AMD

HDR KMS Workshop Summary

Harry Wentland

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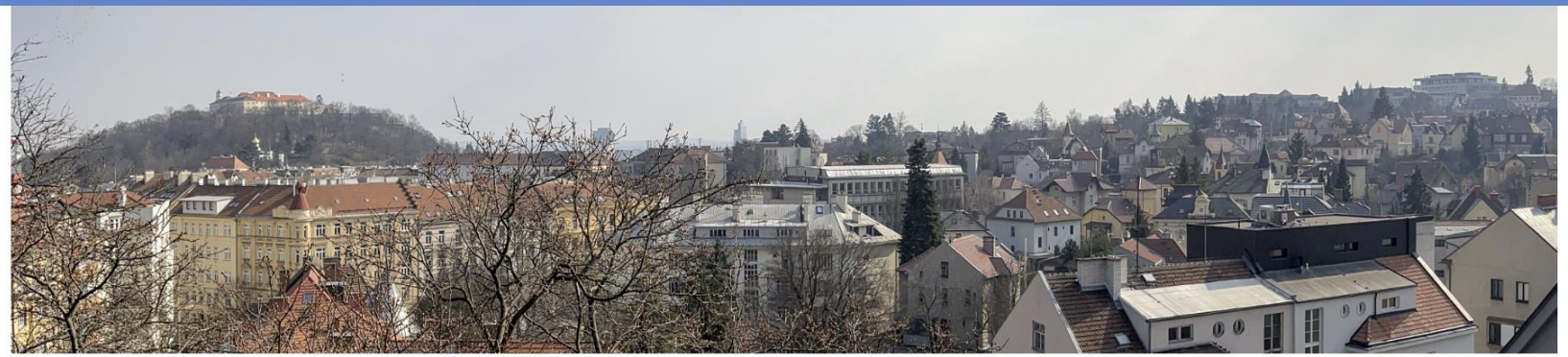

NOTE: This hackfest is currently a (n advanced) proposal awaiting from budget approval from Red Hat and availability of key attendees from outside Red Hat.

Shell & Display Next hackfest

Brno, CY23Q1/CY23Q2

Primary contact: Carlos Soriano Sanchez <csoriano@redhat.com>
Secondary contact: Tomas Popela <tpopela@redhat.com>

Relevant GNOME team

Shell & mutter, possibly Design. Teams outside of GNOME will be key too, for KMS/DRM, Mesa, etc.

Attendees

- Liviu - ARM
- Abhinav - Qualcomm
- Wayne - AMD
- Solomon - AMD
- Derek - Collabora, Weston
- Melissa - Igalia, CRTC color mgmt
- Drew - Google CROS, Display
- Isabella - Understand HDR better!
- Maira - Ditto
- Emersion - wlroots, libliftoff
- Jonas - Redhat, HDR gnome
- Niels - Redhat, listening in
- Sean - ChromeOS
- Jim, Andrew - ChromeOS compositor
- Sebastian - Gnome compositor?

- Manasi D Navare – Intel
- Laurent Pinchart
- Carlos Soriano Sanchez – Red Hat

EOTF^{-1}

- Let's try and see if inverted EOTF LUTs work out
- **Need someone to code and try this**
- Enumerated TFs are good but won't work for all compositor use-cases

Static vs Dynamic Block definition

- Different HW vendors have different block arrangement
- HW vendors like to be able to optimize to their HW
- It is not 100% clear whether compositors will use similar color pipelines; we'll need to wait and see
- There are ideas on an API to allow drivers to support different color pipeline arrangements
  - https://gitlab.freedesktop.org/pq/color-and-hdr/-/issues/11
  - I have some ideas on how to take this a bit farther
  - **Need to try and code this :)**

Descriptive vs Prescriptive API

- Descriptive: describe surface, blending, output space
- Prescriptive: describe transforms and order of transforms

- An API that supports prescriptive could support a descriptive model at a higher layer
- An API that supports a descriptive model can never support a userspace that wants to be prescriptive

- There are a lot of decisions that go into color space conversions.
- A descriptive model will almost inevitably mean that there will be some delta between KMS and shader color processing

- A kernel API should be prescriptive

Use Cases

- **It's complicated**

- API doesn't need to support everything under the sun
- API needs to support our use cases
- Compositors are still working on the use case aspects
- It is unclear whether all use cases will be served by a pre-blending KMS API
- Post-blending color processing is desired for most use cases

- DRM/KMS API needs a userspace implementation
- We want to be ready with API drafts but shouldn't finalize them without userspace

