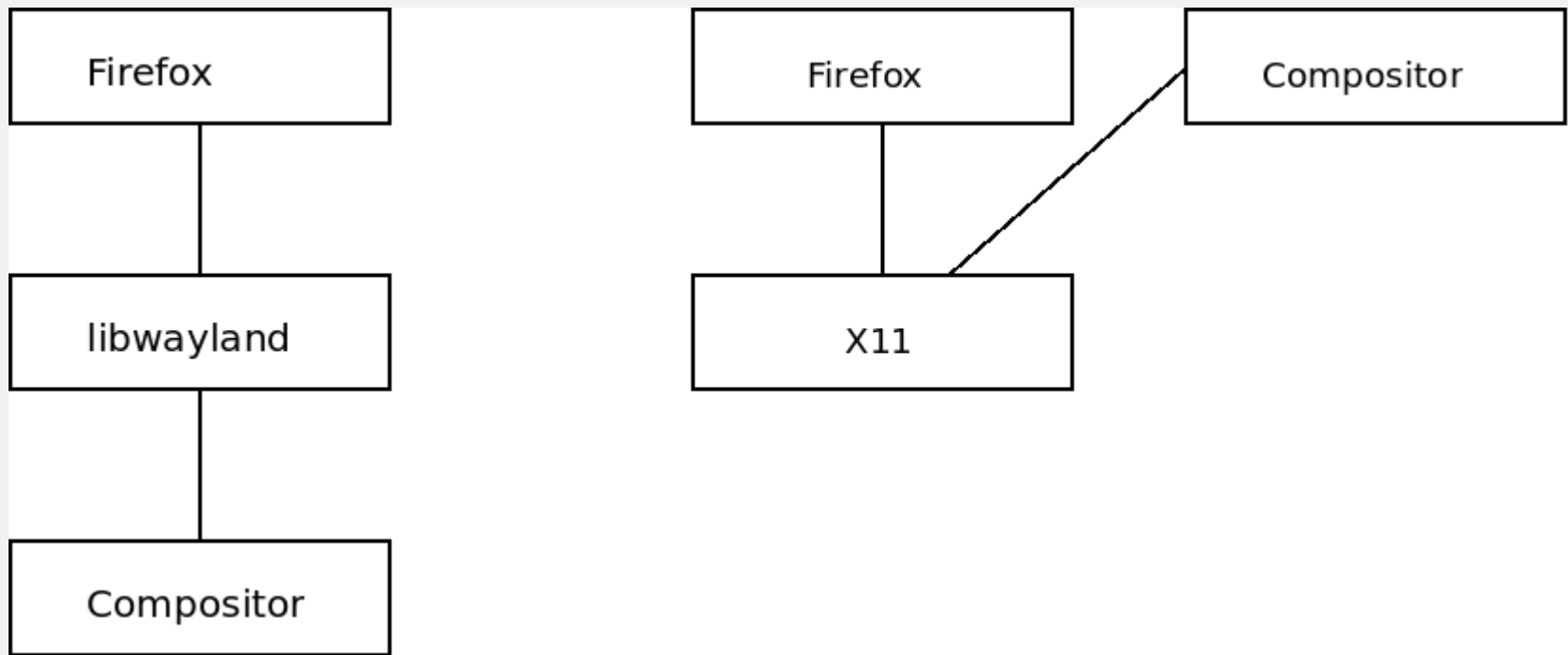




Firefox & Wayland

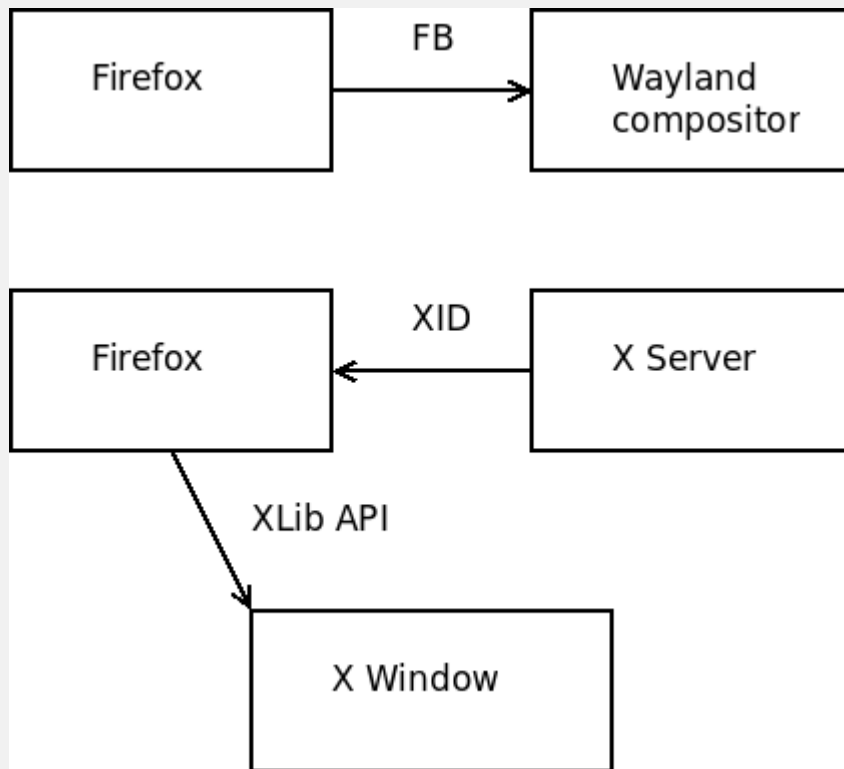
Martin Stránský
<http://people.redhat.com/stransky/>

Architecture overview



Wayland compositors – mutter, kwim, sway...

Architecture



