



Compressed Texture Transmission Format

Mark Callow

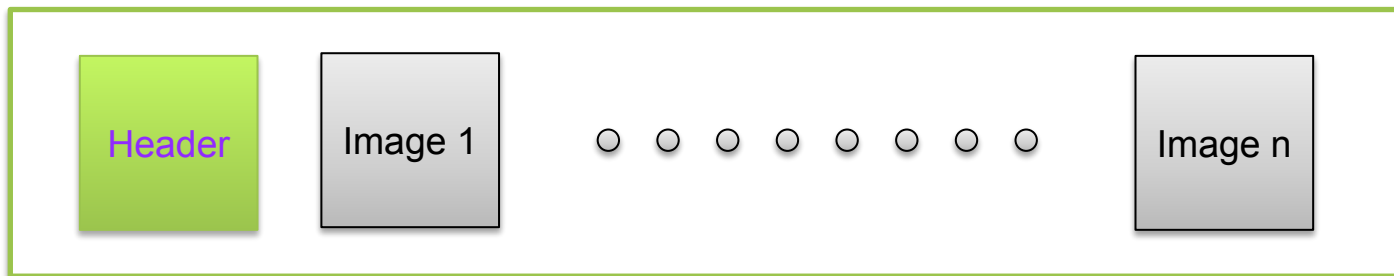
glTF Meetup, June 14th, 2018

This Talk Describes a Work in Progress



Required Specifications

- Container
 - Textures often consist of multiple images
 - A container makes for easier use.



- Format(s) for the image bits

Image Bits - Issues

- Can use image formats defined by the GPU APIs but
 - Uncompressed formats too large for transmission
 - GPU block-compressed formats too large for transmission
 - Compression to GPU formats slow or unavailable on most clients
 - Nightmare of many GPU/Platform-Specific formats

Image Bits - Solutions Under Discussion

Rate Distortion Optimization (Crunch RDO Mode)



Supercompression (Crunch CRN mode)

