THE IMMERSIVE WEB

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WebXR Spec Editor

VR

Richie's Plank experience - https://toast.gg/theplank/
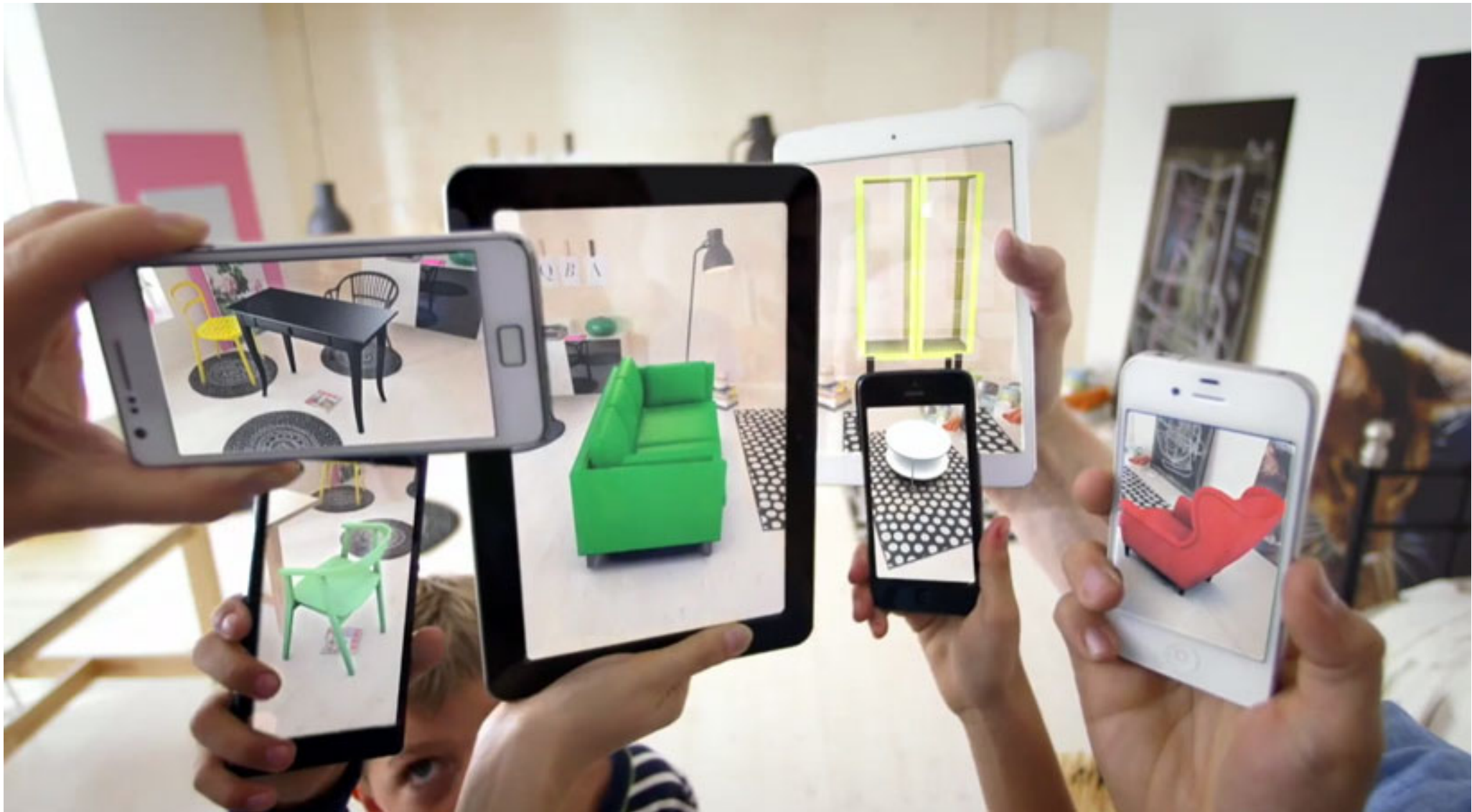
TETHERED VR