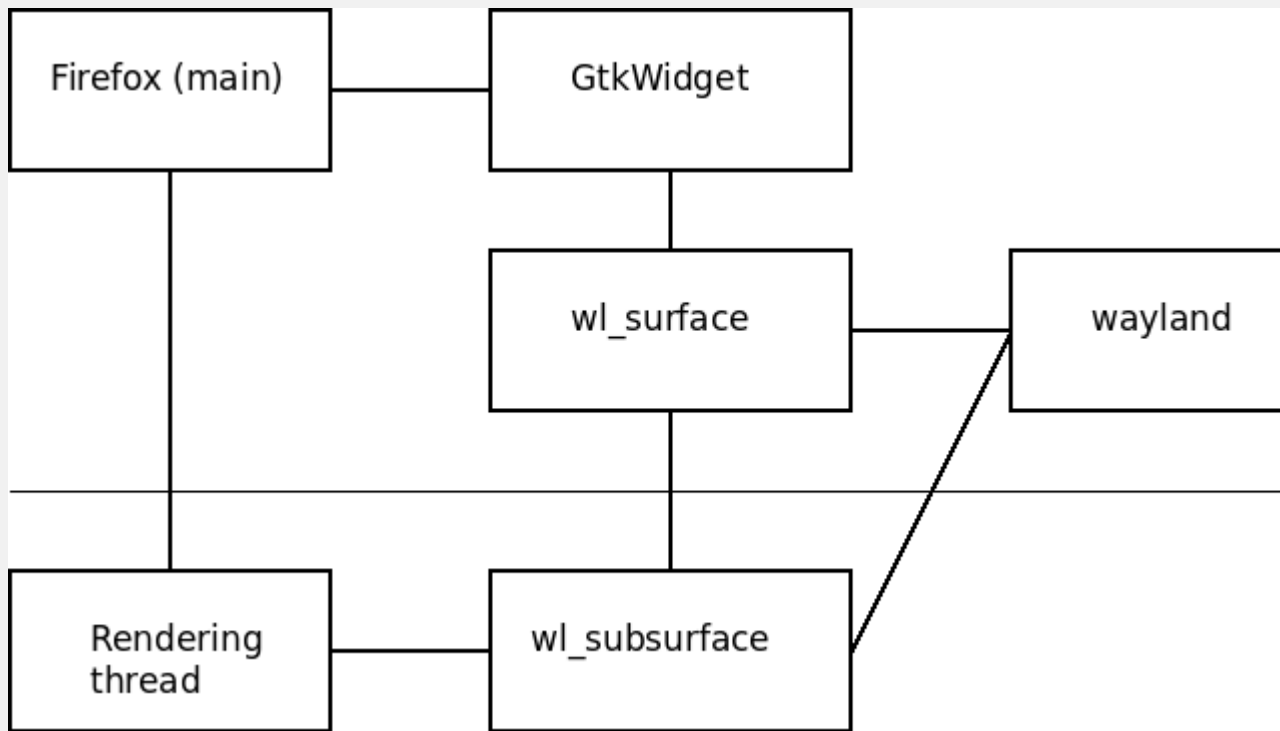
- Window is defined by `wl_surface`
- Shared via. SHM (mmap), GL
- Defines Window size
- Position can't be set
 - Issued with popup/child windows
- Window can't be shared with different process (easily).

