphics.
- **Next steps** focused on **performance**, **stability**, and **maintainability**.
  - **New possibilities** opening with **Android** and **WebXR support**.

It's a pretty exciting moment for **WebKit on Linux**!

How to contribute

WebKit:

- Website: **https://webkit.org**
- Mailing list: **https://lists.webkit.org/mailman3/lists/webkit-dev.lists.webkit.org**
- Documentation: **https://docs.webkit.org**

WebKitGTK:

- Website: **https://wpewebkit.org**
- Mastodon: **https://floss.social/@WebKitGTK**
- Bluesky: **https://bsky.app/profile/webkitgtk.org**
- Mailing list: **https://lists.webkit.org/mailman3/lists/webkit-gtk.lists.webkit.org**
- Matrix: **#webkitgtk:matrix.org**

WPE WebKit:

- Website: **https://webkitgtk.org**
- Mastodon: **https://floss.social/@WPEWebKit**
- Bluesky: **https://bsky.app/profile/wpewebkit.org**
- Mailing list: **https://lists.webkit.org/mailman3/lists/webkit-wpe.lists.webkit.org**
- Matrix: **#wpe:matrix.org**

Questions?

Mario Sánchez-Prada
mario@igalia.com


igalia