KHRONOS™ GROUP

glTF and Mobile VR:

Inclusive standards for a 3D world

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Oculus Mobile SDK

oculus

Choosing a Scene Format for Mobile VR

- **For content creators, mobile VR can be an exciting new medium, but a challenging new platform**
  - Severe resource constraints, even for graphics devs
  - Absence of vetted tools/best practices
- **Formats for mobile VR should be chosen to minimize its barrier to entry**
  - Support inclusive standards that make it easy to integrate with major packages
  - Prioritize community tools that can open up development to a range of artists, engineers and contributors.

Creating a Scene Format for Mobile VR

ovrscene: Oculus scene format

- High performance run times, rendering
- Designed, deployed, maintained internally
- Deployed to developers via FBXConvert

- **Significant advantages to choosing external, community-driven (open) standard over an in-house format:**
  - Interoperability
  - Support from the greater community
  - Step towards a healthy ecosystem

The *inclusive* 3D formats aren't open

- Industry standards tend to be ones that are heavily tailored to a platform

The ***open* 3D formats aren't performant**

- Probably where all those other standards came from

Creating a Scene Format for Mobile VR

oculus

models.json

Ordered list of "surfaces"/materials
Indices into models.bin

models.bin

Geometry: vertices and indices (sorted, pre-filtered)

.pvr,
.ktx
…
Textures

glTF™

.gltf

JSON describes node hierarchy, materials, cameras

.bin

Geometry: vertices and indices
Animation: key-frames
Skins: inverse-bind matrices

.glsl

Shaders

.png
.jpg
…
Textures

FBX2glTF: built with VR in mind

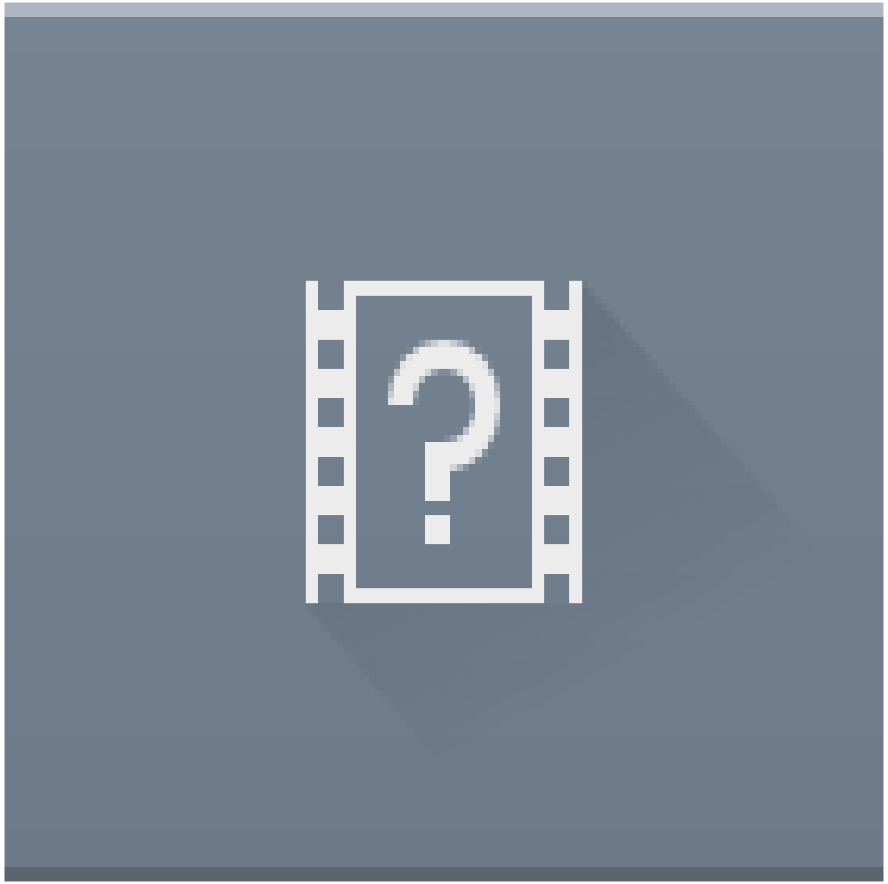
- Conversion tool based on in-house FBX->.ovrscene converter
- Definitely a *subset* of glTF (for now)

- Merging meshes
  - Draw calls incur substantial driver overhead on mobile
  - Merges meshes that use the same material into a single surface.
- Pre-filtering vertices
  - Removing attributes unnecessary for rendering reduces the data set and improves the cost of lookups and storage
- Remapping textures to adjust LOD
  - Static scenes can simplify their textures by baking in the optimal LOD for a fixed vantage point
- Pre-compressing textures
  - Image files compressed with GPU compression formats
- Sorting geometry
  - Rendering front-to-back is optimal on modern GPUs
  - Perfect sorting for scenes with fixed/limited vantage points
- Texture Atlas

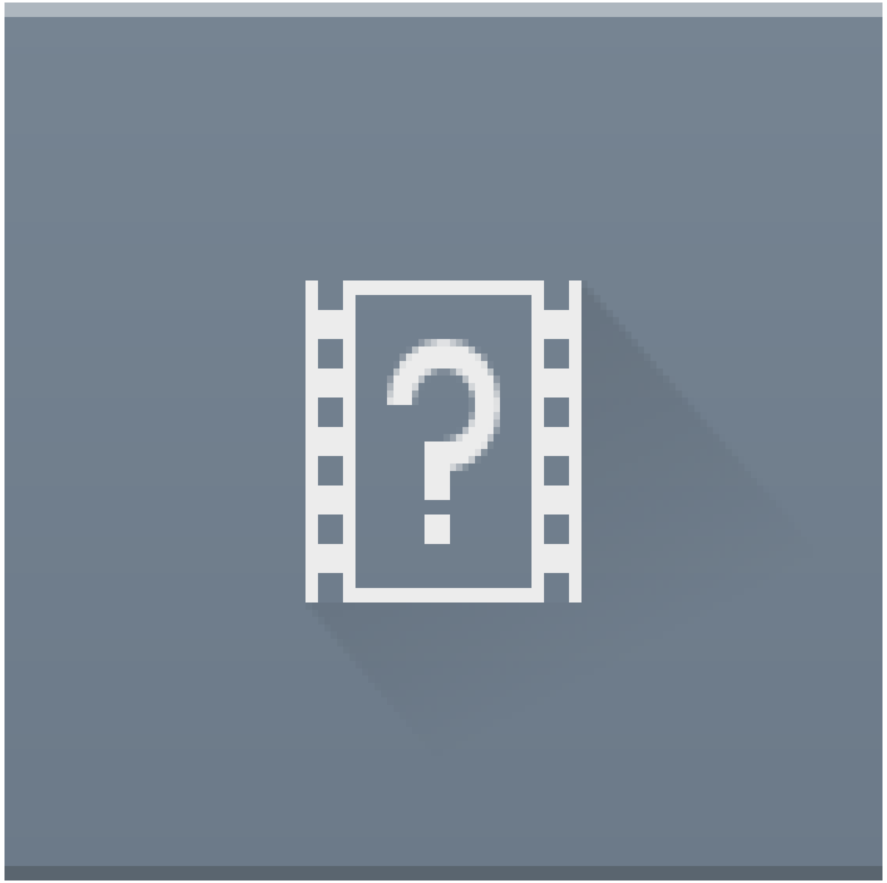
On The Roadmap

- Open Source/Khronos Release
- Collision detection/gaze selection
- Support for animations

Most Thrilling Demo You Will See at SIGGRAPH



Loading with glTF



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