Crash course in...

Hands on introduction to 3D on the web

Johan Bowald
johan@bowald.se
github.com/bowald

Outline

- How to 3D on the web
- Hello world!
- Actually do stuff
- Cool, but why do I need this?

Before we start

It is a crash course.

Talk to me during the mingle session for more detailed answers.

Code on github. Slides will be posted somewhere... Check github!

Multiple ways to implement things. My implementations may not be the optimal way.

If you think everything in this presentation is too basic...

RapidImages

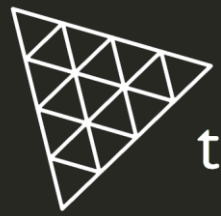
We’re hiring!

How to 3D on the web

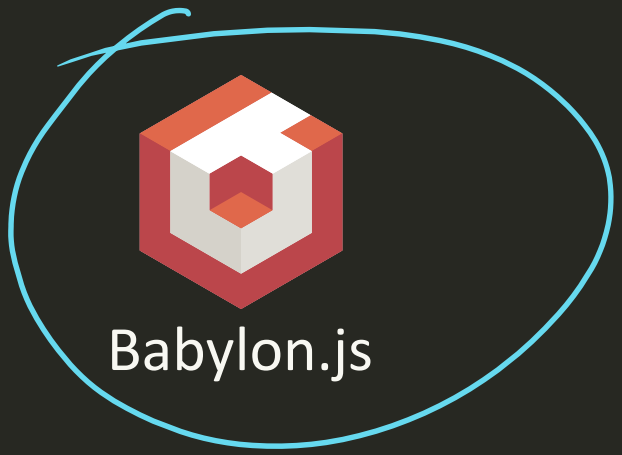
3D content uses the GPU for calculation. We need to enable it from the web.

Graphic APIs

Frameworks



three.js



How to 3D on the web

- Create the context

```
<html>
 <body>
   <canvas id=“glCanvas" width="600" height="480"></canvas>
   <script src="myAwesomeCode.js"></script>
 </body>
</html>
```

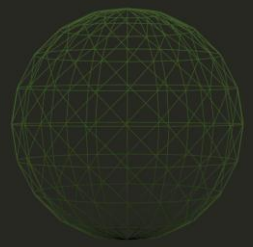
webpage

```
const canvas = document.querySelector("#glCanvas")
const gl = canvas.getContext("webgl")
```

myAwesomecode.js

A typical 3D application

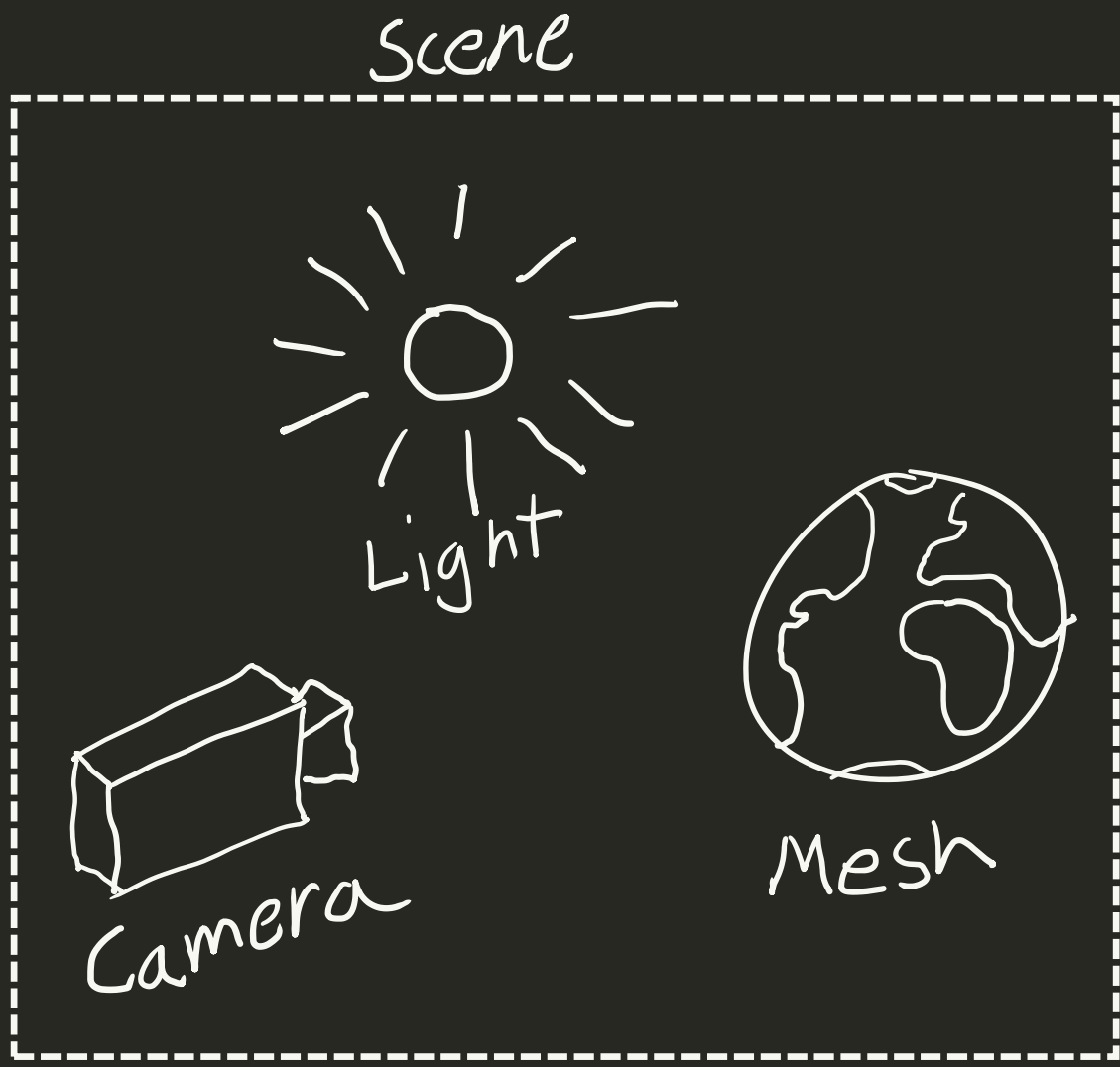
What do we need for Hello World?



