

HDR for 2D content creators

HDR support in Krita painting application

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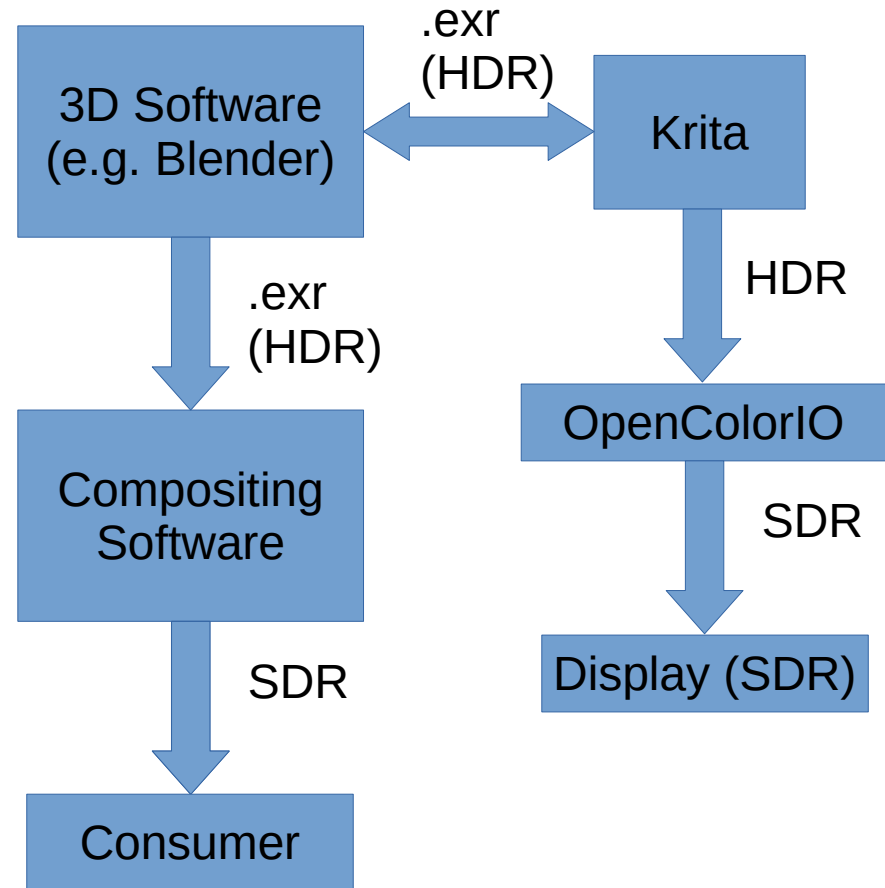
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HDR Support in Krita