- XID/Xlib – global X Window handle
- Shared via. XID
- Resized/positioned by Xlib
- XWindow can be shared.

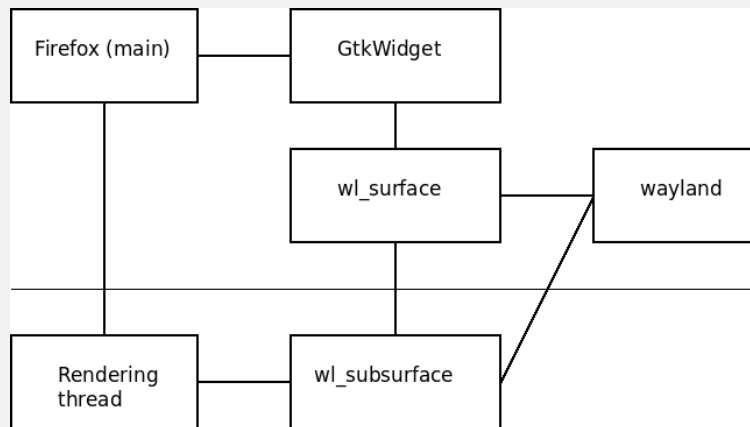
X11 vs. Wayland

- Network transparent
- Global XID
- Shareable XID (GPU)
- Window can be positioned
- Parent/child XWindow from different process (XEmbed)
- Insecure
- Fine tuned
- Local frame buffer
- Restricted ownership (shm)
- Can be restricted (sandbox)
- Can be faster (direct draw)
- Can be lighter (Embedded systems...)
- Can't run flash and other NPAPI plugins (missing Xembed).