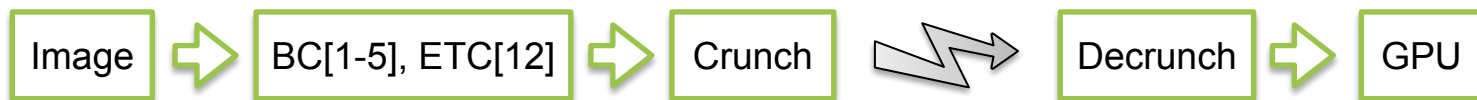
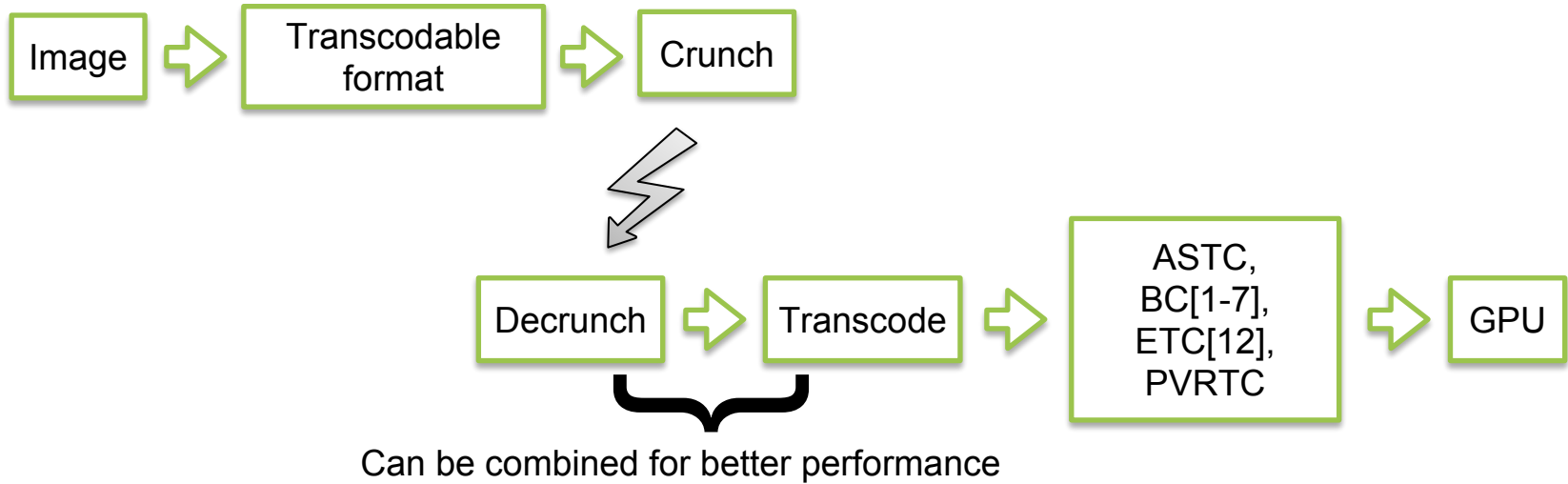
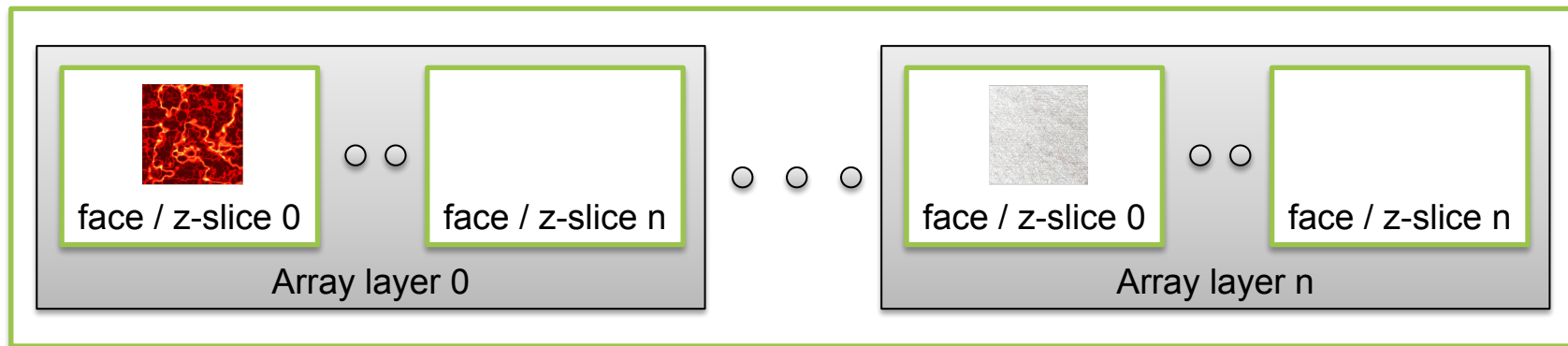
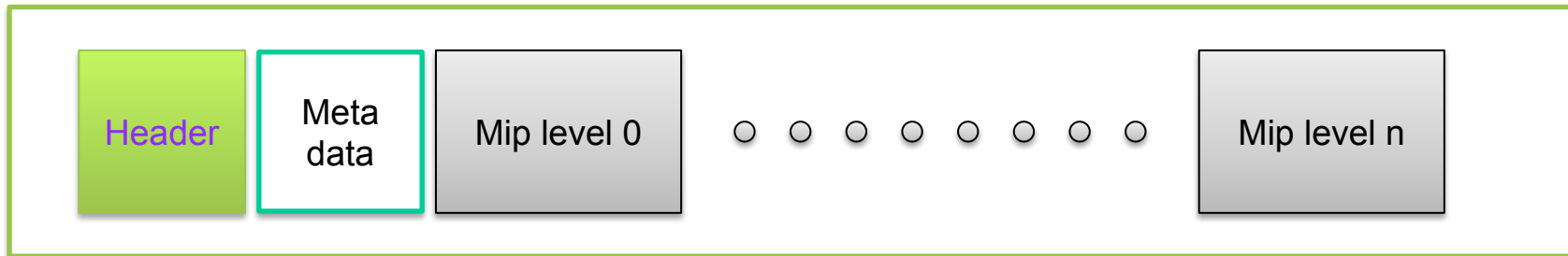


