

Request for Quotations

Blender glTF Exporter

February 2017

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1. Background

glTF™ (GL Transmission Format) is a royalty-free specification defined and maintained by the Khronos Group for the efficient transmission and loading of 3D scenes and models. glTF minimizes both the size of 3D assets, and the runtime processing needed by 3D applications to unpack and use those assets. glTF defines a common publishing format for 3D content tools and services that streamlines authoring workflows and enables interoperable use of content across the industry.

The Khronos 3D Formats Working Group is working to define and release the glTF 2.0 specification that removes underlying 3D API dependencies, adds PBR (Physically Based Rendering) materials, and streamlines the animation definition from glTF 1.0.

Blender, the open source 3D authoring tool, has started development of an open-source exporter of assets in the glTF file format; see here for the status of the current work: <https://github.com/Kupoman/blendergltf>. The goal of this project is to build on, and expand, the current exporter so that it robustly supports full glTF 2.0. The resultant exporter code is to be contributed, royalty-free to the Blender open source project.

2. Scope

The exporter should support complete glTF 2.0 functionality:

2.1 Geometry

The Exporter must export mesh data as indexed triangle list. The Exporter should provide an option to apply modifiers before exporting.

In glTF, “Mesh Primitive” is a set of triangles that share the same indices scope and material.

A “Mesh” is a set of “Mesh Primitives” that share the same transformation matrix.

The Exporter must choose most efficient indices data type (ubyte, ushort, or uint) for each “Mesh Primitive”. The Exporter should provide an option to split “Mesh Primitives” that require 4-byte indices into smaller ones.

For each vertex, the Exporter must write position (XYZ), tangent-space basis (see spec for exact layout options), and UVs (if present).

The Exporter must convert Blender’s “Shape Keys” into glTF’s “Morph Targets”.

The Exporter should provide a way to export custom vertex attributes (see spec for custom attribute semantics definition). E.g., each custom attribute could be filled with “Vertex Weight” data bound to separate “Vertex Group”.

2.2 PBR Materials

glTF 2.0 uses Metallic-Roughness PBR material model.

The Exporter must provide a node-based material template with as-close-as-possible representation of glTF 2.0 Metallic-Roughness model.

Optionally, the Exporter could provide node-based material template for Specular-Glossiness PBR material (from the corresponding glTF extension).

Optionally, the Exporter could convert Blender materials into Metallic-Roughness and/or Specular-Glossiness representations.

The Exporter must export all images needed for asset’s material in PNG format.

2.3 Scene Graphs

glTF 2.0 has a notion of “Scenes” and “Nodes”.

Each “Scene” is defined by a set of its top-level “Nodes”.

“Node” hierarchy must be a strict tree.

2.4 Animation and Skinning

glTF 2.0 supports animating rigid bodies, skin joints, and morph target weights.

glTF 2.0 supports STEP, LINEAR, and BEZIER interpolation modes between keyframes. All other interpolation modes must be converted to one of these.

glTF 2.0 supports only Linear Blend Skinning model. No more than four bones can influence one vertex.

2.5 Cameras

glTF 2.0 supports Orthographic, Finite Perspective, and Infinite Perspective projection matrices.

The Exporter should have an option to export Blender’s perspective cameras using Finite or Infinite Perspective projection (see details in the spec).

2.6 Common materials

Optionally, the Exporter could support Common Materials glTF extension (after its finalizing).

In such case, the Exporter must support vertex color attribute.

3. Methodology, Deliverables and Acceptance Criteria

The Contractor will be granted a fee-waived Khronos membership for the duration of the contract to enable full communication and collaborate with the Khronos 3D Formats working group to discuss any glTF specification or extension updates and issues, and for full access to all Khronos materials related to glTF.

Deliverables will include:

3.1 Exporter Source Code

- Code development should be undertaken on a public Khronos GitHub repository to encourage collaboration and feedback from the Blender community during development. Ideally, the glTF exporter will be incorporated as part of the Blender install if the Blender community agrees.

3.1 End-user Documentation

- Including usage and installation documentation.

3.2 Testing and Validation

- Automated unit tests for all reasonable test cases;

- Public beta for community testing and feedback;

- All exported models must pass validation: <https://github.com/KhronosGroup/glTF-Validator>.

4. Selection Schedule and Process

Khronos will follow the schedule below to select a Contractor:

1. **February 27th** – Khronos Releases RFQ;
2. **March 17th** – RFQ responses received by Khronos;
3. **March 24th** – Contractor selected and notified;
4. **March 29th** – Contract executed and start of work.

If a bidder is not a Khronos member, NDA access can be provided to any necessary non-public information to create a bid. The contractor will be selected from any received bids by the Khronos 3D Formats working group. The selected contractor will be required to execute the standard Khronos Membership Agreement (with membership fees waived) if they are not already a Khronos member, and execute the standard Khronos Contractors Agreement with milestones and costs entered into Exhibit B and Contractor Disclosures entered into Exhibit C.

No work shall begin, and Khronos shall be liable for no costs or expenses, until the selected contractor is in receipt of an executed contractor's agreement.

5. RFQ Responses

The RFQ responses will form the basis for detailed milestone and cost negotiations for the final contract with the selected vendor(s). Vendors are encouraged to quote for a subset of the deliverables if they feel they are able to specifically address that subset as Khronos will consider splitting this project between multiple respondents.

Please provide the following information in the format of your choice:

1. Identification of which elements of the Project Scope and Deliverables outlined in Sections 2 and 3 on which you wish to bid;
2. A description of your familiarity with Blender development, Python, 3D graphics, glTF, unit testing, Git and art asset creation and open source methodology;
3. Proposed testing approach for the automated unit tests;
4. Proposed schedule to complete deliverables, including when you are available to commence work and incremental milestones;
5. Whether you are bidding a fixed cost or a T&M contract. Fixed cost responses are strongly preferred;
6. Confirmation that you are willing to work under the Khronos Contractor Agreement and execute the Khronos Membership Agreement for the duration of the project;
7. Any particular issues or risk factors that you wish to highlight;
8. Supporting materials, including background materials about your company, highlighting relevant experience and expertise for this project, personnel backgrounds (e.g., resume and GitHub profiles), in particular success in delivering projects requiring close attention to detail and strong writing and communication skills.

Responses and all subsequent communication regarding this RFQ should be sent to 3dformats-rfq@khronos.org.