

Long Road to HDR10 on ChromeOS

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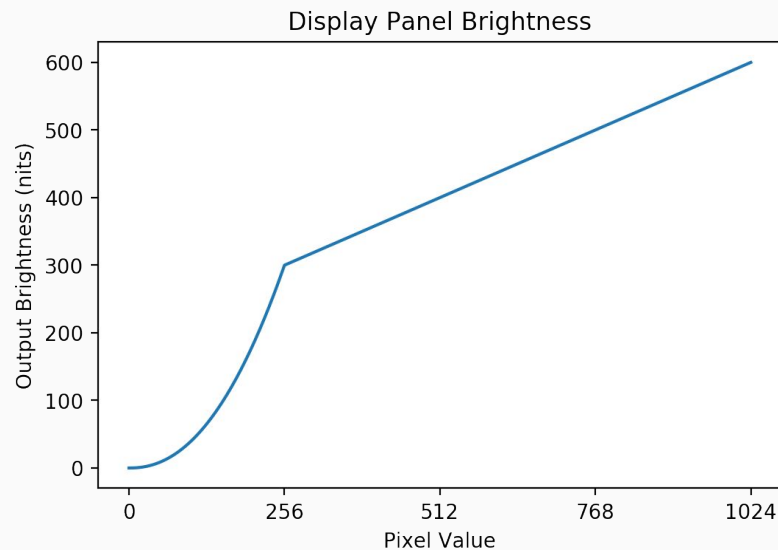
ChromeOS Graphics / Compositor



Recap

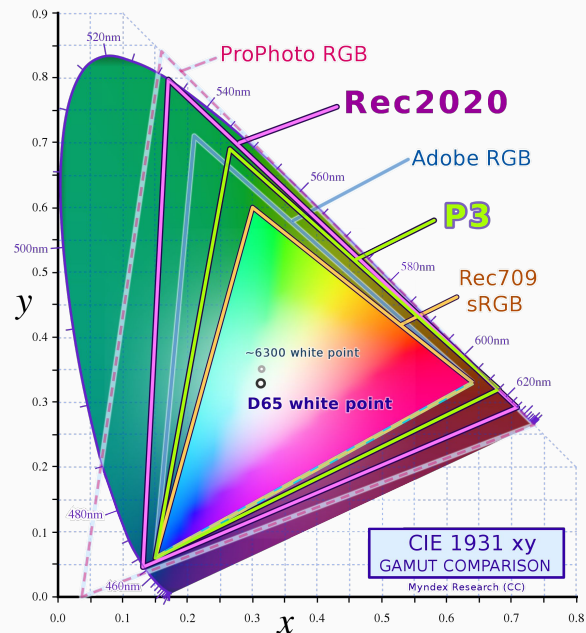
Piecewise transfer function

- sRGB-like curve at the beginning
- Linear for HDR segment
- Programmable “elbow” to customize HDR content headroom and available bits for SDR content
- Uses display’s primaries directly



HDR10 / HDR10+

- Most common HDR format
- 10 bits per channel
- BT.2020 color primaries
- PQ electro-optical transfer function
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HDR_OUTPUT_METADATA

- Post blending
- Requires color space conversion
- May require tone mapping

EDID Parsing

Block 0, Base EDID:

EDID Structure Version & Revision: 1.4

[...]

Basic Display Parameters & Features:

Digital display

Bits per primary color channel: 10

[...]

Color Characteristics:

Red : 0.6796, 0.3203

Green: 0.2373, 0.7226

Blue : 0.1396, 0.0498

White: 0.3125, 0.3291

[...]

Block 1, CTA-861 Extension Block:

Revision: 3

Native detailed modes: 0

Colorimetry Data Block:

BT2020RGB

HDR Static Metadata Data Block:

Electro optical transfer functions:

Traditional gamma - SDR luminance range

SMPTE ST2084

Supported static metadata descriptors:

Static metadata type 1

Desired content max luminance: 116 (616.884
cd/m²)

Desired content max frame-average luminance: 96
(400.000 cd/m²)

Desired content min luminance: 7 (0.005 cd/m²)

Checksum: [...]

What's Next?

- Dynamically adjust SDR white level?
- Per-plane color management uAPI?
 - Overlays with different color spaces?
- Dynamic metadata (per-frame changes)?

Thank You