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
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
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
    
    $\text{pci-0000_00_02_0}$

- 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
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

<table>
<thead>
<tr>
<th>Extension</th>
<th>Mesa</th>
<th>Piglit</th>
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Thank you!