

Boundless WebVR

AN OPEN SOURCE VIRTUAL REALITY PROJECT

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RESEARCH QUESTION

How do we create web-based virtual reality (VR) experiences that bypass the need for advanced programming knowledge, a proprietary rendering engine, and a distributor like Steam?

```
function init() {
  glCanvas = document.createElement("canvas");
  scene = new THREE.Scene;
  camera = new THREE.PerspectiveCamera(75, window.innerWidth / window.innerHeight, 0.1, 1000);
  renderer = new THREE.WebGLRenderer({ canvas: glCanvas });
  light = new THREE.DirectionalLight(0xffffff, 1);
  ambLight = new THREE.AmbientLight(0x404040);
  backgroundTexture = new THREE.TextureLoader().load("background.jpg");
  skyCube = new THREE.CubeTextureLoader().load(new THREE.SphereBufferGeometry(500, 48, 48).clone().applyMaterial(new THREE.MeshBasicMaterial({ side: THREE.DoubleSide })));
  plane = new THREE.Mesh(
    new THREE.PlaneBufferGeometry(1000, 1000),
    new THREE.MeshLambertMaterial({ color: 0x808080 })
  );
  plane.position.y = -1.5;
  plane.position.z = 0;
  plane.rotateX(degreesToRadians(-90));
  scene.add(light);
  scene.add(ambLight);
  scene.add(skyCube);
  scene.add(plane);
}
```

Mid-level JavaScript

DESCRIPTION

VR is one of the most exciting areas of technology; however, lack of access continues to be a formidable roadblock for research and development. Despite advancement in hardware technologies, creating a 3D VR experience is still time intensive, technically exclusionary, expensive, and reliant on proprietary rendering engines such as Unity or Unreal. This project seeks to solve these problems by building a web-based VR experience using open source technologies.



Inside Boundless WebVR

HTC Vive

PROCESS AND METHODOLOGIES

By using Code Studies and Platform Studies methodologies, Boundless WebVR was developed with the following hardware and open source tools:

- **Three.js**
JavaScript library used to create 3D graphics
- **WebGL API**
Used by Three.js to render 3D graphics in a browser
- **WebXR API**
Connects VR capable devices to browser content
- **HTC Vive**
VR capable device

RESULTS

In addition to Boundless WebVR's implementation, it includes a published file called a library that will help other developers access the WebXR API more quickly and easily.

A final note on the nature of open source:
Since we concluded this project in September 2019, Three.js also continued to develop the WebXR API and released a more comprehensive package later that year.

SEE IT LIVE

See the project live at christiandenny.com/webvr and try your hand at archery!