Userspace Library

- **Libliftoff** is a library intended to abstract KMS plane policy with compositors
- We could extend it to do the same for color processing, in particular on multiple planes
- A userspace library could allow HW vendors to optimize for their HW
- It could support scenarios where color accuracy is less important:
  - Provide ability for HW vendors to figure out how to do tone, gamut mapping, and conversion between color spaces

- **Someone should code up a sketch like this and see how this looks**

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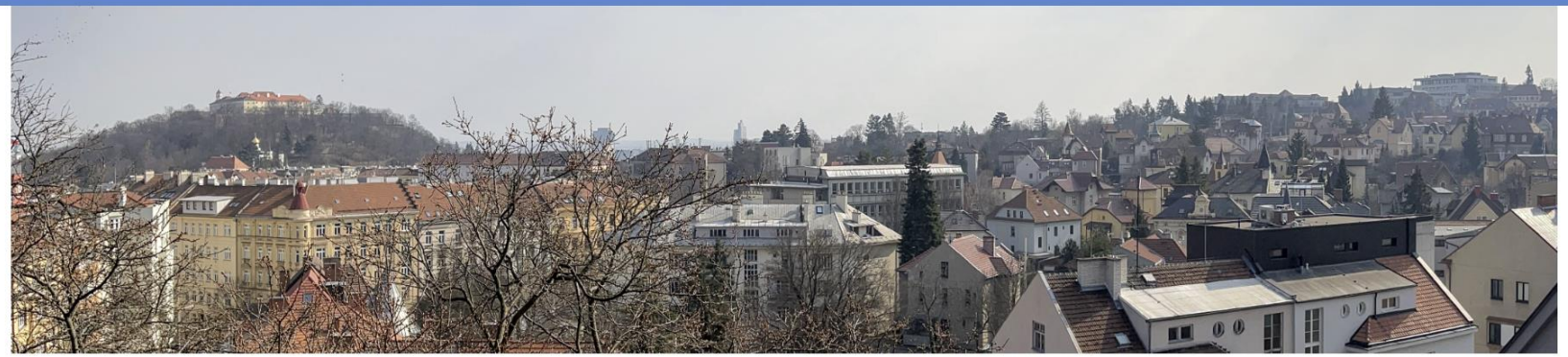

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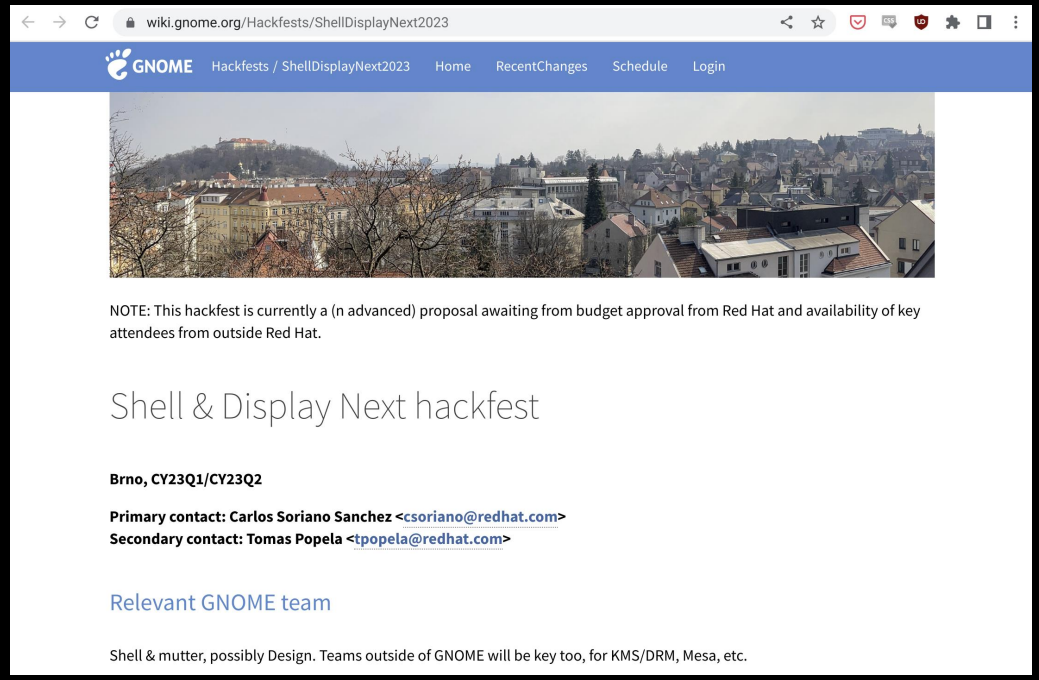
Conclusion

- Need userspace before KMS
- Use-cases should drive API
- HW Vendor-optimizations
- API that gives predictable results
- **We need to try and code some stuff**

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