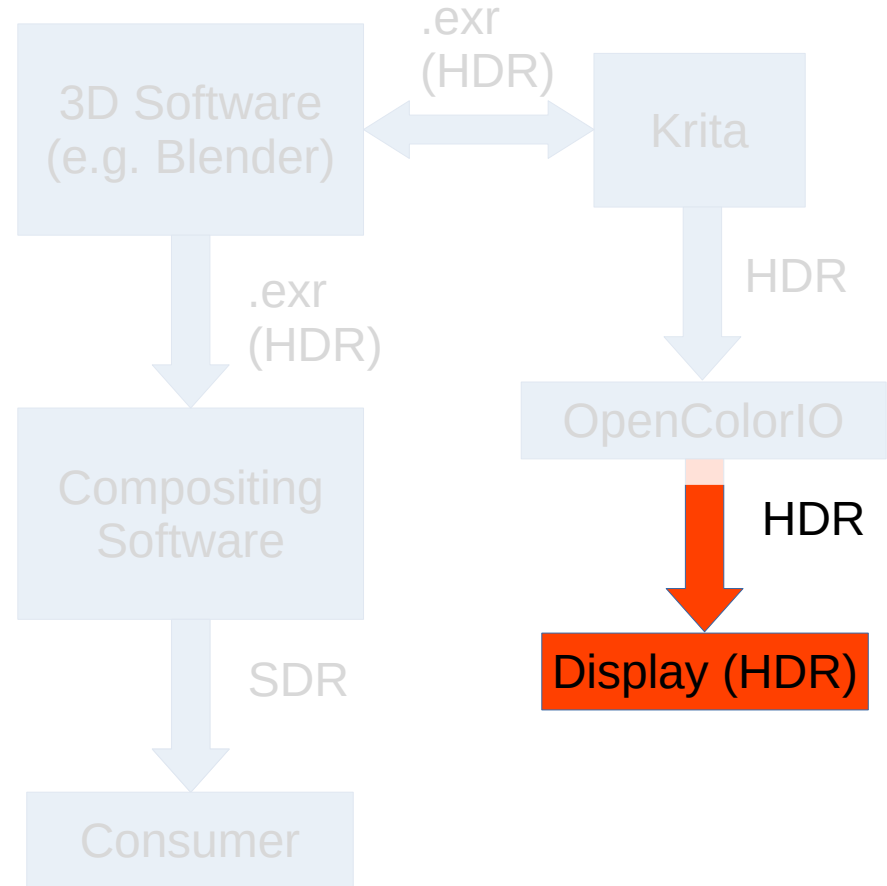
HDR Support in Krita: before HDR era

- Support for scene-referred Rec709 “HDR” images was there for decades
- It was used by 3D-designers via EXR file format
- Final image was supposed to be converted into SDR at a later compositing stage of the production pipeline
- Mapping HDR content on SDR screen was done by OpenColorIO technology



HDR Support in Krita: now

- Now Krita can display HDR content on HDR-capable displays
- If any mapping is necessary, it can still be done by OpenColorIO technology



