

Khronos Group Request for Proposals: Input Binding Infrastructure



April 2023

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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 action system is what lets OpenXR applications interact with input/interaction devices through generation of bindings between semantic "Actions" and specific physical input devices.

To work well, the action system in OpenXR needs an input rebinding UI in each runtime, along with logic to perform generic rebinding and store and share these bindings. When OpenXR launched, the hope was that all runtimes would add that component without the explicit requirement. However, this has not happened, which leaves the action system essentially half-complete and more of an impediment to developers than an aid. There are several small additions that would improve the ecosystem for runtimes and application developers.

2. Project Goal

The main goal of this project is to address the broken promises relating to the action system and develop the missing components that have kept the Action System from being fully usable/useful.

3. Deliverables

The Work consists of small suites of code and programs to improve the state of input bindings for developers targeting OpenXR. Its objective is to be a starting point for runtimes to improve their binding and rebinding capabilities. It must be available on all 3 major XR platforms (Windows, Android, and Linux), unless specified otherwise.

3.1. Code

What follows is a list of deliverables for the project.

- 3.1.1. Report of capabilities of engines and runtimes with respect to binding and rebinding.
- 3.1.2. Development of tests that ensure that rebinding works as specified.
 - 3.1.2.1. Testing default rebinding common controller pairs.
 - 3.1.2.2. Testing of rebinding files taking effect as expected.
- 3.1.3. Development of a Helper Library for managing the bindings. This library must allow:
 - 3.1.3.1. Reading and displaying existing bindings.
 - 3.1.3.2. Editing existing bindings.
 - 3.1.3.3. Generating new bindings.
- 3.1.4. Development of a sample/template UI for binding and rebinding management for developers and end-users that use the Helper Library.
 - 3.1.4.1. Preliminary investigation and comparison of various UI frameworks for use when developing the UI.

Note: All code delivered within this project scope shall be properly commented source code, published into the various repositories that were set up for this project.

The design of the UI should take into consideration the integration of runtimes (language, supported platforms, etc.) but should also be usable with only minor modification if any. The supported platforms must include Windows, Android, and Linux.

3.2. Tests and CI

- 3.2.1. Unit tests for helper library.
- 3.2.2. General CI building each merge request:
 - 3.2.2.1. Windows
 - 3.2.2.1. Linux

3.3. Documentation

- 3.3.1. Code documentation at both function level and high level overview that explains how the different pieces are intended to be used and how they fit together.
- 3.3.2. Developer documentation on how to use sample UI to generate a binding for an app.

3.4. Action and Binding Data File

- 3.4.1 Investigation into existing file formats for conveying action and binding data, including e.g. game engine action/binding authoring, [SteamVR Input v2.0](#), [SteamInput](#), [OpenXR-Action-Code-Generator](#).
- 3.4.2 Simple schema(s) for file format for exchanging actions and binding data, that maps to the design of the OpenXR action system API, suitable for use by application authors, runtimes, and potentially end users (in sharing customized rebindings).

4. Schedule and Budget

Khronos has a budget of \$72K USD for this project and expects work to be completed within six (6) months of project initiation.

Project type: Because of the complexity of the Scope, this project type is expected to be T&M (Time and Material).

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

Team Structure: There is no requirement on the team size and team structure. Proposals must however outline number of resources available for the specified budget, as well as weekly allocations for each resource to perform the Work.

5. RFP Methodology

This RFP is under public review, and any interested company is welcome to respond.

Once awarded, Khronos will establish an email list and a communication channel 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 and documentation development shall take place in a public git repository of the developer's choosing and finally published and/or delivered into the upstream repository identified at the start of the project. Work shall follow good development practices, and allow for regular reviews through incremental commits.

6. Selection Process

Khronos shall designate a Khronos RFP Manager and will use an RFP email list (openxr_interaction_system_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:

- Point of Contact for proposal requests and notifications. This includes name, email address, and phone.
- Proposed schedule, assuming work starts 2 October 2023.
- Confirmation that if your bid is accepted, you are willing to work under the terms of the [Khronos Contractor's Agreement](#).
- 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 PDT on 14 September 2023, and should be sent to the RFP list. All bids must be valid at least through 6 October 2023. 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 bid based on proposed features, budget, schedule, relevant experience, and expertise.

Khronos expects to announce the selected bid within two 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

If this project is completed satisfactorily, the selected bidder may be invited to bid on a continuation project that has yet to be defined.

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

- [PDF](#)
- [Word](#)