What is glTF and it's benefit in 3D Commerce

Norbert Nopper, Shanghai, 8/18/2020
Agenda

- Introduction
- What is glTF?
- glTF in 3D Commerce
- Outlook of glTF
- Summary with Questions & Answers
Introduction

- Managing Director at UX3D

- Computer scientist
  - OpenGL, Vulkan, glTF … anything GPU related

- Working more than two years on glTF with the 3D Formats group
What is glTF?

• glTF is a 3D asset format ...
• ... but what is the “magic” of glTF?
glTF - The JPEG of 3D!

Efficient, reliable transmission
Bring 3D assets into 1000s of apps and engines

- Compact to Transmit
- Simple and Fast to Load
- Describes Full Scenes
- Runtime Neutral
- Open and Extensible

glTF 1.0 - December 2015
Primarily for WebGL
Uses GLSL for materials

glTF 2.0 - June 2017
Native AND Web APIs
Physically Based Rendering
Metallic-Roughness and Specular-Glossiness

- Audio: MP3
- Video: H.264
- Images: JPEG
- 3D: glTF

New market opportunities for 3D content creation and deployment!

glTF spec development on open GitHub - get involved!
https://github.com/KhronosGroup/glTF
Basics of glTF

- **Technical**
  - Text file encoded as JSON
  - Images as PNG or JPEG
  - Binary file for vertex and animation data

- **Content**
  - Scenes
  - Nodes with transform hierarchy
  - Meshes and primitives
  - Material
  - Animations
  - Cameras
Extensibility of glTF

• Adding functionality as required
  - Do not need to wait for a new version
    - E.g. glTF 2.0 to 2.x

• Grouped by …
  - KHR_* Khronos extensions
  - EXT_* Several vendors
  - UX3D_* Vendor extension

```json
"extensions": {
  "KHR_materials_clearcoat": {
    "clearcoatFactor": 1.0,
    "clearcoatRoughnessFactor": 0.03
  }
},
```
• Goal: Visualize products
  - Maximum visual realism
  - Maximum visual consistency

➢ Challenge: Final pixel on the screen
  - Material
  - Lighting
  - Postprocessing e.g. tone mapping
glTF in 3DCommerce™

- Material
  - Physically based
  - Optimal for GPU
    - From embedded to server
glTF in 3DCommerce™

- Lighting
  - Physically based
    - Utilized by raytracers ...
    - ... and rasterizers
  - Pre-computed for rasterizers
    - E.g. Unreal Engine 4 or Unity
• Post processing
  - Tone mapping
    - High dynamic range image
      ➢ GPU and Output device “range”
• Extensions under discussion
  - Material
    - Clear coat
    - Sheen
    - Thin film
    - ... and much more...
  - Light
    - Orientation
    - Exposure
  - Tone mapping
    - Same visual output

https://belcour.github.io/blog/research/2017/05/01/brdf-thin-film.html
Outlook of glTF

- glTF beyond 3D Commerce

Maps
https://cesium.com/

Architecture
https://home.otoy.com/render/octane-render/showcase/

Simulation
https://www.bit-ts.com/solutions/autonomous-driving/

Instrument Cluster
https://cgistudio.at/de/hmi-design/

Much more ...
Summary

• glTF is the perfect choice for 3D Commerce
  - Major requirements are provided out of the box
  - Extensible by e-commerce companies demands

• Questions & Answers