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Firefox & Wayland

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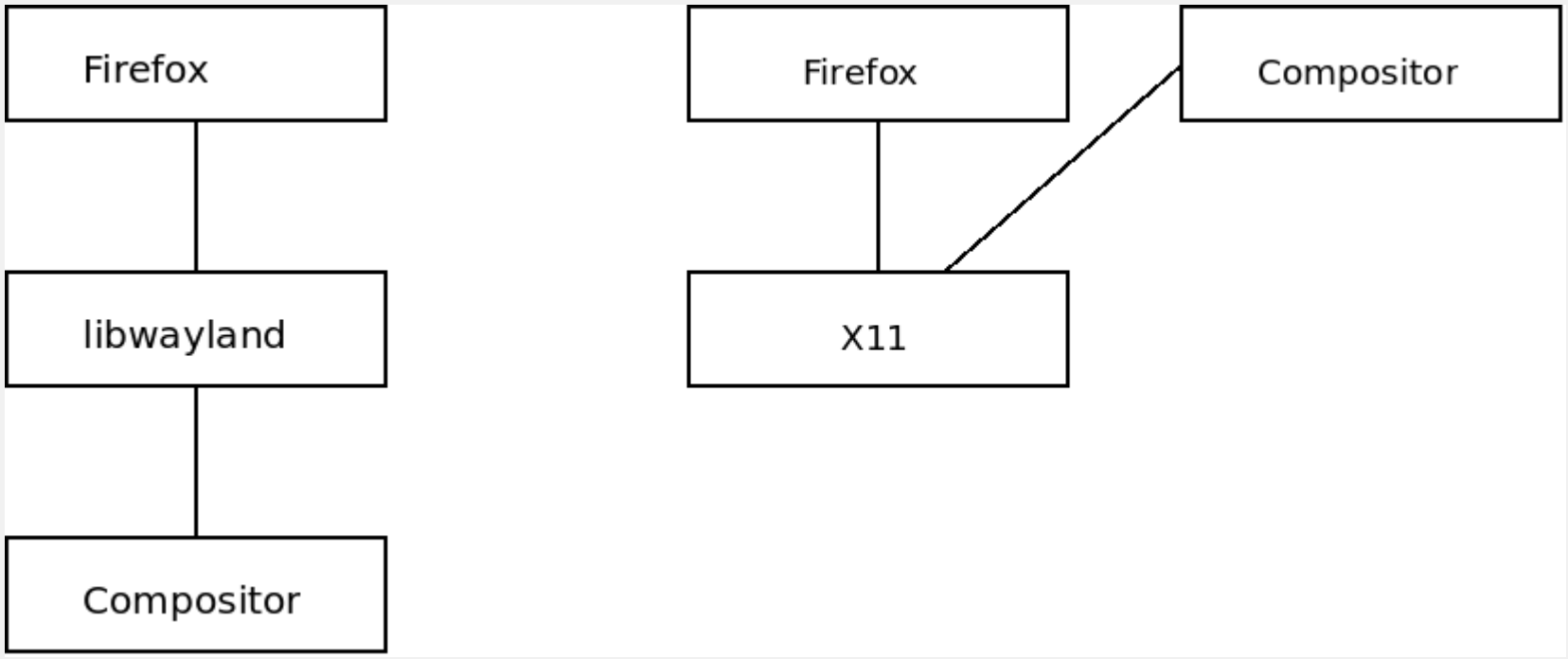
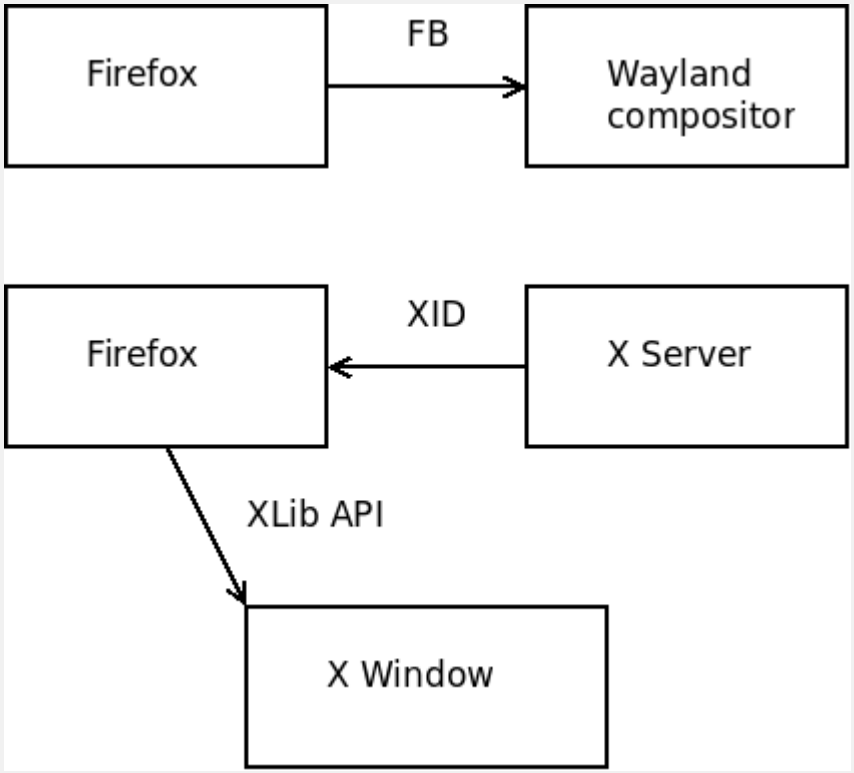
Architecture overview



