Dealing with GPU resets

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GPU resets

- Can happen after an invalid GPU command, infinite loop, power management issues

- Userspace driver asks kernel driver if everything is OK, and (might) do something about it

  - Kill the guilty app?

- Kernel driver can also act on it

  - "A job has timed out, so let's reset the GPU"

How should GPU resets be implemented?

- Nowadays, everyone does their own way

- But at least now we have a doc!

https://www.kernel.org/doc/html/latest/gpu/drm-uapi.html#device-reset

How should GPU resets be implemented?

- Every DRM driver has a specific API for reporting GPU resets:

    - I915_GET_RESET_STATS
    - AMDGPU_CTX_OP_QUERY_STATE2
    - MSM_PARAM_FAULTS

- **How can we get a DRM API for that?**

    - Can we have a `struct drm_context`?

DRM_IOCTL_GET_RESET

```
struct drm_get_reset {
    /** Context ID to query resets (in) */
    __u32 ctx_id; // no global context ID...
    /** Flags (out) */
    __u32 flags;
    /** Global reset counter for this card (out) */
    __u64 reset_count;
    /** Reset counter for this context (out) */
    __u64 reset_count_ctx;
};
```

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How should GPU resets be implemented?

- It would be very nice to know what caused the reset in the first place
- But this seems to be locked inside the firmware side
- **What's available for us in the open source driver?**

OpenGL robustness

Apps using OpenGL should use the available robust interfaces, like the extension GL_ARB_robustness. This interface tells if a reset has happened, and if so, all the context state is considered lost and the app proceeds by creating new ones. **There's no consensus on what to do if robustness is not in use.**

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- Some drivers think they should kill the non-robust app, some others don't think so

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End to end testing

- **How to write a proper IGT test for resetting?**
- How can userland know that a driver is properly putting something on screen?
  - amdgpu sometimes gets just a dark screen after a bad reset

Discussion

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