Prepare HDR content

Prepare HDR content: paint with light on HDR screen

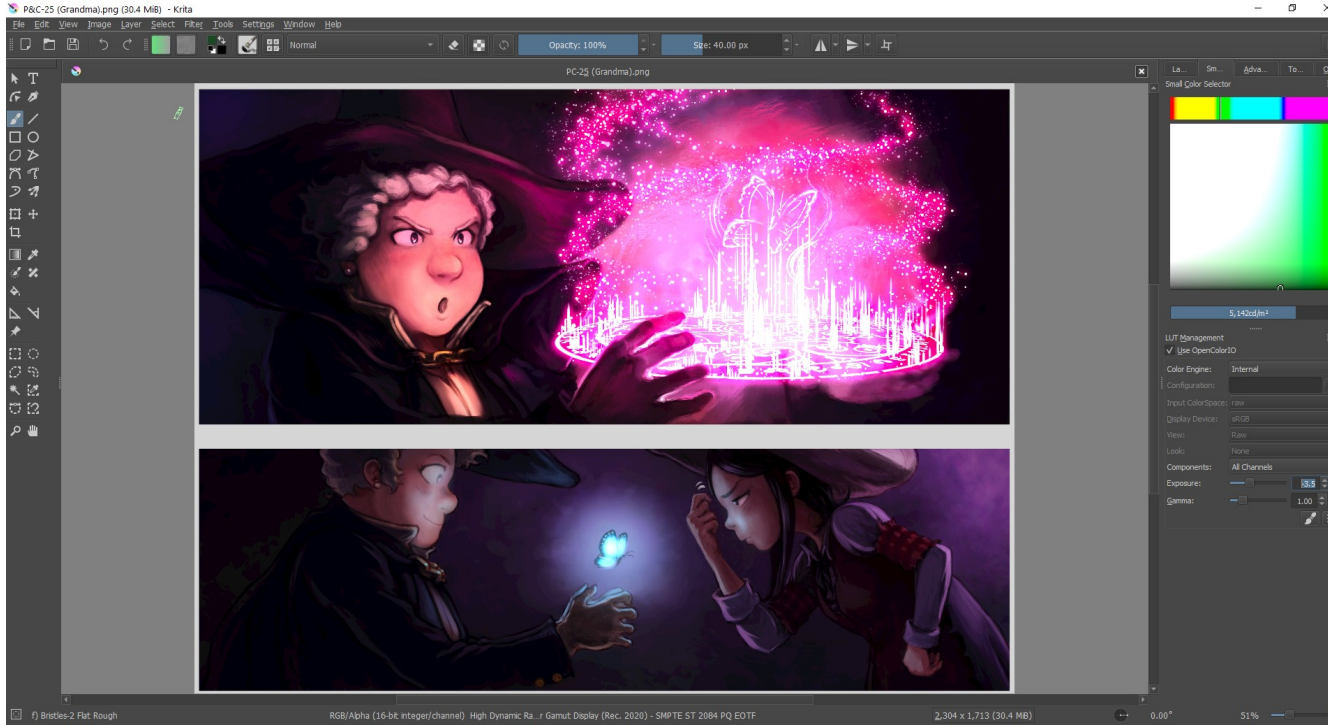