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).

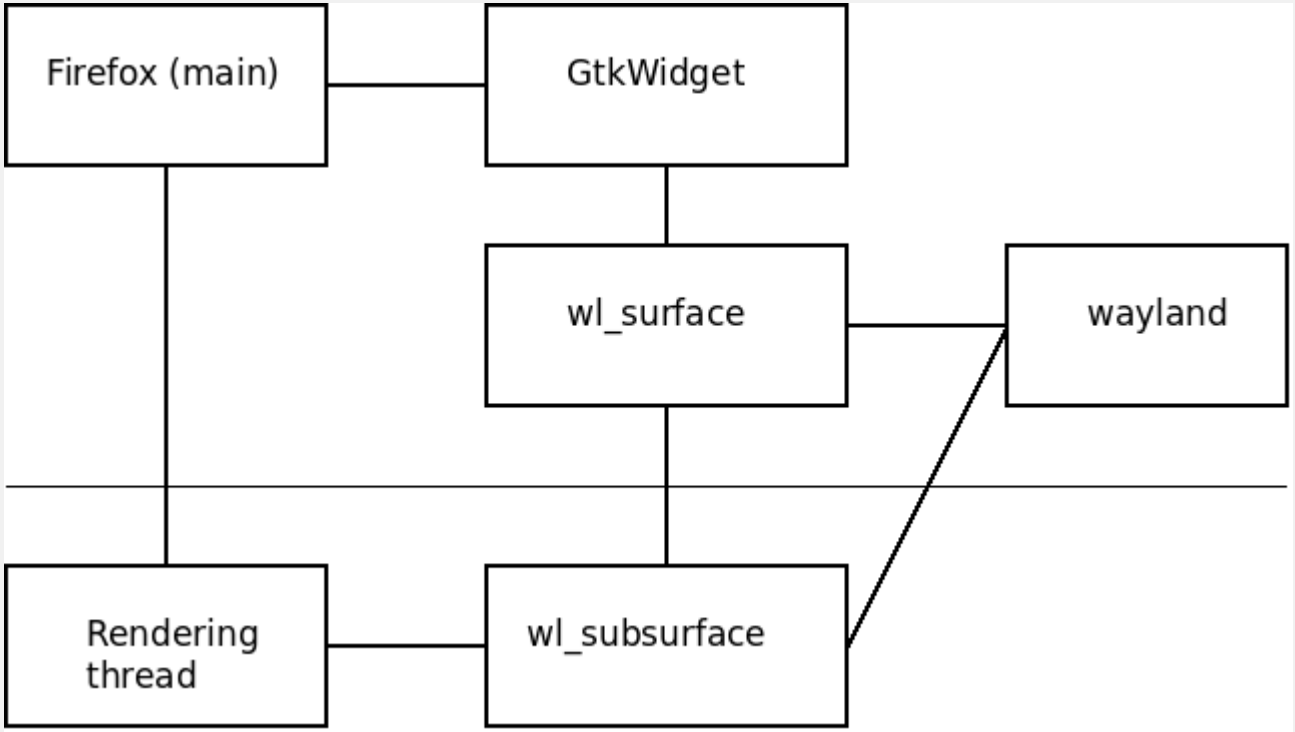
- XID/Xlib – global X Window handle
- Shared via. XID
- Resized/positioned by Xlib
- XWindow can be shared.