Firefox rendering on Wayland

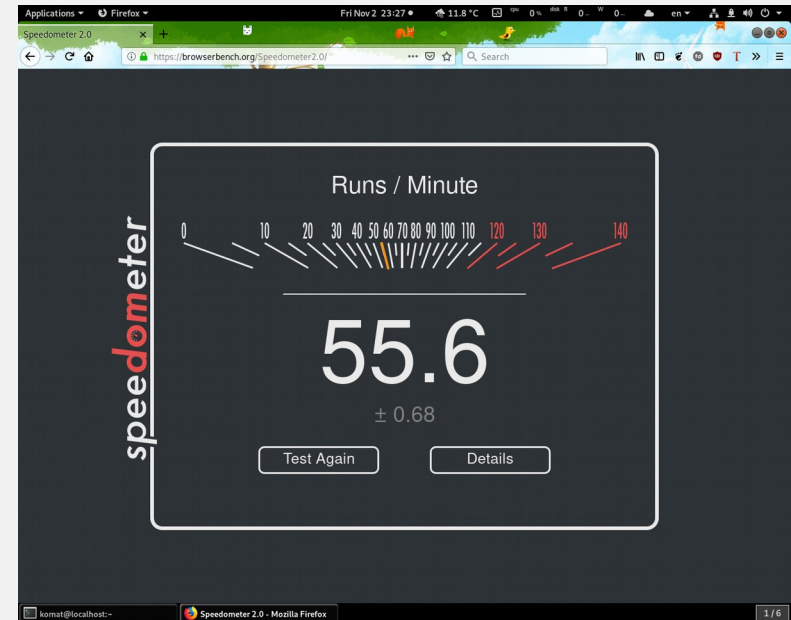
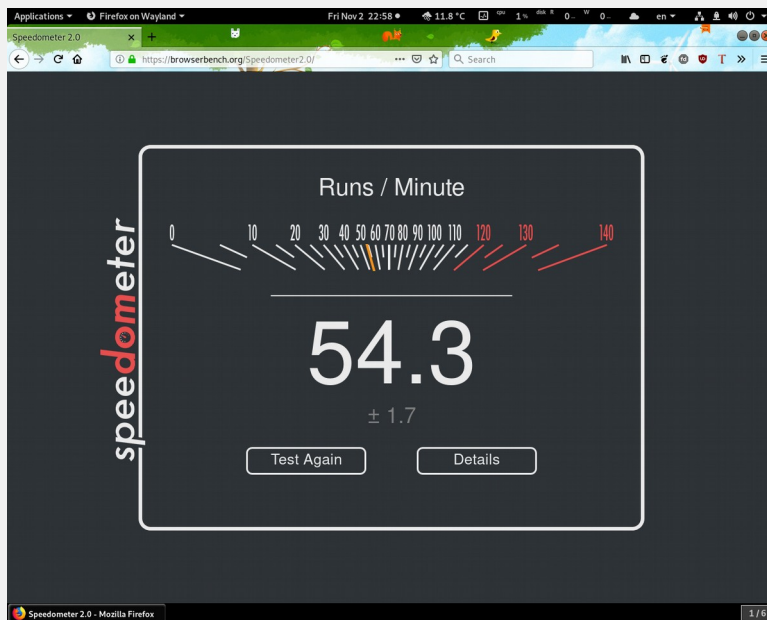


Firefox Wayland specific issues

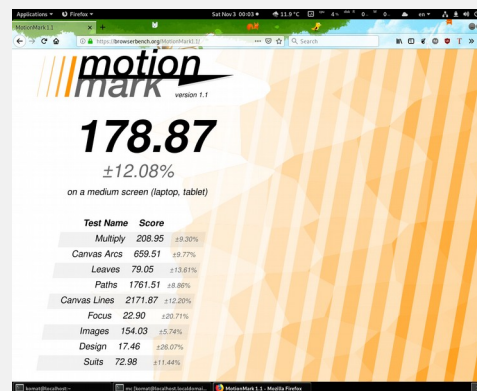
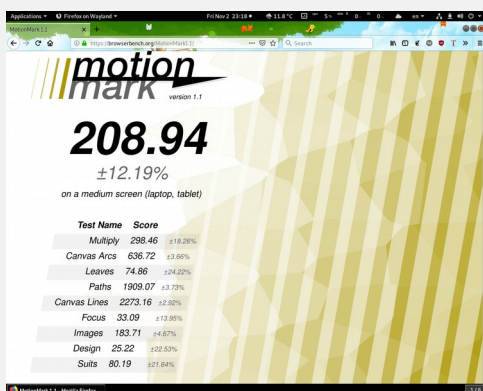
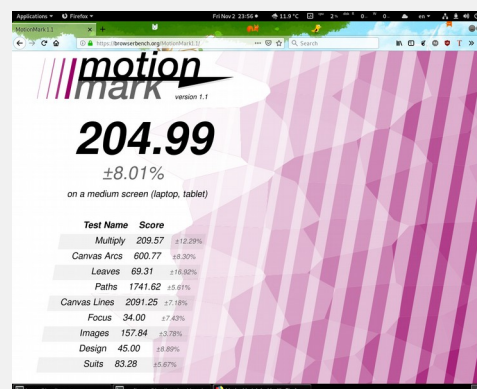
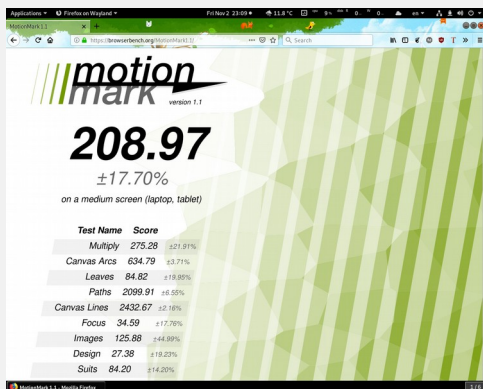