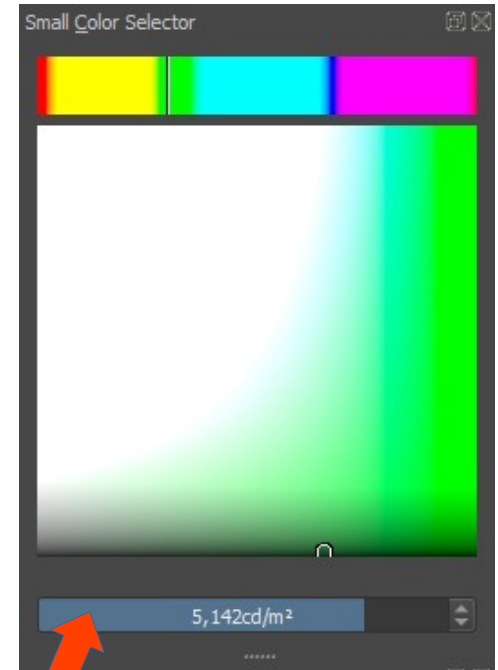
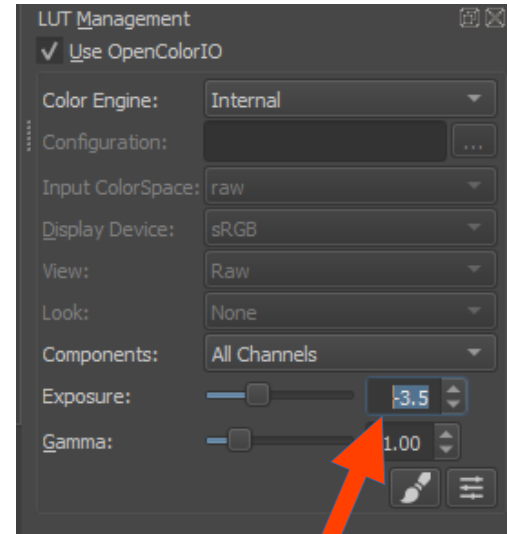
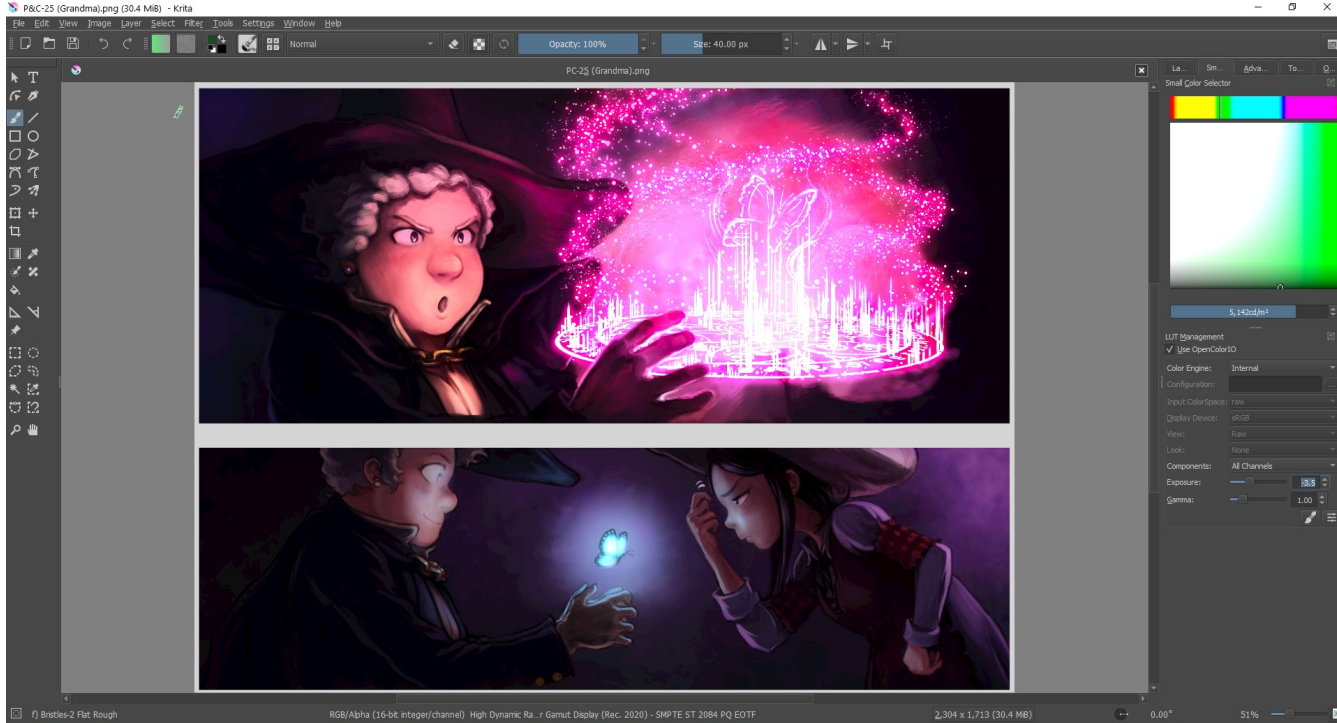