X11 vs. Wayland

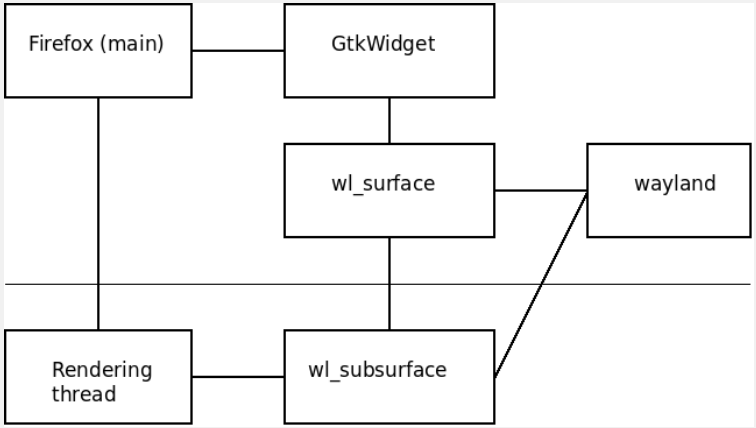
- Network transparent
- Global XID
- Shareable XID (GPU)
- Window can be positioned
- Parent/child XWindow from different process (XEmbed)
- Insecure
- Fine tuned

