Open Source Mobile GPU drivers

Present and future

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COLLABORA

Current status

Freedreno

- Support for Adreno 200 to 600 series
- OpenGL 3.1 and OpenGL ES 3.0
- On Adreno 5xx and 6xx OpenGL ES 3.1 is supported
- Very preliminary Vulkan driver for Adreno 600 series
- Has been shipped in products

Broadcom VC4

- Support for VideoCore IV
- Mostly compliant with OpenGL ES 2.0
- Performance counters

Broadcom V3D

- Support for VideoCore V
- Mostly compliant with OpenGL ES 3.0

Etnaviv

- Supports GC400 to GC6000
- Stable and performant OpenGL ES 2 and OpenGL 2.1 support
- Complex scenarios such as like Qt5 QML and Chromium with WebGL are tested and performing well
- Few bits of useful GLES3 features implemented
- Production quality Wayland support

Lima

- Support for Utgard Mali
- Kernel and Mesa drivers about to land
- Tested to support kmscube, some of glmark2 tests, Kodi, etc.

Panfrost

- Support for Midgard Mali (Weston, Kodi, SuperTuxKart, ...)
- Mesa driver upstream
- Kernel driver close to be merged
- IGT tests
- T760, T820 and T860
- RK3288, RK3399 and Amlogic S912
- Work on dEQP compliance has started

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Future

Freedreno

- Geometry and tesselation shaders
- OpenGL ES 3.2 and OpenGL 3.3 features
- Complete Vulkan driver for a6xx and ideally a5xx

- Compiler improvements for OpenCL
- Other OpenCL work needed for CTS compliance

Broadcom VC4

- CTS compliance work
- Switching on by default in Raspbian

- Switching to shared job scheduler
- OpenCL

Broadcom V3D

- OpenGL ES 3.1
- Improved texturing from media decode output

- Vulkan
- Performance counters

Etnaviv

- Application isolation via per-process address spaces
- GC7000 (i.MX8) support

- Switch to NIR
- OpenCL

Lima

- Misc. shader compiler improvements
- X11 and Wayland desktops
- OpenGL ES 2.0 compliance

- Android

Panfrost

- Merge into mainline
- GNOME Shell, browsers and WebGL
- MMU improvements
- Continuous Integration

- OpenCL
- Bifrost
- Vulkan
- dEQP and CTS compliance

OpenCL

- Leverages OpenGL and Vulkan compute support
- CL C → SPIR-V → NIR → GPU
- Improvements needed in Clover, NIR compiler and Gallium drivers

- Shared Virtual Memory
- OpenCL 2.0 and beyond
- Reuse part of this work towards domain-specific state trackers, such as a XLA backend for TensorFlow

COLLABORA

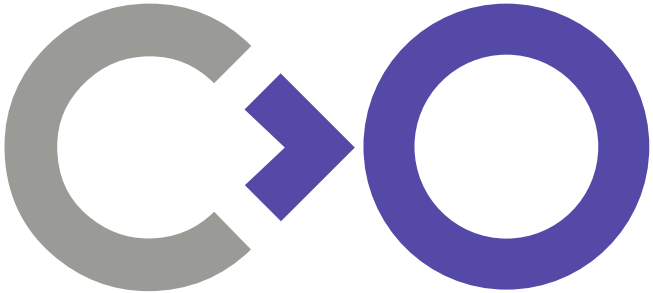
Common infrastructure

Kernel

- Job scheduler
- Memory management
- Common support for userspace API
- Page table library
- Other support not specific to GPU drivers

Userspace

- OpenGL and OpenCL state trackers
- Fixed function emulation
- Drawing primitives emulation
- GLSL and CL C compilers
- NIR compiler and optimization passes
- SPIR-V to NIR translator
- Experienced community ready to help
- Profiling and tracing infra and tools



Thank you!