Khronos Group
Request for Proposals

OpenXR CTS Improvements

February 2022

Notice

Trademarks

1. Background

The OpenXR Working Group was established in January 2017 to create a royalty-free, open standard that provides high-performance access to Augmented Reality (AR) and Virtual Reality (VR)—collectively known as XR—platforms and devices.

The OpenXR 1.0 specification is currently ratified with a Conformance Test Suite (CTS) written by members of the Working Group. The Working Group wishes to further develop CTS tests to improve coverage of the OpenXR 1.0 specification and reduce OpenXR API fragmentation. The aim is to build on the existing OpenXR 1.0 CTS[2].

2. Methodology

Khronos will provide a prioritized list of conformance tests and or samples for development.

This RFP is being circulated publicly, and any interested company is welcome to respond.

Once awarded, Khronos will establish an OpenXR CTS email list and establish a Mattermost channel for communications regarding this project that any interested Khronos member may join. Status and progress reports should be prepared for the OpenXR meetings, in particular raising questions or resolving blocking issues.

All code development shall take place in a branch of the Khronos public OpenXR CTS GitHub Repository[3], should follow good development practice and allow regular review through incremental commits.

3. Scope

Contractor's primary tasks are to write conformance test specifications and implement tests for OpenXR on a time and materials basis, other work may be undertaken for the OpenXR Working Group on a time and materials basis. Exact work schedules would be agreed in writing between Khronos and Contractor during a monthly meeting.

Below is a current example list of tests and sample topics for development.

3.1. CTS framework support for the test result file (using a catch2 reporter) to contain logging messages, rather than just logging to stdout.
3.2. CTS framework support for VK_KHR_vulkan_enable2 with new functional test cases similar to those that already exist for VK_KHR_vulkan_enable.
3.3. Functional tests for the XR_EXT_performance_settings extension
3.4. Functional tests for the XR_EXT_debug_utils extension
3.5. Interactive tests for the following layer composition extensions: XR_KHR_composition_layer_equirect2, XR_KHR_composition_layer_cube, XR_KHR_composition_layer_cylinder, XR_KHR_composition_layer_color_scale_bias, and XR_KHR_composition_layer_depth
3.6. CTS framework support for all supported graphics APIs to render arbitrary meshes rather than just simple cubes.
3.7. Interactive tests for the XR_KHR_visibility_mask extension. This requires arbitrary mesh support.
3.8. Interactive tests for composition layers with XrSpace pose offsets
3.9. Interactive tests for MSAA (sampleCount > 1) used with XrSwapchains

4. Deliverables

Below is some rough guidance on what is expected to be delivered for each type of work product.

4.1. Most work will be targeting conformance tests, each conformance test shall consist of:

- source code integrated into the existing OpenXR CTS framework which uses C++, catch2 and its own reusable testing components built for OpenXR testing.
- Source code in the designated public Khronos GitHub repository in the same style and form as the existing conformance test suite
- Source code that leverages existing included libraries and frameworks
- CI using GitHub Actions across all repos
- Build and test definition using CMake and the Catch2 framework
- Appropriate test result reporting, both successful and failure cases within the existing Catch2 framework.
- Confirmation of successful compilation and execution on agreed platforms, generally Windows, Linux, and Android
- User documentation added to the OpenXR Guide with sufficient test case description that the test can be evaluated for correctness and completeness.

4.2. Some sample/example source code may be requested: Implementation of sample(s) based on OpenXR-Samples contributing guidelines (framework, coding and license guidelines) delivered on a branch of the OpenXR-Samples GitHub repository with associated Pull Request to gather feedback.

4.3. Some user documentation/tutorial work may be requested: Detailed instructional text and illustrations that walk the user through the process of using the OpenXR feature(s) highlighted with each sample. This documentation will be included as a Readme file included with the sample source code.

5. Structure and Budget

Budget: Khronos has a budget of approximately $260K USD for this project in 2022. If successful, Khronos expects ongoing engagement on an annual basis at similar funding levels until terminated in accordance with the contract.Continuity of resources preferred.

Billing: Contractor will invoice Khronos on a monthly basis. Proposals must outline the cost per engineer per month.

Team Structure: The team size is expected to be approximately 2 full time engineers, bids should identify how many resources would be available for the available budget. Any additional changes to team structure shall be mutually agreed in writing between Khronos and Contractor.

6. Selection Process

Khronos shall designate a Khronos RFP Manager and will use an RFP email list (openxr_cts_rfp@lists.khronos.org) that can be used to contact the RFP Manager and all other OpenXR Working Group members involved in the bid selection process. No company or 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 resourcing structure, assuming work starts in April 2022.
- Qualifications of the engineering resources
- Confirmation that if your bid is accepted, you are willing to work under the terms of the Khronos Contractor Agreement[2].
- 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 **5PM PT on Friday March 11th, 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 timescales, and relevant experience and expertise.

Khronos expects to announce the selected bid one week after the submission deadline and will immediately notify all bidders and enter into contract negotiations with the selected bidder to finalize resourcing 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 Resource Structure 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. References

[1] The OpenXR 1.0 Specification
https://www.khronos.org/registry/OpenXR/#apispecs

[2] Khronos Contractors Agreement template
https://members.khronos.org/document/dl/23303

[3] Khronos OpenXR CTS Repository
https://github.com/KhronosGroup/OpenXR-CTS