- 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

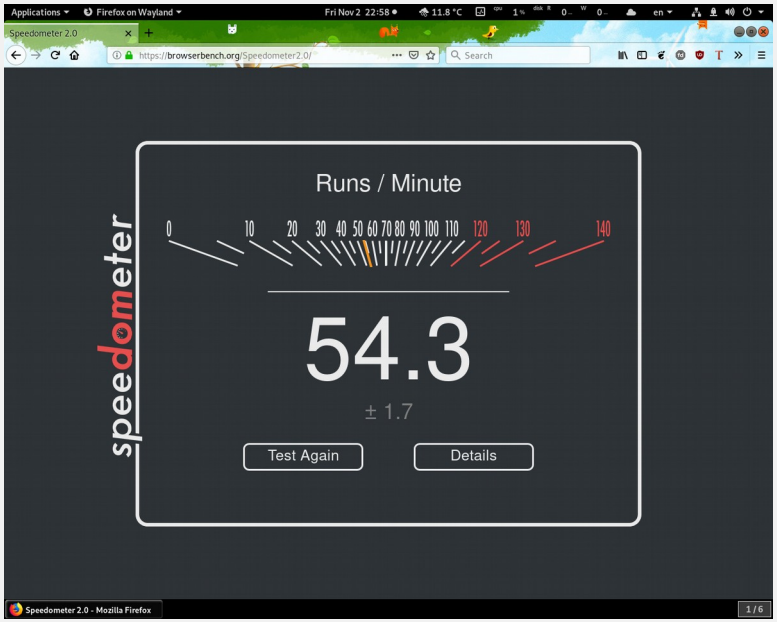


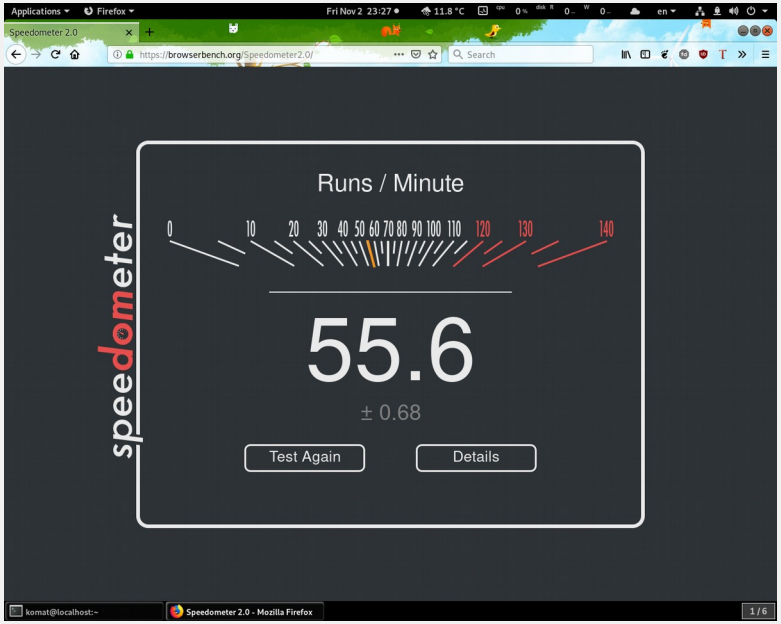
Firefox Wayland specific issues



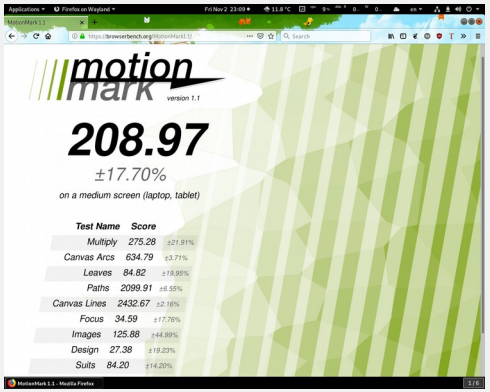
- Async rendering from non-main thread (Gtk+ does not like that)
- Sync clipboard and drag&drop
- Popup placement/positioning
- WebRTC – desktop sharing (PipeWire)
- Broken flash
- HiDPI multi-monitor issues
- OpenGL/WebRenderer

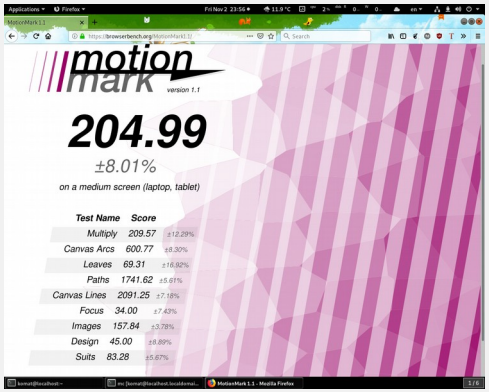
Firefox Wayland vs. X11 performance

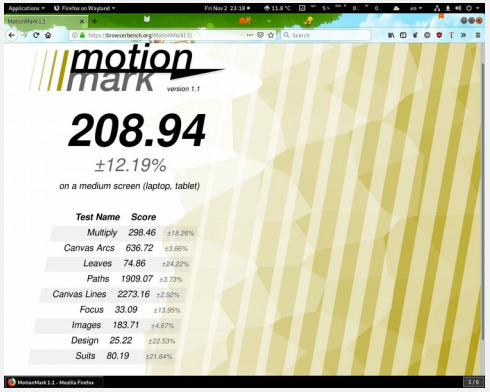


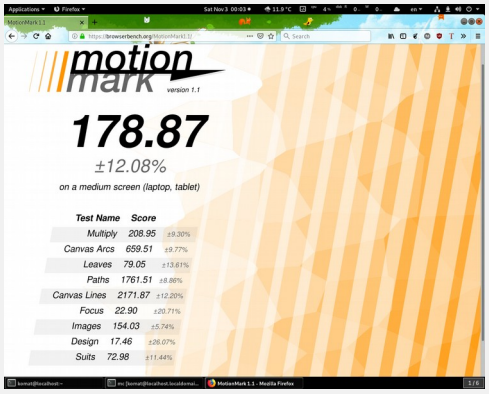


Firefox Wayland vs. X11 performance









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.

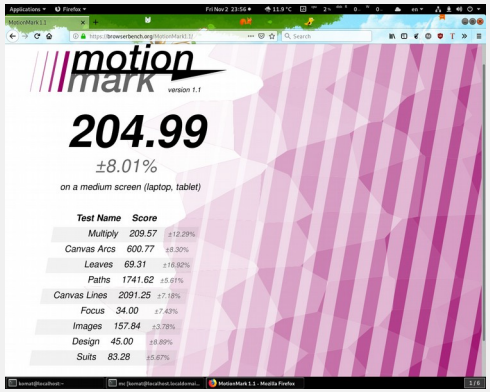
CanvasMark Score: 14277 (Firefox 63 on Linux)

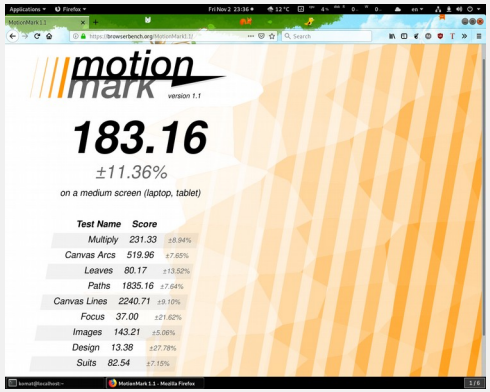
Tweet this result.