MOBILE VR

STANDALONE VR

AR

https://commons.wikimedia.org/wiki/File:Augmented-reality.jpg

HEADSET AR

HANDHELD AR

XR

???? Reality

ENVIRONMENT AWARENESS

Hit testing

Anchoring

Point clouds
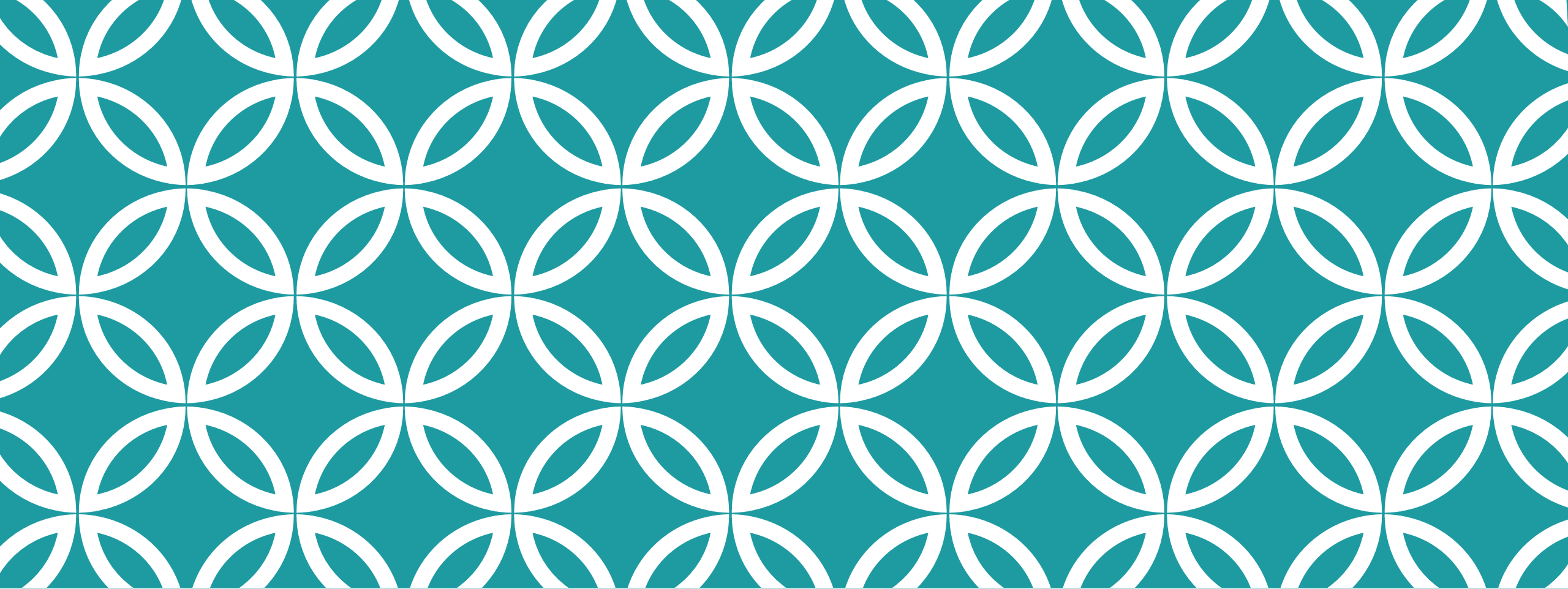
Meshes

Lighting

Semantic labeling

USER AWARENESS

Location in 3D space

Input sources (motion controllers, hands)

Eye tracking

Facial expressions

THE IMMERSIVE WEB

Yes, but what is it?
And why should I care?

WESTIN
HOTELS & RESORTS

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1000 Penn Avenue, Pittsburgh, PA, 15222, United States • Weather: **Clear, 21 °C / 70 °F**

🕐 1:48am 📞 412-281-3700 🎧 888-627-7053

English

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Rooms & Suites

View: ft² m²

Traditional Guest Room

Room size: 408 ft²

Premium Guest Room

Room size: 500 ft²

Corner Suite

Room size: 500 ft²

https://flic.kr/p/csvxid

Immersive Web Community Group

📖 **Repositories** 14   👥 People 7   Teams 0   📋 Projects 0   ⚙ Settings

Pinned repositories

Customize pinned repositories

≡ **webxr-reference**

A draft of the reference that will eventually be published on MDN.

★ 15   ⑂ 1

≡ **webxr-samples**

Samples to demonstrate use of the WebXR Device API

● JavaScript   ★ 92   ⑂ 23

≡ **webxr**

Repository for the WebXR Device API Specification.

● CSS   ★ 931   ⑂ 137

≡ **proposals**

A place for discussing proposals for future Immersive Web Community Group work

★ 32   ⑂ 2

≡ **webxr-polyfill**

Use the WebXR Device API today, providing fallbacks to native WebVR 1.1 and Cardboard

● JavaScript   ★ 54   ⑂ 8

≡ **webvr-polyfill**

Use WebVR today, without requiring a special browser build.

