



**Khronos Group
Request for Proposals**

Tooling TSG

glTF-Compressor with KTX

Fall 2022

Forward

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1. Background

The Tooling Task SubGroup (TSG) of 3D Formats Working Group (WG) was established in July 2021 to support and promote the increased adoption of glTF and other 3D Formats file formats and processes. This was to be done by promoting and funding projects to increase tooling support, create documentation, and develop tutorials that promote or support glTF, KTX, and other formats and processes.

glTF-Compressor was a tool developed by a member for investigative use to assist technical artists in creating better and smaller glTF/GLB files. This tool was a prototype and did not support KTX images. This project is to create a production tool that includes support for KTX images.

2. Methodology

Khronos has a fixed budget for this project, with incremental monthly payments or what is agreed to during contract negotiation. 10% of the total contract will be held at the end for final approval by 3D Formats Working Group.

This RFP is being circulated to the public. - any interested organization or individual is welcome to respond.

Khronos has established a project email list (see §6 - Selection Process) for communications regarding this project that any interested Khronos member may join.

All code development shall be delivered to a branch of the Khronos public glTF repository. .

3. Scope

This project builds on two open-source projects: *glTF-Compressor*¹ and *Interactive KTX compressor*². This project is to create a new code base that combines the functionality of both of these tools. As much or little of the existing tools may be used as long as appropriate credit is provided.

The delivered application needs to run in a web browser running on a sufficiently powered computer with a GPU. The display does not need to support all browser window widths. The full specification and requirements are listed in Appendix A.

The contractor is responsible for developing a user interface in a web browser window according to the requirements that supports all of the required functionality.

4. Deliverables

The following deliverables are required for the project.

1. Preliminary design review presentation to Tooling TSG
2. Final results presentation for 3D Formats WG
3. Running browser-based application that meets or exceeds the requirements and specifications in Appendix A.
4. Full source code to Khronos via GitHub
5. Draft of blog post describing application written in English

#1 is made to the Tooling TSG during a regular meeting.

#2 is made to the 3D Formats WG during a regular meeting

#3 is achieved with a GitHub app from the source code (#4)

#5 is delivered as a Word, OpenOffice, or Google Doc.

Successful delivery of all items above allows final payment including the hold-back amount.

5. Schedule and Budget

Khronos has a budget of \$40,000 USD for this project and expects work to be complete within three months of project initiation, with payment due in monthly increments. The bidder should indicate the preferred payment schedule. For the purpose of the bid, assume that work commences on 3 January 2023. A bidder may propose additional time or request additional budget. Either request must be justified. If there is any request for additional schedule or budget, the proposed must indicate what can be done within the limits defined in this paragraph.

6. Selection Process

Khronos shall designate a Khronos RFP Manager and will use an RFP email list (3DF_Compressor_RFP@lists.khronos.org) that can be used to contact the RFP Manager and all other 3D Formats Working Group members involved in the bid selection process. No member making a bid shall be on the RFP list. Any company considering making a bid in response to the RFP should notify the RFP list as soon as possible. Any potential bidder may request additional information and submit questions directly to the RFP manager or on the RFP email list. Any additional Khronos information and RFP clarifications will be distributed equally to all potential bidders.

All bidders should provide the following information in the format of their choice:

- Proposed schedule, assuming work starts on 12 December 2022.
- Confirmation that if your bid is accepted, you are willing to work under the terms of the Khronos Contractor Agreement^[3].
- Any issues or risk factors that they wish to highlight.
- Supporting materials, including background materials about their company, highlighting experience and expertise relevant to this project.

RFP responses are requested by **6AM PST on Monday 5 December 2022** and should be sent to the RFP list. Bidders may update their bid as they wish before the submission deadline. In exceptional circumstances a requested submission deadline extension may be issued to all bidders at Khronos' discretion.

Khronos will evaluate all bids and select the winning bid based on budget & schedule, innovative UX (either proposed or demonstrated), and relevant experience & expertise.

Khronos expects to announce the selected bid within 20 working days after the submission deadline and will immediately notify all bidders and enter into contract negotiations with the selected bidder to finalize deliverables and payment schedule. Khronos will immediately notify all other bidders once contract negotiations are complete. In the case contractual agreement cannot be reached, Khronos may select an alternative bidder and re-enter negotiations.

Work can start immediately when the contract is negotiated and executed by both parties.

7. Contractors Agreement

The selected contractor will be required to execute the 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 a mutually executed Contractor's Agreement.

It is important that contractors understand that, under the terms of the Contractors Agreement, Khronos will assess progress on a regular basis and reserves the right to terminate or renegotiate the contract in the event of insufficient progress or other issues.

8. Project Continuation

There is no anticipated continuation to this project.

9. References

[1] glTF-Compressor

<https://pushmatrix.github.io/compressor/#>

[2] Interactive KTX compressor tool

<https://basis.dev.jibencaozuo.com/>

[3] Khronos Contractors Agreement template

https://members.khronos.org/wg/All_Khronos/document/previewpdf/23303

Non-footnote References

- glTF Report - <https://gltf.report/>
- toktx - <https://github.khronos.org/KTX-Software/ktxtools/toktx.html>

Appendix A - Requirements and Specifications

This section describes the requirements on the developed tool for this project.