Image Bits - Solutions Under Discussion

Universal Transcodable Format

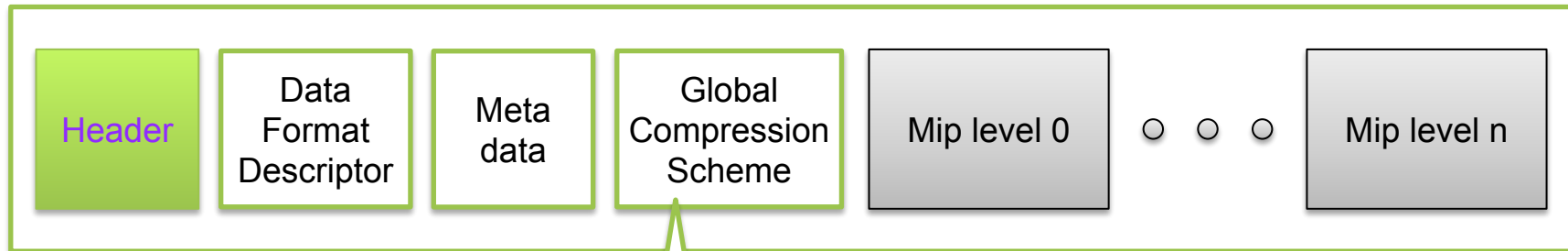


KTX File Structure



Mip Level Structure

KTX2 File Structure



CRN
LZ (zlib)
zstd ?
tANS?

KTX 2 Header Additions

- vkFormat field
 - makes loading of Vulkan textures easier
- levelOrder field
 - lets mip levels be ordered from smallest first, enabling streaming

Metadata Additions

- KTXswizzle
 - Indicates desired component mapping for a texture

Data Format Descriptor*

- provides exact description of texel format and color space
 - non-OpenGL and non-Vulkan applications no longer need to understand OpenGL or Vulkan enums to use the image data.
 - provides applications that care about correct color with the necessary information.
 - KTX files can now contain multisample images

* See <https://www.khronos.org/dataformat>.

Global Compression

- CRN, LZ (zlib) compression.
 - Inclusion of zstd and tANS under discussion.
 - Use only with RDO mode or uncompressed images
- Transcodable format can be encoded by either CRN or RDO so KTX2 also supports it.

Open Issues

- Specification has several unresolved open issues listed inside.
- Please look. I want your opinion.
 - Read the specification at <http://github.khronos.org/KTX-Specification/>
 - File issues at <https://github.com/KhronosGroup/KTX-Specification>

WiP Reminder



Watch these places for progress

Crunch GitHub Repo: <https://github.com/BinomialLLC/crunch>

Improvements to Crunch to support ETC were done by Alexander Suvorov of Unity. His blog describing the work is:

<https://blogs.unity3d.com/2017/12/15/crunch-compression-of-etc-textures/>

Crunch and the transcoders were developed by Rich Geldreich now at Binomial LLC. Some relevant blogs are:

<http://richg42.blogspot.com/2018/06/etc1s-texture-format-encoding.html>

<http://richg42.blogspot.com/2018/05/some-basis-baseline-universal-format.html>

KTX2 specification source: <https://github.com/KhronosGroup/KTX-Specification>

KTX software (currently only supports KTX1): <https://github.com/KhronosGroup/KTX-Software>.

I am about to land a huge change bringing Vulkan support and much easier use when not using OpenGL or Vulkan