● JavaScript   ★ 1.1k   ⑂ 272

WHAT IS WEBXR

"The WebXR Device API provides access to input and output capabilities commonly associated with Virtual Reality (VR) and Augmented Reality (AR) hardware" – WebXR explainer
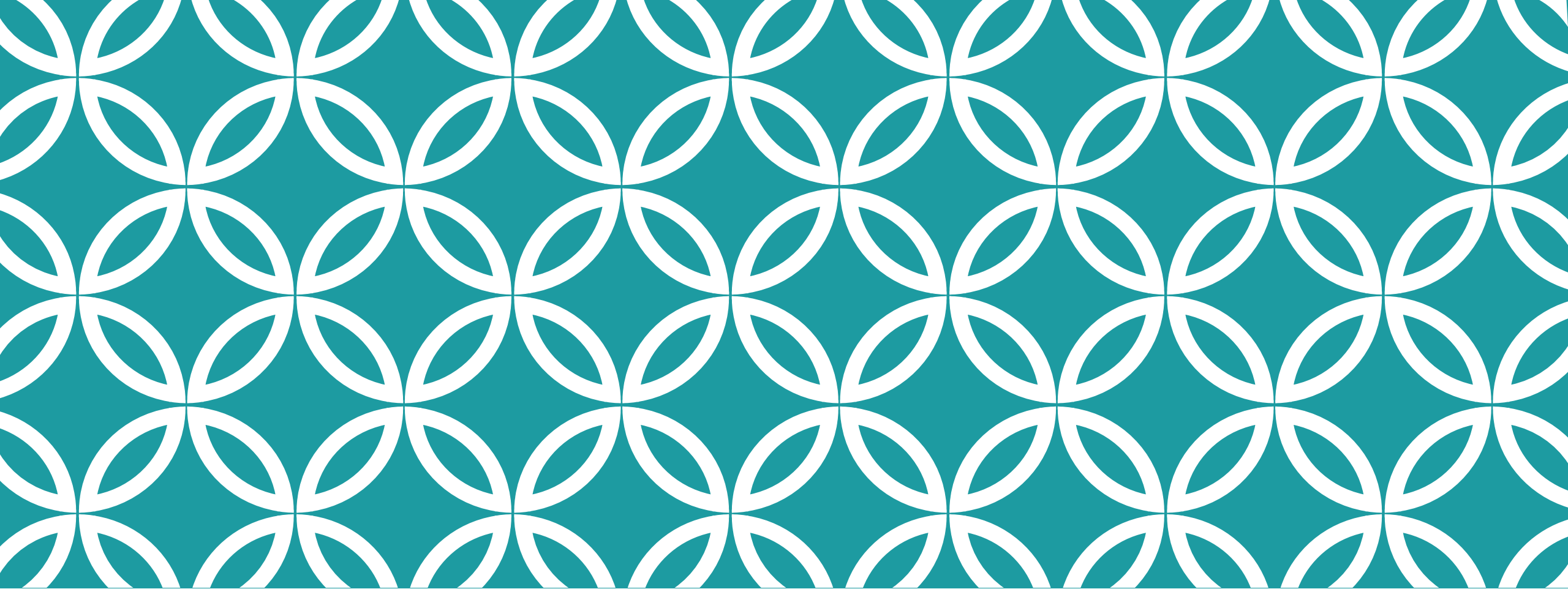
With it you can:

1. Detect available VR/AR devices

2. Query the devices capabilities

3. Poll the device's position and orientation

4. Display imagery on the device at the appropriate frame rate

5. Respond to user input

PROGRESSIVE ENHANCEMENT

Credit:

https://unboring.net/workflows/progressive-enhancement/video/progressiveEnhancement.mp4

USER CONSENT AND PRIVACY

Within the Immersive Web

AREAS OF CONSIDERATION

Fingerprinting during bootstrapping

Real World Geometry

Camera Access and Perception of Camera Access

Object or Image Identification

Permissions

FINGERPRINTING DURING BOOTSTRAPPING

Issues:
- Sites need to put a button for entering VR or AR
- Some experiences require specific hardware behavior (ex: world-scale tracking)
- Multiple devices may be connected
- Spinning up the full hardware just to reject isn't a good experience

Proposed mitigations:
- "Supports" checks only for VR vs. AR
- Inline vs. Exclusive data restrictions
- User action required to enter Exclusive
- Consent requested
- Actual hardware bootstrapping happens as a last step

REAL WORLD GEOMETRY

Issues

- Room geometry may be used to identify when two sessions are occurring in the same space
- Real-world geometry may indicate a specific location. (ex. the Eiffel Tower)
- Inferred location history
- Estimating the size of the user's house, to estimate user income
- Facial Geometry
- Gait analysis
- Credit card # geometry

CAMERA ACCESS AND PERCEPTION THEREOF

Issues

- See-thru vs. pass-thru
- Can users reason about the difference?
- Is there a meaningful difference if real-world geometry is available?
- Polyfills will blur the line

OBJECT AND IMAGE IDENTIFICATION

Issues

- Registered images/objects can be anything
- Can be used to profile users (ex: identifying the presence of a specific brands of TV)
- Can be used to blackmail users (ex: "this embarrassing thing was just found in your house!")

PERMISSIONS

Issues

- Bundling XR permissions
- Bundling with non-XR permissions
- Upfront vs. just-in-time
- Duration