

Universal Texture Compression Format

WebGL/WebVR/glTF Meetup

Stephanie Hurlburt

K H R  N O S
G R O U P

Introduction

I work at Binomial, a company building a texture compressor called Basis. I'm currently fully focused on building this up with my business partner, Rich Geldreich.

Since Basis uniquely solves a texture compression problem, especially in the WebGL/WebVR pipelines, we are more than happy to donate our texture file format specification and transcoder as a standard to the Khronos Group.

We are standardizing this as a part of glTF.

Using JPEG for textures

A common way to handle texture data is to compress to JPEG, and store uncompressed on the GPU

It has decent reasoning behind it CPU-side (JPEGs are small!), but truly limits your graphical capacity.

GPU formats were made to improve upon this pipeline! We should use them!

(Side note: You don't want to compress to JPEG and then turn that into a GPU format. Great CPU storage, but heavy runtime processing and double-artifacts and poor GPU compression)

Using GPU formats for textures

This is what we want to do, but there exists a problem in the existing pipeline.

Right now web developers have to store a copy of every GPU format they want to support (at least ETC for Android/Metal iOS, PVRTC for non-Metal (older) iOS, and DXT for desktop-- and more if you want better quality!)

To give some perspective-- even if you're only storing one GPU format, GPU formats are not meant for CPU storage and are still very big.

This is where Basis comes in

One format, the size of JPEG, that turns into the GPU format you need when you need it.

The ideal place for Basis is as low-level in the stack as possible-- we are actively working with browser developers, but in the meantime it can be put in WebGL code.

The transcoding step of Basis (turning into the GPU format you need at runtime) can happen in Javascript and is fast.

This technology needs to be standardized

One of the reasons why GPU formats became so problematic was lack of standardization-- we can't make this mistake again.

We're happy to donate the Basis file format to Khronos, and open up the transcoder so that we can have a healthy texture compression ecosystem.

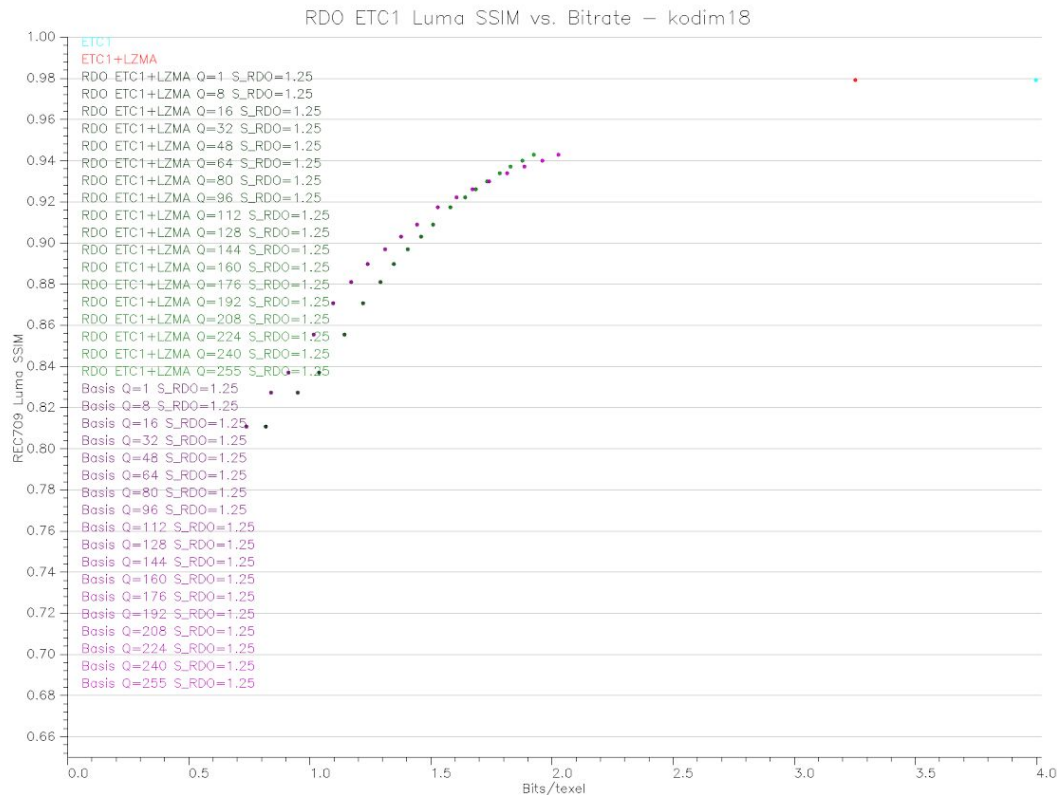
We'll be integrating this into glTF as a part of the 3D Formats working group.

