gltf Webinar | Fall 2021

gltf Fast Forward

Brent Scannell
3D Formats Working Group Chair &
AR/VR/MR Product Manager @ Autodesk
Quick Intro to 3D Formats
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Member Companies and Sponsored Individuals

3D Formats Working Group
Chair: Brent Scannell (Autodesk)
Vice Chair: Alexey Medvedev (Facebook)
Outreach Officer: Adam Morris (Target)
Specification Editor: Alexey Knyazev

Task Sub-Groups (TSGs)

Physically Based Rendering
Chair: Ed Mackey (Analytical Graphics, Inc)

glTF Tooling
Chair: Leonard Daly

Adopters
Assist in building conformant implementation and products

Developers
Encourage application development using the specifications and APIs. Develop and maintain samples

Conferences and Press Events
Strengthen the ecosystem with presence and thought leadership

Standards Bodies
Create liaison opportunities and cooperation models

Industry and Ecosystem Advisors
Maintain connections and guarantee relevancy of specifications

Outreach Officer: Adam Morris (Target)
 Specification Editor: Alexey Knyazev
Quick Intro to 3D Formats

Member Companies and Sponsored Individuals

3D Formats Working Group
- Primary decision and discussion forum
- Strategy development and roadmapping
- Outreach discussions and feedback review

Task Sub-Groups (TSGs)

Physically Based Rendering
- Rendering and materials center of excellence
- Specification and Extension development

glTF Tooling
- Tools and adoption projects center of excellence
- Ensures ecosystem can stay up to date

Adopters
Assist in building conformant implementation and products

Conferences and Press Events
Strengthen the ecosystem with presence and thought leadership

Developers
Encourage application development using the specifications and APIs.
Develop and maintain samples

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Industry and Ecosystem Advisors
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glTF Evolution

**glTF 1.0**
- Primarily for WebGL
- Uses GLSL for materials

**glTF 2.0**
- Native AND Web Apps
- Metallic-Roughness and Specular-Glossiness PBR
- Draco Mesh Compression
  - 10-20X compression ratios

**#1 PBR Extensions**
- Transmission
- Clearcoat
- Sheen
- Material Variants
  - 3D Commerce use cases

**#2 PBR Extensions**
- Refraction
- Specular Color
- Color attenuation
- Volumetric Properties

**KTX 2.0**
- Universal Textures
- Basis Universal Supercompression

**Metadata**
- KHR_xmp_json_ld
  - supports XMP Extensible Metadata Platform
  - ISO 16684-1

**Future Roadmap**
- ISO/IEC JTC 1 glTF 2.0.0 specification

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The first wave of PBR

- KHR_materials_clearcoat (December 2020)
  - Adds a layer on top of existing material

- KHR_materials_transmission (December 2020)
  - Enables materials like plastics and glass
  - More accurate than using alpha coverage/opacity

- KHR_materials_sheen (December 2020)
  - Enables materials like cloth and fabric

- See [https://github.khronos.org/gltf-Sample-Viewer-Release/](https://github.khronos.org/gltf-Sample-Viewer-Release/)
A second wave of PBR

- **KHR_materials_ior (July 2021)**
  - Adds index of refraction to transparent materials

- **KHR_materials_volume (July 2021)**
  - Adds depth and attenuation properties
  - Adds thickness for non ray-tracing engines

- **KHR_materials_specular (July 2021)**
  - Enables colored specular highlights within the metal/roughness material model


- See [https://github.khronos.org/glTF-Sample-Viewer-Release/](https://github.khronos.org/glTF-Sample-Viewer-Release/)
KTX 2.0 Supercompression

- KTX 2.0 image container (April 2021)
  - Adds support for Basis Universal supercompressed GPU textures
  - Basis Universal is developed by Binomial (binomial.info)

- KHR_texture_basisu (April 2021)
  - glTF extension to support KTX2 textures

KTX 2.0 Supercompression

Universal GPU Compressed Textures

Texture Assets .png or .jpg

Encode and Supercompress

BINOMIAL

Basis Universal supercompressed textures in KTX 2.0 container

Transcode ON THE FLY to GPU formats

GPU Compressed Texture

GPU Compressed Texture

GPU Compressed Texture

Open-source Basis Universal encoder with supercompression produces compact textures for transmission

Open-source tools pack supercompressed textures into KTX 2.0 container and then pack KTX textures into glTF assets

Open-source C++ and WebAssembly transcoding to GPU compressed formats

Use GPU compressed textures native to platform
Desktop: BC*
Mobile: ETC1/2, PVRTC1, ASTC
KTX 2.0 Supercompression

(300% zoom)

**JPG + PNG**
File size: 12.8 MB
Memory: 96.2 MB

(300% zoom)

**KTX: UASTC + ETC1S**
File size: 10.4 MB
Memory: 21.4 MB

(300% zoom)

**KTX: ETC1S**
File size: 4.6 MB
Memory: 15.7 MB
Collaboration with 3D Commerce

- **KHR_material_variants** (November 2020)
  - To support multiple material variations of an object

- **KHR_xmp_json_ld** (prov. June 2021)
  - Supporting the metadata needs of retailers and more

ISO/IEC/JTC 1 Transposition

• Khronos Recognized as JTC 1 PAS Submitter (May 2021)
  • Enabling step to prepare for submitting glTF PAS for International Standard transposition

• Specification Overhaul (September 2021)
  • Released glTF 2.0.0
    • No technical changes
    • Aligns glTF with document quality requirements consistent with an International Standard

What’s Next

Roadmap Discussions

More PBR (Node-based?)
Subsurface Scattering, Anisotropy, Translucency, Thin Film (iridescence)

Composability
Procedural Textures
Interaction/Constraints
LODs/Streaming
Mesh Variants
Geospatial Metadata
Subdiv Surfaces
XR Dimensions/GeoPose
Enhanced Animation
Point Clouds

Photo by Matt Duncan on Unsplash
Ways to get involved after the event:

- glTF Slack Instance
  https://khr.io/slack
- https://github.com/KhronosGroup/
- https://www.khronos.org/gltf/
- 3dformats-wgchair@khronos.org