- Async rendering from non-main thread (Gtk+ does not like that)
- Sync clipboard and drag&drop
- Popup placement/positioning
- WebRTC – desktop sharing (PipeWire)
- Broken flash
- HiDPI multi-monitor issues
- OpenGL/WebRenderer

Firefox Wayland vs. X11 performance



Firefox Wayland vs. X11 performance



Firefox Wayland vs. X11 performance

CanvasMark Score: 13692 (Firefox 63 on Linux)

[Tweet this result.](#)

CanvasMark Score: 10747 (Firefox 63 on Linux)

[Tweet this result.](#)

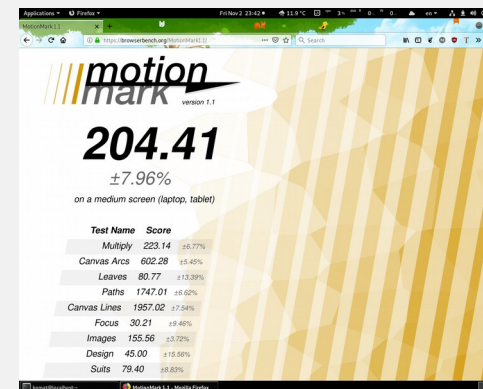
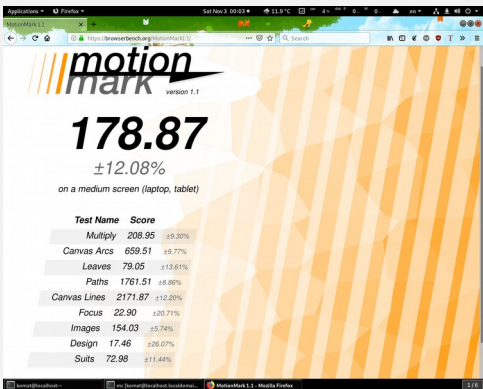
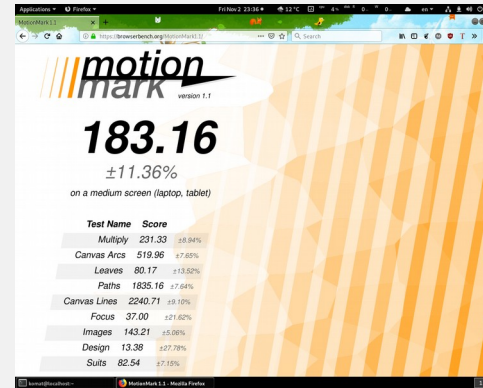
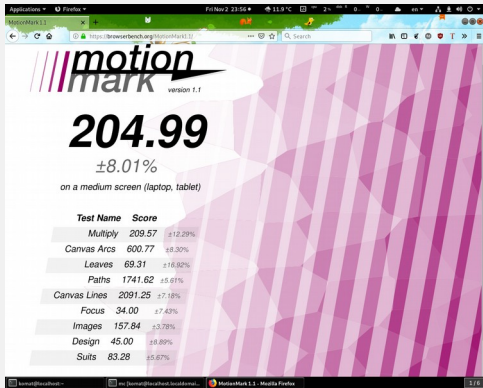
CanvasMark Score: 14277 (Firefox 63 on Linux)

[Tweet this result.](#)

CanvasMark Score: 11525 (Firefox 63 on Linux)

[Tweet this result.](#)

Firefox X11 Software vs. OpenGL (Skylake GT2)