Performance statistics

GPU Format: 4.0 bits/texel

GPU Format + lossless: 3.4 bits/texel

Basis: 0.6-2.4 bits/texel

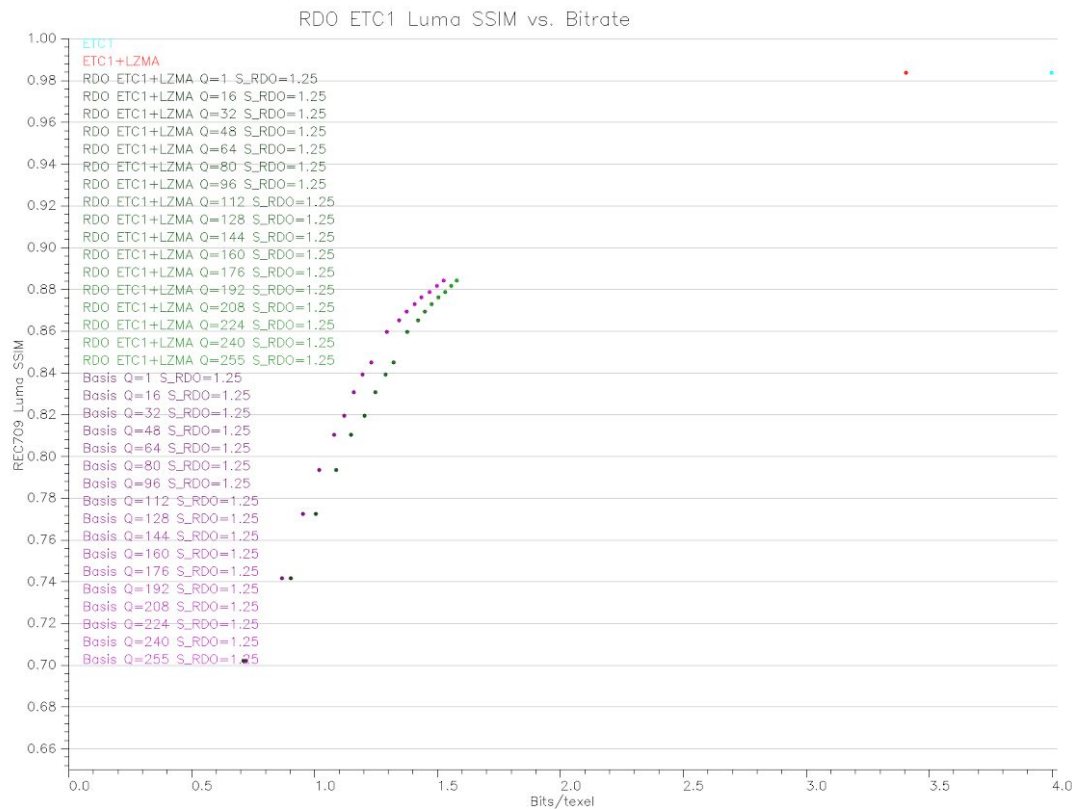


Performance statistics

GPU Format: 4.0 bits/texel

GPU Format + lossless: 3.6 bits/texel

Basis: 0.7-1.8 bits/texel



Performance statistics

GPU Format: 4.0 bits/texel

GPU Format + lossless: 2.1 bits/texel

Basis: 0.6-1.4 bits/texel

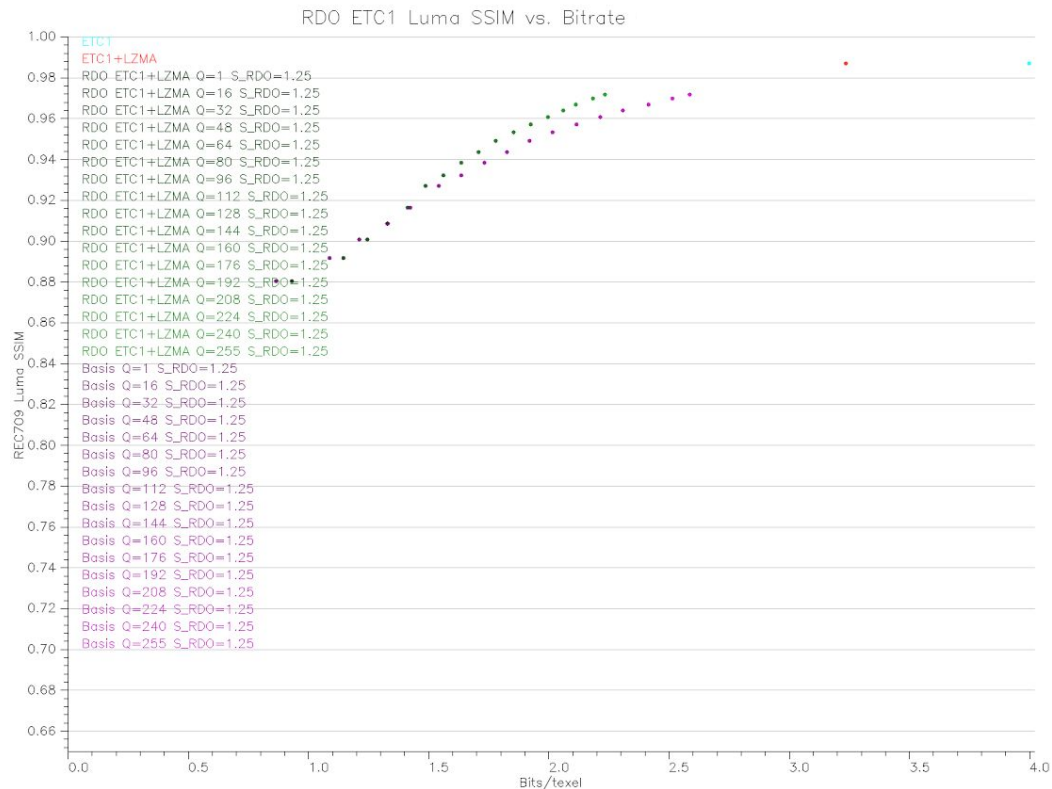


Performance statistics

GPU Format: 4.0 bits/texel

GPU Format + lossless: 3.4 bits/texel

Basis: 0.4-2.8 bits/texel



Thank you!
@sehurlburt
binomial.info