Open Standards in XR

A current overview of OpenXR and WebXR

Ayaskant Panigrahi
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whoami

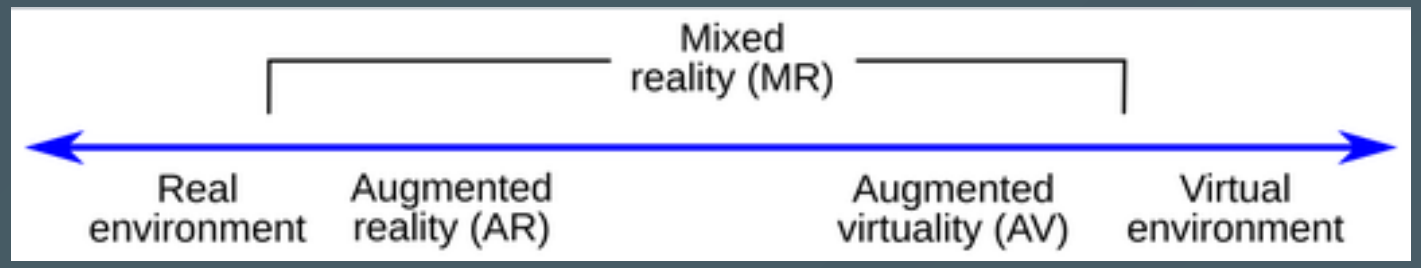
- Have been in the XR and HCI Research space since 2019
- Open source contributions to Wolvic XR and three.js
- Sr. Engineer (Systems Programming) at Mecha Systems



Ayaskant's Website

XR?

- XR is Extended Reality, used as an umbrella term
  - Continuum of devices, from AR on smartphones to immersive VR



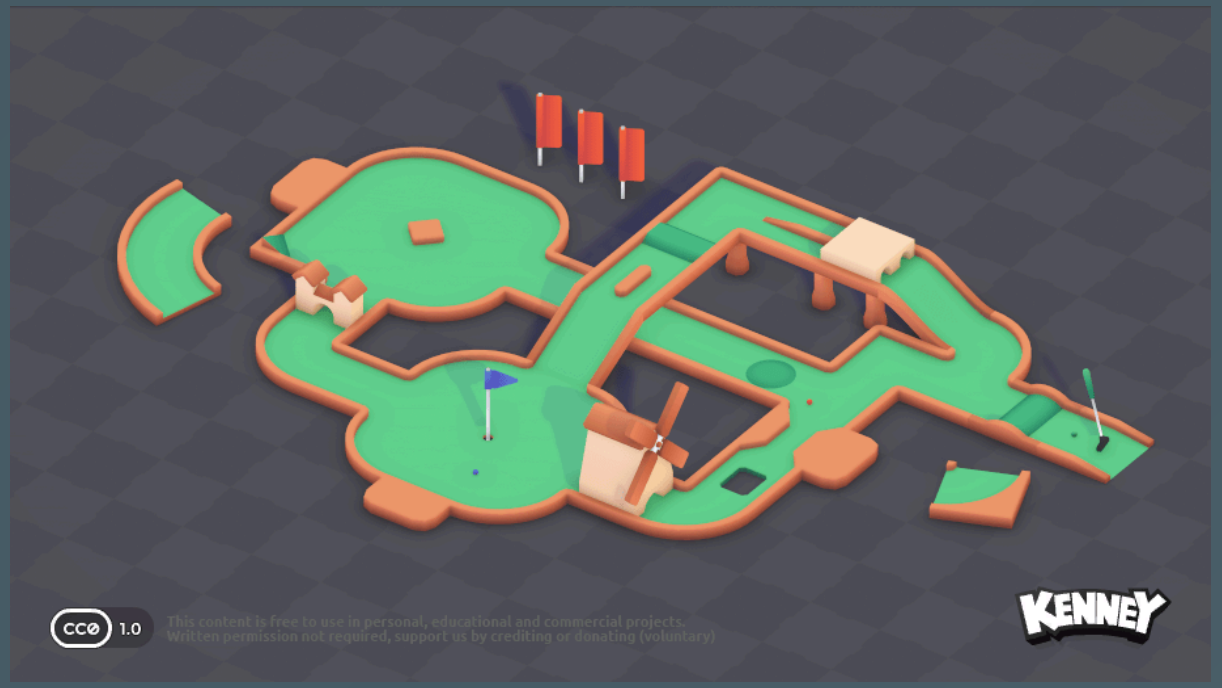


Image Source: Kenney

What if you had to build a separate app for

EVERY XR device released?