Firefox Wayland state

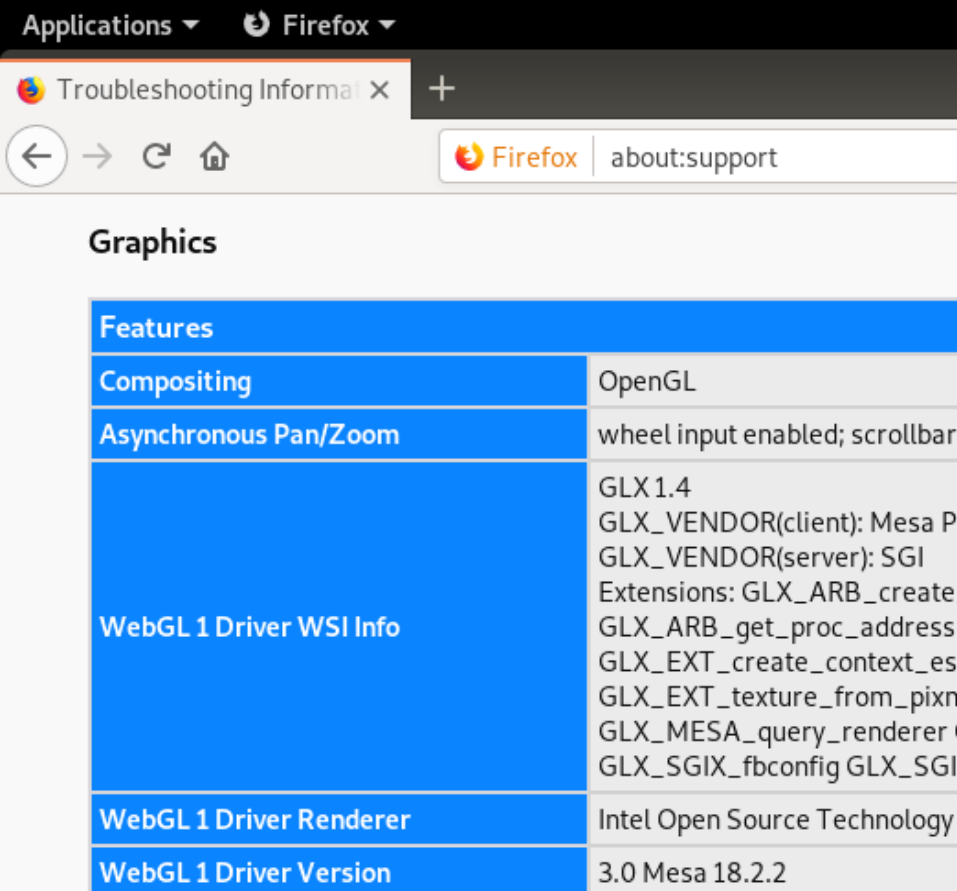
- Default on Fedora 30 (firefox-x11)
- Optional on Fedora 28/29 (firefox-wayland)
- Mozilla gtk 3.10 update and built by default (GDK_BACKEND)

There's even more...

- Clang vs. gcc (PGO/LTO)
- Firefox flatpak (<https://firefox-flatpak.mojefedora.cz/>)
- Titlebar rendering
- Gtk3 port