Image by David Revoy
<https://www.peppercarrot.com/>



Adjustable
dynamic range of
the color selector

Prepare HDR content: adjust exposure to work on SDR screen



Adjustable
exposure of the
image

Prepare HDR content: map SDR color selectors to HDR range

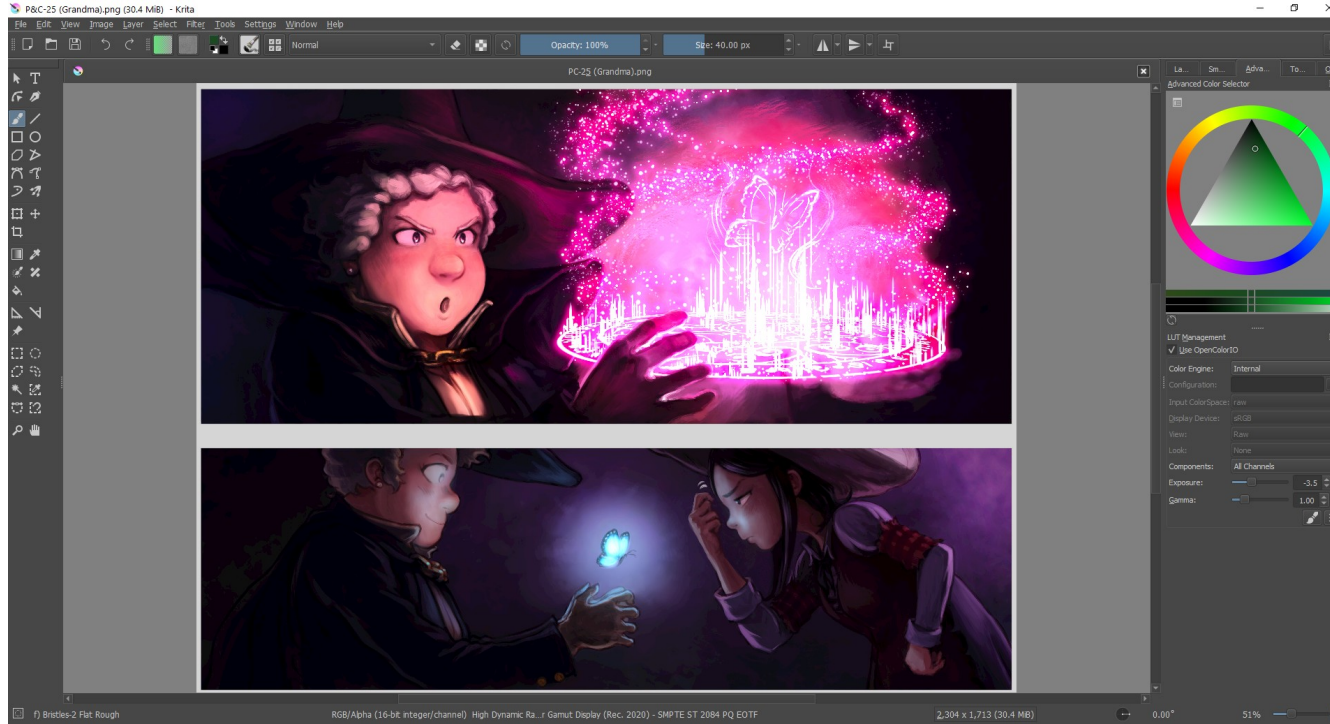
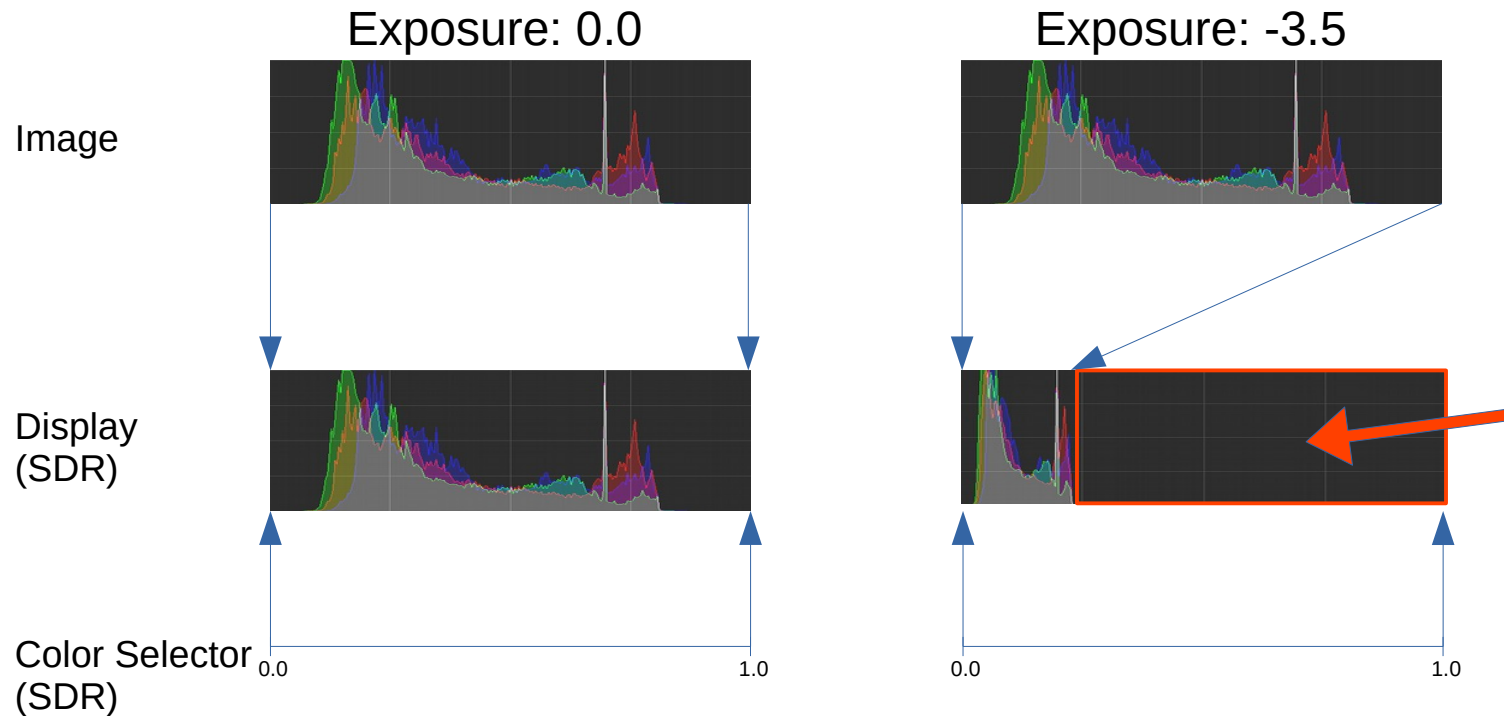