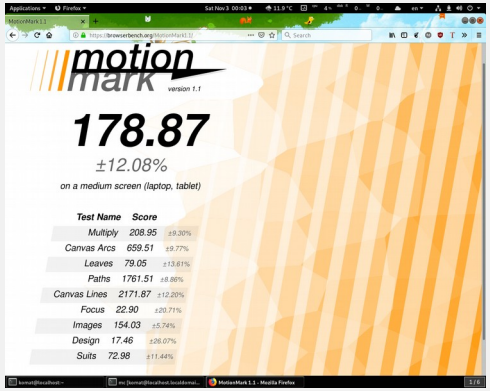
CanvasMark Score: 11525 (Firefox 63 on Linux)

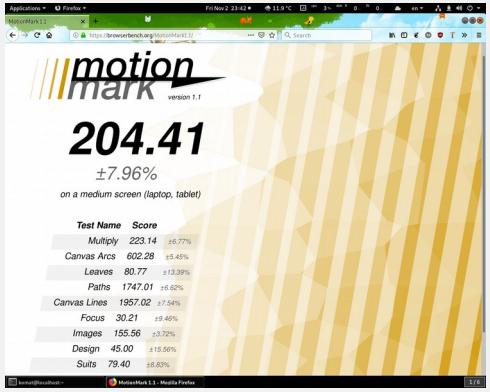
Tweet this result.

Firefox X11 Software vs. OpenGL (Skylake GT2)









Firefox Wayland state

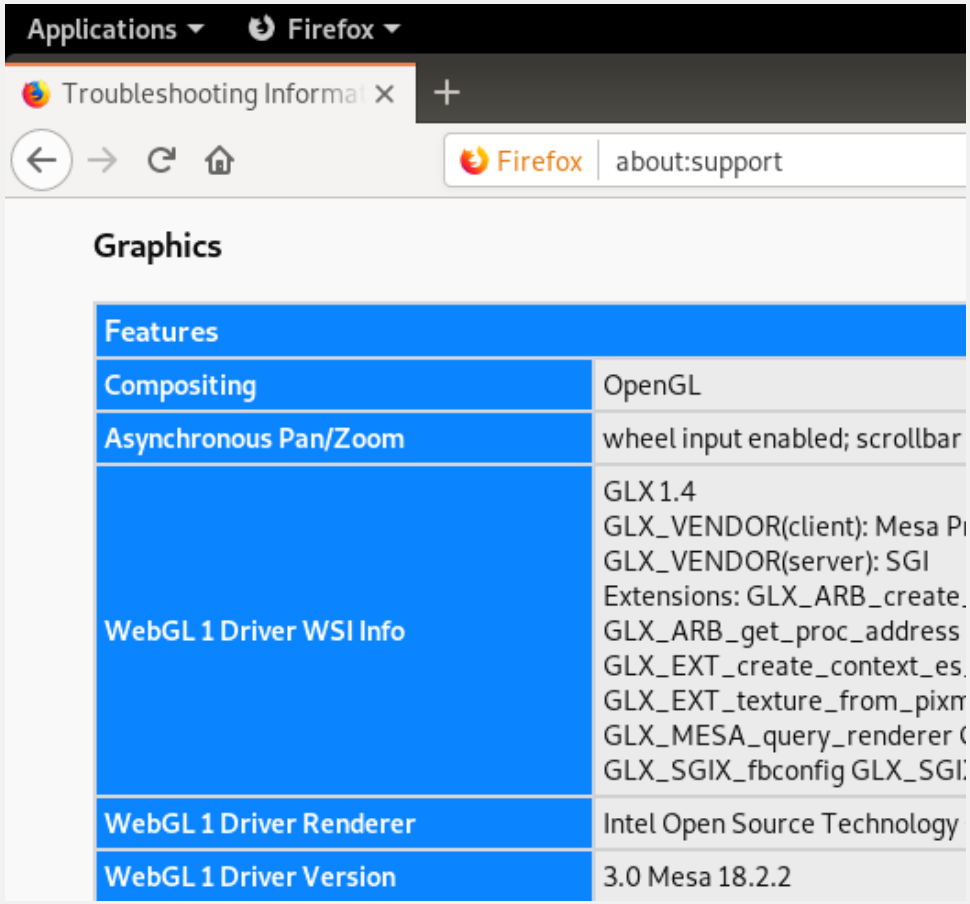
- Default on Fedora 30 (firefox-x11)
- Optional on Fedora 28/29 (firefox-wayland)
- Mozilla gtk 3.10 update and built by default (GDK_BACKEND)

There’s even more...

