



Khronos Group

Request for Proposals

OpenXR Tutorial

March 9th, 2023

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Request for Proposals: OpenXR Tutorial

1. Background

There is a strong need from 3rd party developers to have a tutorial style walk through on how to use OpenXR with best practices. This will promote correct usage and strengthen the OpenXR ecosystem.

2. Methodology

This RFP is being circulated to all Khronos members and the general public, and anyone is welcome to respond.

Khronos will establish a project email list and Slack channel for communications regarding this project that any interested Khronos member may join. A short weekly status and progress report should be prepared for the weekly OpenXR working group meetings.

All code development shall take in place in a branch on a Khronos provided git repository.

3. Scope

The project will deliver a set of web pages similar to the [Vulkan Tutorial](#) web site.

This will include chapters detailing all the steps necessary to set up for Windows and Android down to the details of the API including the Action System and certain high use extensions like hand tracking. This will be done in the form of prose and code snippets. At the end of each chapter will be a functional program demonstrating the lessons learned. Links to relevant websites should be included, these include but are not limited to www.khronos.org and <https://github.com/KhronosGroup/OpenXR-SDK>

4. Deliverables

This project has 2 phases.

Phase 1:

- Design as described in section 4.1
- Outlines of Chapters 1.1, 1.2 and 2.1.
- Draft Text of Chapter 1.1
- Draft Text of Chapter 2.1 (with code examples)

Phase 2:

- Remainder of the outlines
- Final text for all chapters

The working group will appoint a sub group that will review each deliverable. Chapter outlines must be submitted and approved before work on the full chapter is to begin. The introduction chapter should be written last.

The final result will be hosted on a dedicated website using a Khronos server. This website may be accessible from a top-level domain such as www.openxr-tutorial.com or as a subdomain from www.khronos.org, the generated website should handle both.

Ownership and licensing of the work is specified in the Contractor's Agreement.

4.1 Look and Feel

The Look and Feel (L&F) phase of the project consists of two parts. The first part consists of at least 3 designs, which are presented to the working group for consideration. Once the working group decides which design to use the contractor will commence the final design phase. This phase a fully functional version of the design is presented, this should include mock text and be hosted on a contractor server so that it can be tested on various devices by the working group members.

1. Look and Feel Preliminary (2 weeks) After which the working sub group will down-select to 1 or 2 designs with possible modification requests.
2. Look and Feel Final (2 weeks) Fully functional Page, mock text & images, for approval by working sub group.

4.2 Webpage Requirements

The webpages should be:

1. [Accessible](#) and the [webaim report](#) should not have any errors.
2. Indexable by [search engines](#) and search console should not have any errors.
3. Use a responsive design adapting to mobile screens as well as desktop.
4. Have a local search option (google search is OK)
5. Have a clear and clickable index
6. Each page will have user selectable and copyable code snippets using syntax highlighting.
7. [Validate properly against](#) HTML5 and render properly in Firefox, Chrome, Edge and Safari, including Mobile versions thereof.
8. During development the contractor hosts the project.
9. Delivery will include clear instructions on how to take the git repo and deploy it on a web server.

4.3 Source code Requirements

All example source code presented on the pages should also be accessible from a OpenXR working group owned gitlab.khronos.org repo. At the conclusion of each chapter the source code should be compilable for Windows and Android.

The source code may be based upon the hello_xr sample application or a custom developed tutorial code demonstrating equivalent API usage, OS independence and graphics separation.

4.4 Image Resources

Each chapter will include several images, including the expected output as the page progresses and possible additional images explaining key concepts, such as coordinate systems. Images, if appropriate, should be vector graphics with the source files part of the deliverables as SVG's, non vector graphics images should use WebP.

4.5 Chapters

The following topics / chapters will be covered:

1. **INTRO (understanding & dev env)**

- 1.1. What is the goal of OpenXR
- 1.2. High Level overview of the components of OpenXR (Application - Loader - API layers - Runtime - Graphics - Input System)
- 1.3. Setting up a development environment (Visual Studio & Android Studio & Monado for people without HMDs)
- 2. SETUP (Basic structure ready)**
 - 2.1. Creating an XrInstance / xrGetSystem (xrCreateInstance)
 - 2.2. Creating an XrSession (xrCreateSession, OpenGL based for code brevity)
 - 2.3. 2.3. Polling the Event Loop (xrPollEvent and Session States)
- 3. GRAPHICS (solid color render at end)**
 - 3.1. Creating SwapChains for color and depth (xrEnumerateSwapchainFormats)
 - 3.2. The Renderloop (xrWaitFrame/xrBeginFrame/xrEndFrame/ env.blend.mode) (solid color)
- 4. ACTIONS (cube at controller position at end)**
 - 4.1. Using Spaces (xrCreateReferenceSpace/xrLocateSpace) (draw cube at world origin, view from VIEW space)
 - 4.2. The interaction system. Interaction Profiles, Bindings best practices
 - 4.3. Create Actions and Actions Sets (xrCreateActionSet, xrCreateAction, xrSuggestInteractionProfileBindings)
 - 4.4. How to check if a controller is connected.
- 5. EXTENSIONS (extensions debug and hand tracking)**
 - 5.1. Using Extensions and Layers xrEnumerateInstanceExtensionProperties, xrEnumerateApiLayerProperties,
 - 5.2. Using xrCreateDebugUtilsMessengerEXT (might consider doing this earlier to show how to get debug messages)
 - 5.3. Extension examples including XR_EXT_HAND_TRACKING cubes at joints.

5. Schedule and Budget

Phase 1 is expected to be completed in the first month. Phase 2, is expected to take the remainder of the project.

Khronos has a budget of \$70K USD for this project and expects work to be complete within six months of project initiation, with payment in 6 intervals upon working group acceptance of progress and work.

6. Selection Process

Khronos shall designate a Khronos RFP Manager and will use an RFP email list (xr_tutorial_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 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 in May 2023.
- Confirmation that if your bid is accepted, you are willing to work under the terms of the Khronos Contractor Agreement (chapter 7)
- 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 7AM EDT on April 10, 2023 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 within three weeks 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. Contractor's 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 planned continuation of this project at this time.

9. References

9.1. The OpenXR 1.0 spec

<https://registry.khronos.org/OpenXR/specs/1.0/html/xrspec.html>

9.2. Khronos Contractors Agreement template

<https://members.khronos.org/document/dl/23303>