Image by David Revoy
<https://www.peppercarrot.com/>



Standard SDR color selector
is mapped to a compressed
HDR range (exposure -3.5)

Prepare HDR content: map SDR color selectors to HDR range



SDR color selectors
can select color from
HDR range thanks to
compression by
exposure

Export HDR content

Export HDR content (1)

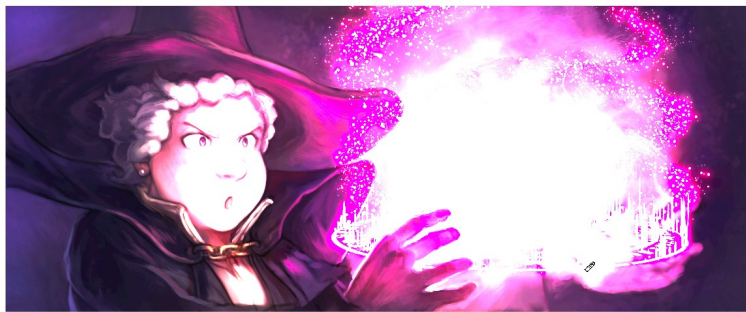
- OpenEXR format
 - stores lossless HDR data
 - supported by the majority of 3D packages
 - doesn't support any color profiling, stores raw untagged data (software can write custom extensions for it)
 - doesn't support layers (Krita uses an extension to export layered EXR documents)
 - good for work, not good for content distribution
 - More info: <https://www.openexr.com/about.html>

Export HDR content (2)

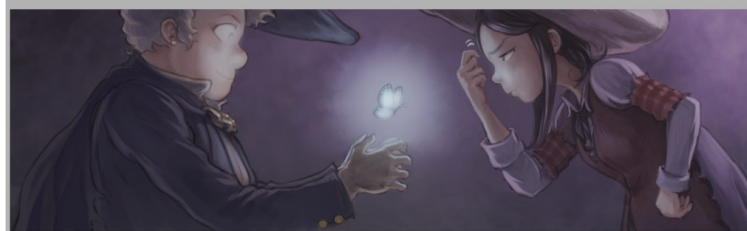
- HDR extension for PNG
 - normal 16-bit PNG file encoded with Perceptual Quantifier transfer function (PQ EOTF)
 - “iCCP” chunk contains “ITUR_2100_PQ_FULL”
 - a special ICC profile is attached to let legacy applications open it correctly
 - Specification: <https://www.w3.org/TR/png-hdr-pq/>

Export HDR content (3)

- HDR extension for PNG



Original HDR image (clipped)