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

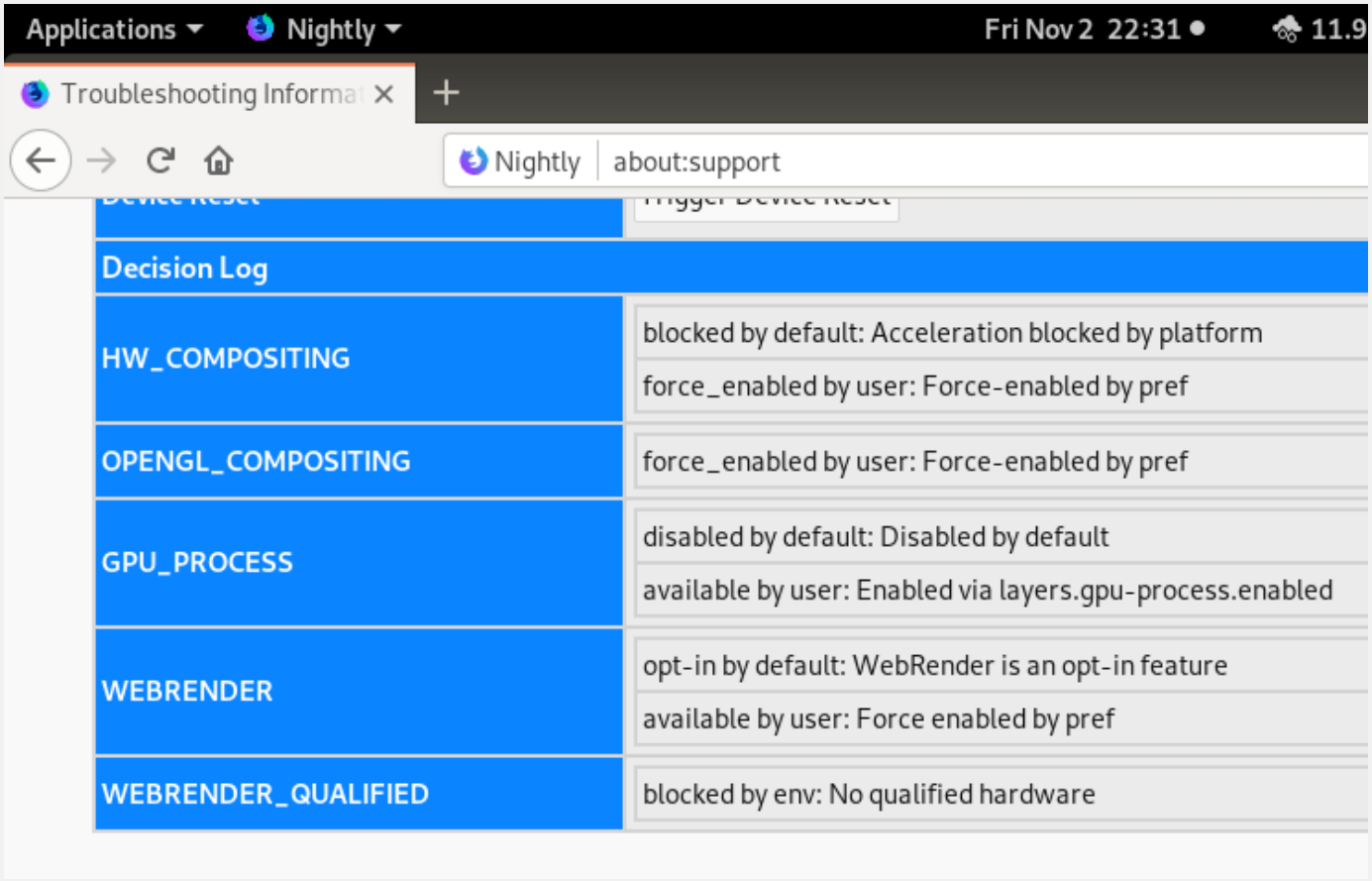
HW acceleration on Linux

layers.acceleration.force-enabled



HW acceleration on Linux

Hidden option “layers.gpu-process.enabled”



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