

A look towards a robust GPU device selection in GL

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Who is this guy?

- Emil Velikov
- Software Engineer at Collabora
- Mesa developer since 2011
- Working across the whole graphics stack



Introduction

- OpenGL, EGL, GLX
- Why do we need robust device selection
- Current solution
- API evolution – EGL, GLX
- Implementation status





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OpenGL, EGL, GLX

OpenGL, EGL, GLX

- Originates in the 1990s
- Modular infrastructure
- Rendering API
- Windowing system binding APIs - GLX, EGL...



Why do we need robust device selection

- Testing
 - Multiple GPUs for single system
 - Test interaction with winsys
- Developer
 - Select the GPU that fits their needs
- Separation, prioritization, etc





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Current solution

Enter DRI_PRIME

- Environment variable, DRI/Mesa specific
- Queries the X server for the “other” GPU



DRI_PRIME deficiencies

- How to handle systems with 3+ GPU
 - Use ID_PATH_TAG

pci-0000_00_02_0

- Select the correct device
- Systems without X server
- Expose GPU selection to games developer/user



LIBGL_ALWAYS_SOFTWARE

- Environment variable, DRI/Mesa specific
- Selects the software driver – `swrast_dri.so`
- The fallback when the hardware driver fails



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API evolution

EGL Device

- EGL_EXT_device_base
 - Defines the concept of a device extensions
 - Means to query and enumerate devices
- EGL_EXT_device_drm
- EGL_MESA_device_software *
- EGL_MESA_query_renderer **



EGL Device (2)

- The concept of native platform
- EGL_EXT_platform_device
 - Defines EGL device as a platform
- EGL_EXT_explicit_device
 - Allows an EGL device alongside the platform
- Device - Display - Config - Context



GLX Device

- No extensions exist
- `GLX_MESA_query_renderer` mentions *renderer*
- No concept of GLX Display
- `XOpenDisplay - Config - Context`
- `XOpenDisplay - Device - Config - Context`
- Workshop session with Kyle (Nvidia)



Implementation status

EGL Device

Extension	Mesa	Piglit
EGL_EXT_device_base	V2 on the list	Merged
EGL_EXT_device_drm	V2 on the list	Merged
EGL_MESA_device_software	V2 on the list	Merged
EGL_MESA_query_renderer	Locally	Locally
EGL_EXT_platform_device	V2 on the list	Merged
EGL_EXT_explicit_device	TODO	TODO





Thank you!



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