HW acceleration on Linux

layers.acceleration.force-enabled

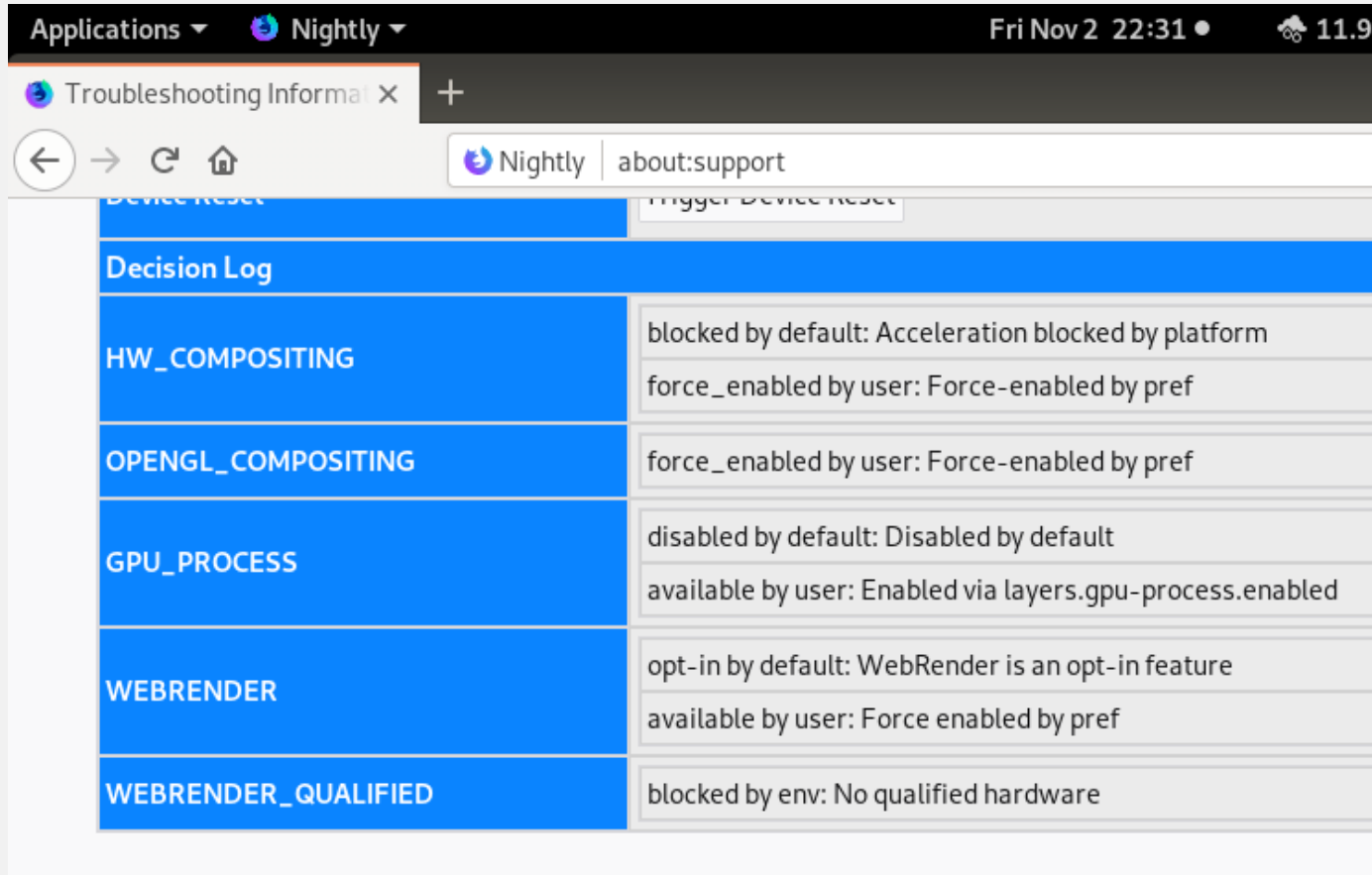


The screenshot shows the Firefox browser interface. The address bar displays 'about:support'. The main content area is titled 'Graphics' and contains a table with the following data:

Graphics	
Features	
Compositing	OpenGL
Asynchronous Pan/Zoom	wheel input enabled; scrollbar
WebGL 1 Driver WSI Info	GLX 1.4 GLX_VENDOR(client): Mesa Pr GLX_VENDOR(server): SGI Extensions: GLX_ARB_create. GLX_ARB_get_proc_address GLX_EXT_create_context_es. GLX_EXT_texture_from_pixmap GLX_MESA_query_renderer (C GLX_SGIX_fbconfig GLX_SGI.
WebGL 1 Driver Renderer	Intel Open Source Technology
WebGL 1 Driver Version	3.0 Mesa 18.2.2

HW acceleration on Linux

Hidden option “layers.gpu-process.enabled”



The screenshot shows a browser window with the address bar set to "about:support". The page displays various system information, with a table of GPU-related settings. The table has two columns: the setting name and its status. The settings are:

Device Reset	Trigger Device Reset
Decision Log	
HW_COMPOSITING	blocked by default: Acceleration blocked by platform force_enabled by user: Force-enabled by pref
OPENGL_COMPOSITING	force_enabled by user: Force-enabled by pref
GPU_PROCESS	disabled by default: Disabled by default available by user: Enabled via layers.gpu-process.enabled
WEBRENDER	opt-in by default: WebRender is an opt-in feature available by user: Force enabled by pref
WEBRENDER_QUALIFIED	blocked by env: No qualified hardware



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