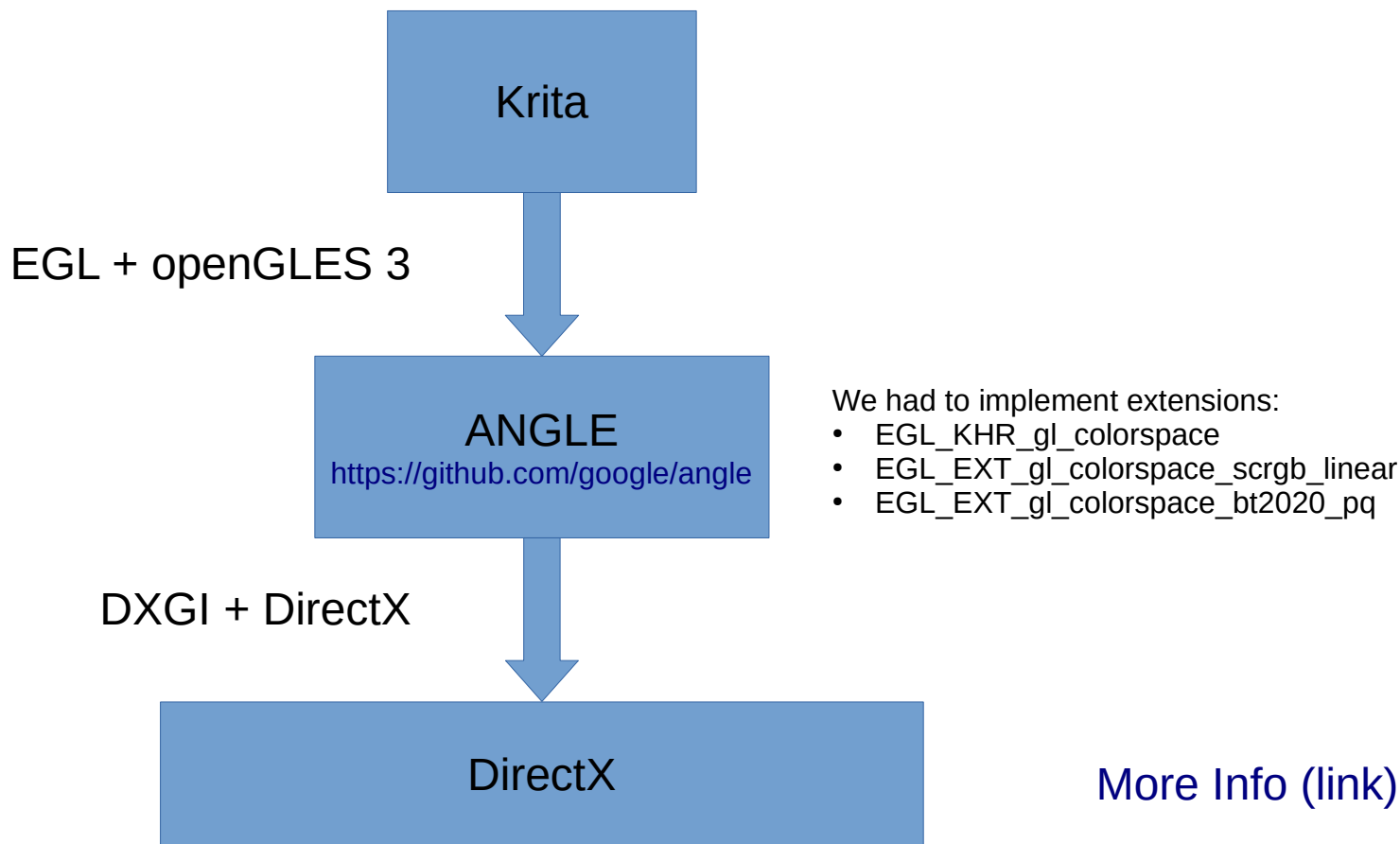
Range compressed by
ITUR_2100_PQ_FULL.icc
legacy profile

Export HDR content (4)