The tool is open source software and Creative Commons documentation as described in the Khronos Contractor's Agreement³.

1. Operating Environment
 - a. It is assumed that the client is running a computer with sufficient resources to accomplish all tasks. This includes sufficiently resourced CPU, GPU, RAM, HCI, and display
 - b. The tool shall run in at least the following modern web browsers
 - i. Firefox
 - ii. Chrome
 - iii. Edge
 - iv. Safari
 - c. All operations shall be performed on client's computer
 - d. There are no requirements on the application to run outside of a web browser
2. Display capabilities
 - a. The tool should use the Khronos Sample Viewer, three.js, or Babylon.js for the viewer, or another viewer which supports all [Khronos ratified extensions](#) and [EXT texture webp](#) that affect the visual appearance of the asset.
 - b. The data related to extensions not supported must be carried through without change.
 - c. The tool shall display glTF models in either glTF or GLB format with all supported materials via the above extensions.
 - d. The tool shall allow the user to view the model from any position in any orientation. This may be done by manipulating the viewing camera or changing the model's position and orientation in space.
 - e. It is not necessary to support model animations
3. Image Compression
 - a. The tool shall support the compression of any image used in the model
 - b. The user shall select the output compression format from the following list
 - i. PNG
 - ii. JPEG
 - iii. WebP
 - iv. BasisU/KTX
 - c. The tool shall support reasonable settings for items 3.b.i-iv. The exposed options should be identified in the bid.
 - d. Default selections shall be based on image use in the model.
 - i. Images used as textures should have a lossy compressed image selected as default
 - ii. Images used as normals or other non-texture uses should have an lossless compressed image selected as default
 - iii. Default compression settings shall be reasonable for the image use and previous settings
 - e. The compression calculations must be done on the client's computer using available resources.
 - f. Compress statistics including, but not limited to, file size and GPU size need to be displayed
4. KTX Compression
 - a. This tool shall use the top-of-tree KTX-Software compiled to WASM
 - b. That library is currently under development with an expected available date
 - c. For the purposes of the bid, assume that the library will be similar to the one used in [2].
5. Image Display
 - a. The tool shall provide the option to the user to show the compression
 - i. As a flat image
 - ii. On the model

- iii. Interactive slider for before/after comparison
 - iv. Hotkey & interface button to toggle before/after comparison
 - b. Nothing in the requirements prevent novel or innovative display and comparison techniques
- 6. UX
 - a. The tool shall be easy to use with a clean interface
 - b. Users of either [1] or [2] should find the tool intuitive
 - c. Existing Khronos and related tools can be used when developing the user interface. These include Sample Viewer, glTF-Transform, etc.
 - d. Drag-and-drop import of GLB files, or glTF with associated references.
 - e. Ability to select individual textures to apply compression settings to.
 - f. Display the original texture's pixel resolution and input format.
 - g. Before/after estimates of Disk size and GPU size for the currently selected texture.
 - h. Display the selected texture in 2D view, zoomed to fit right side of application (similar to glTF Compressor).
 - i. Ability to downsize textures in powers of two increments.
 - j. UI shall expose all KTX compression settings.
 - k. Before/after toggle to compare uncompressed vs. compressed textures in both 2D and 3D views. Currently in glTF Compressor this is a button in the interface (Compare) and the C key.
 - l. Interactive slider for before/after comparison.
- 7. Output
 - a. The tool shall have the capability to create the following outputs
 - i. A single JSON file that describes all compression operations for each compressed image that can be used as input to toktx⁵.
 - ii. A glTF file in the same format as the input using the compressed images.
- 8. Software
 - a. Any open source software package or library may be used subject to the following conditions
 - i. All items have a license that is compatible with that specified in the Khronos Contractor's Agreement
 - ii. All items are properly credited according to the source license
 - b. Coding shall follow modern coding practices and be compatible with GitHub structure, practices, and conventions

Appendix B - Assessment of Existing Tools

This section provides relevant assessments of similar tools, to inform proposed features for the new tool.

Interactive KTX compressor tool

<https://basis.dev.jibencaozuo.com/>

Positive features:

- Easy to use, drag-n-drop, easy to understand.
- Preview has nice A/B comparison.
- Can easily batch process and download a bunch of textures.

Negative features:

- No progress bar, difficult to know when compression is finished.
- Preview is small and difficult to zoom.
- Can't see it on the model.
- Missing multiple codec compression options. No supercompression.
- No resize options.
- No before/after statistics on file size, no estimated GPU size.

SuperPNG

<https://www.fnordware.com/superpng/>

- Photoshop plugin that offers improved PNG export settings.
- Quantize and Alpha and Interlacing controls.

glTF Report

<https://gltf.report/>

- GUI exposes texture information for glTF models.
- Supports KTX2 textures (pending current bug: <https://github.com/donmccurdy/glTF-Report-Feedback/issues/34>)
- Texture info displayed:
 - 2D view
 - material slots/index/URI/name
 - file format
 - resolution
 - disk size
 - gpu size