What if you had to build a separate web-app for

EVERY browser + XR device combo?

Standards to the rescue!

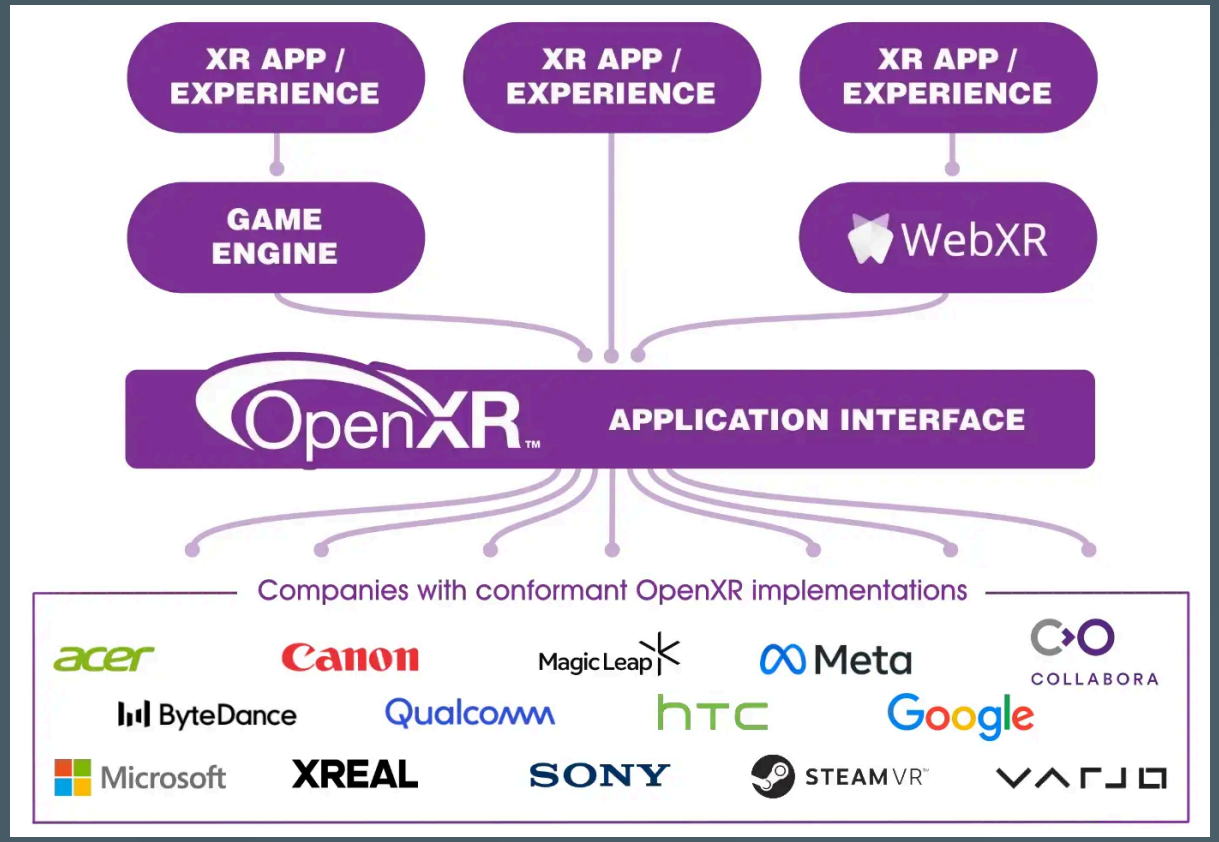


Image Source: [Khronos]

OpenXR: Overview

- Khronos Group consortium



- Major participants in OpenXR group
  - includes Collabora, Meta, Microsoft, Google, Valve
  - Notably Apple not a member of the group

OpenXR: General Architecture

- Runtime
  - Monado
  - SteamVR
  - Meta (previously Oculus)

OpenXR: General Architecture

- Applications and Engines
  - Godot
  - Unity
  - Unreal Engine
  - Stereokit

OpenXR: Major versions and extensions

- Architectured as Core and Extensions
  - Extensions can graduate to be included in Core as they mature and get adopted by more companies
- July 2019 - First major public release v1.0
- April 2024 - OpenXR 1.1 brought many Vendor Extensions to Core for unification
- June 2025 - OpenXR Spatial Entities Extension

OpenXR Highlight: Monado

- Monado offers an open source SLAM and full OpenXR compliant solution
- Collabora's XR Division Head Frédéric Plourde posted Google's AndroidXR, NVIDIA CloudXR uses Monado at its core
- Runtime even for Android devices! Google Cardboard driver announced