- Work in progress
 - High Efficiency Image File Format (HEIF)
 - AV1 Image File Format (AVIF)

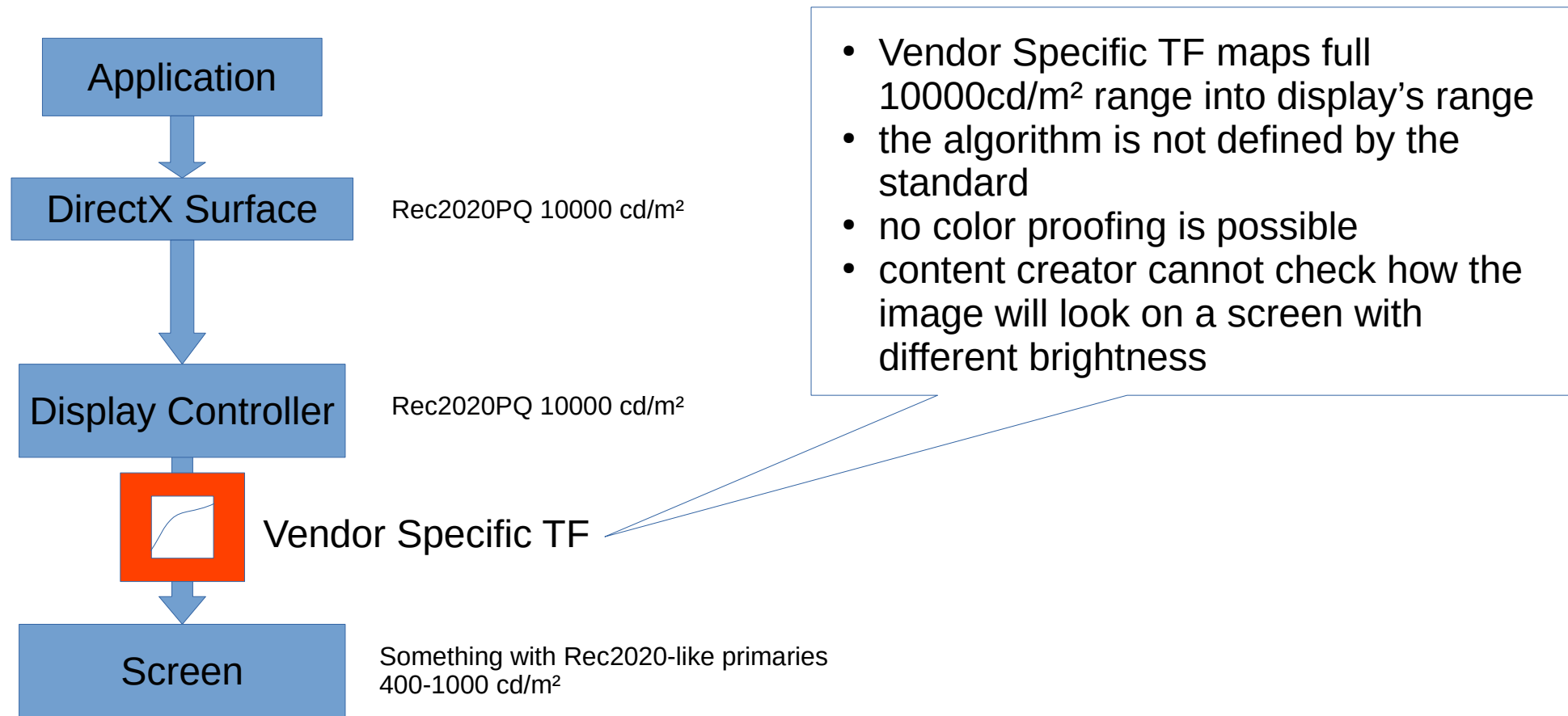
Implementation

Implementation (Windows only)



Problem: ICC vs HDR color proofing

Problem: ICC vs HDR color proofing (1)



Problem: ICC vs HDR color proofing (2)