OpenXR Highlight: Godot

- Spatial Anchors, Plane Detection, Marker tracking already implemented
- Godot direct support for Apple Vision Pro (though not OpenXR)
- Frequent XR Game Jams - Godot XR Game Jam Sep 2026 ongoing!
- Godot supports Steam Frame from day 1 because of OpenXR
  - Lead XR Maintainer Bastiaan Olij posted about OpenXR support being very good for Steam Frame and Android XR

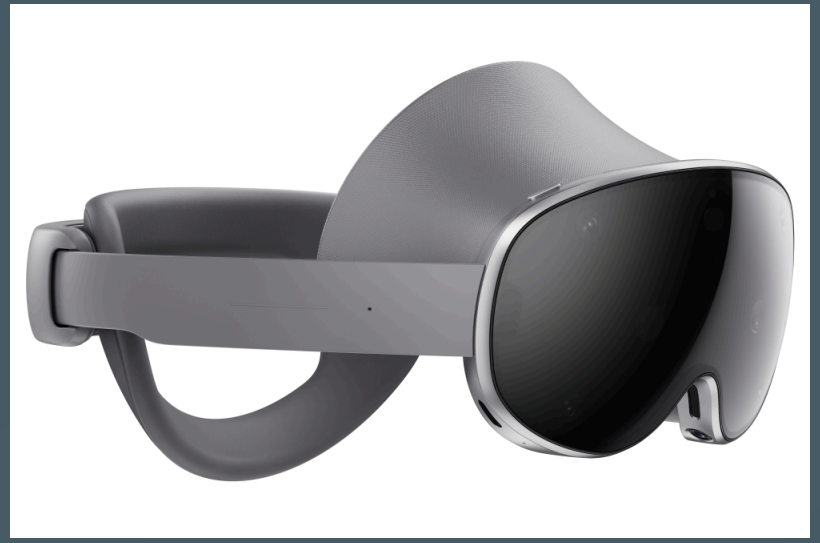
OpenXR: Current and upcoming

- Steam Frame and FEX



OpenXR: Current and upcoming

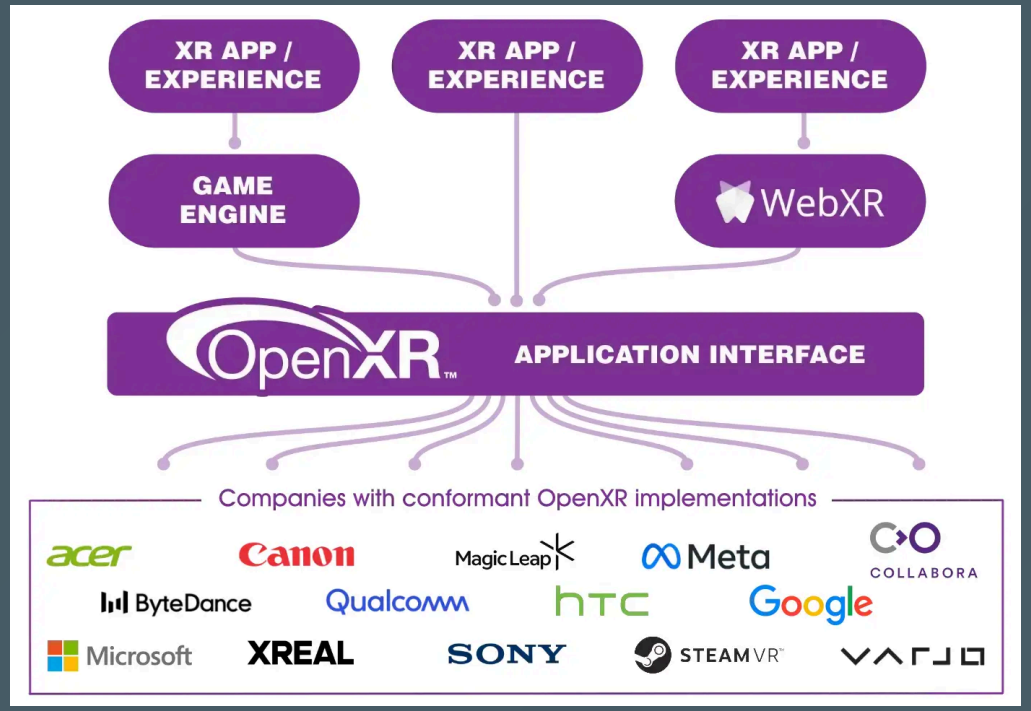
- Samsung Galaxy XR (standalone) and XREAL Aura (puck)





WebXR: Overview

- W3C Immersive Web group
- Feb 2019 - First working draft published



WebXR: Overview

- Seeing increasing platform support
  - Apple supports WebXR on Safari on Vision Pro but not on iOS
- Browsers
  - Meta Browser (based on Chromium)
  - Chrome on Android
  - Firefox
  - Wolvic (originally Firefox Reality)

WebXR: Modules

- Device API (Core)
- Input
  - Gamepads
  - Hand Input
- Augmented Reality
- Hit Test
- Others like DOM Overlays, Layers API, Anchors, Lighting Estimation API

WebXR: Library and tooling

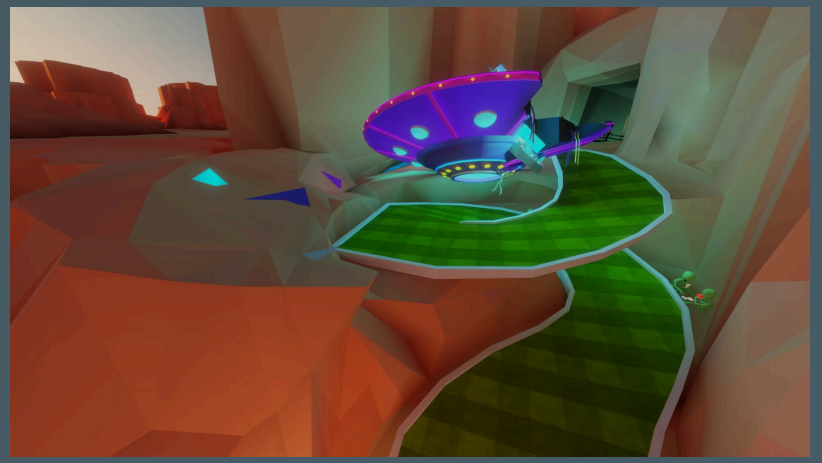
- three.js
  - react-three-fiber and react-xr
- Aframe
- Babylon
- IWSDK
- HTC Viverse platform

WebXR: Engines

- Wonderland Engine
- Unity export
  - WebXR export
  - Needle Engine
- PlayCanvas

WebXR Highlight: three.js

- Long history of WebVR and WebXR support
- aframe, react-xr, IWSDK build on top of it
- Great open-source Applications like Paradowski Mini Golf

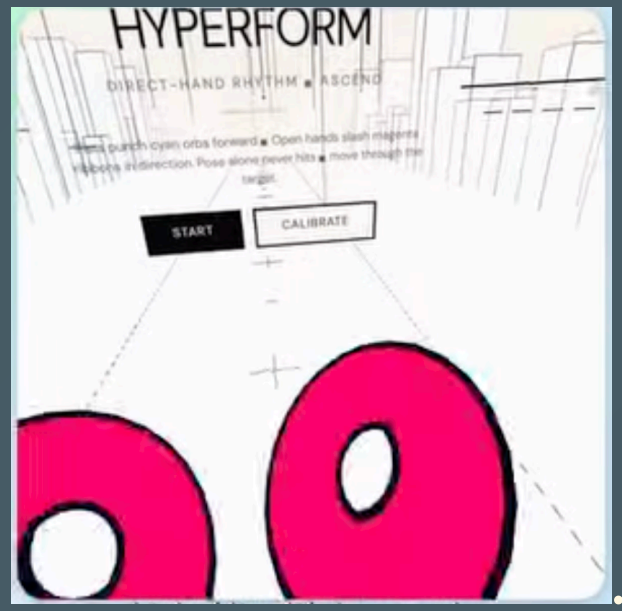


WebXR Highlight: IWSDK

- Immersive Web SDK library by Meta built on open source libraries like three.js and react-three/uikit
- Simulator / Dev extension for the browser
- Integration with Meta Spatial Editor

WebXR: Current and upcoming

- Immersive Web Adventures
  - Felix Zhang - Muse Code workflow for HYPERFORM VR FPS
  - James C. Kane - The Nanauts





WebXR: Current and upcoming

- Snap SPECS support WebXR



- Gemini Vibe Coding - Google XR Blocks

Conclusion

- Growing ecosystems of engines and libraries
- Open source community can contribute at any level
  - participating in the standards discussions
  - contributing to engines and libraries
  - building applications on the open source stack
  - funding development

Thank you!

Find me afterwards for everything from XR and epaper to wayland compositors and the Mecha Comet! (Image Source: Khronos)