Basecolor: [1,0,0]
Roughness: 1
Metallic: 0

Mesh = geometry + material

Lets see it in code

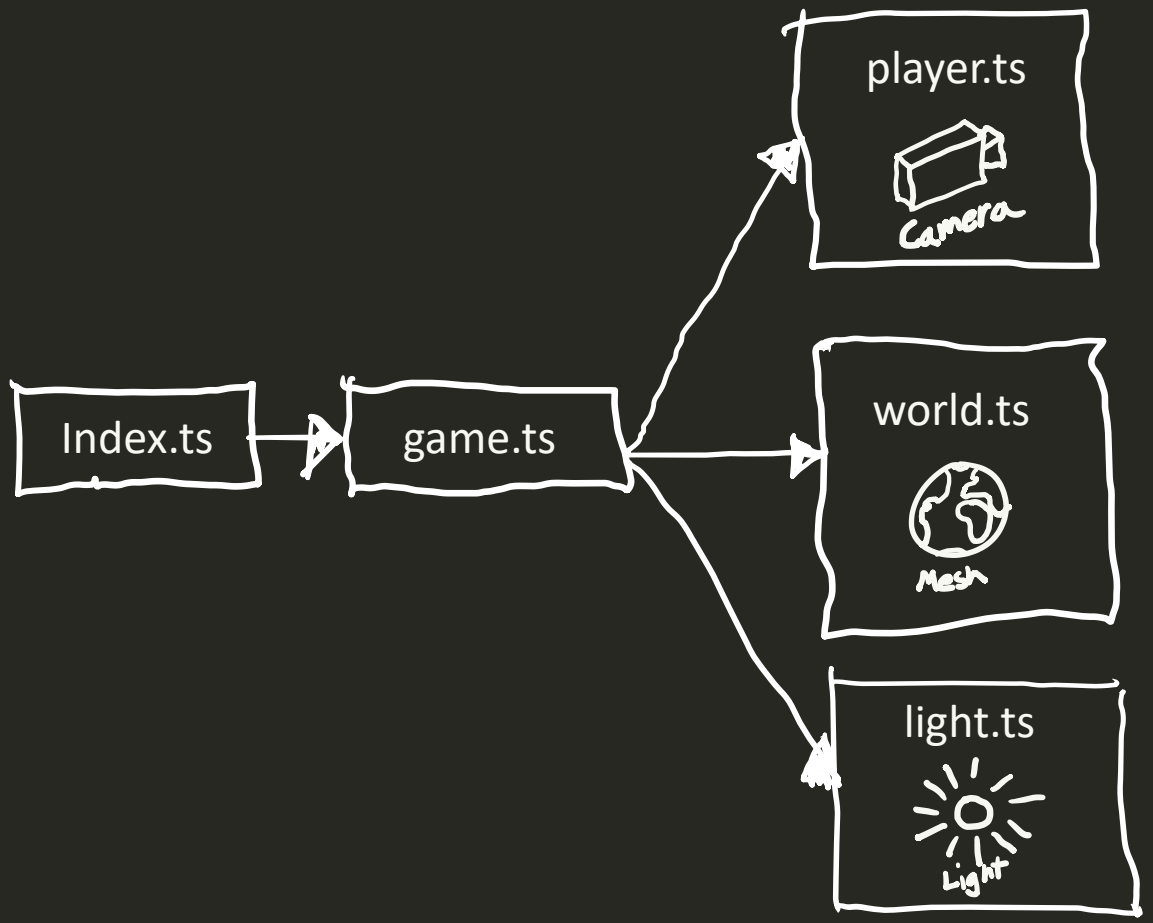


Let’s create a simple Minecraft clone

Todo

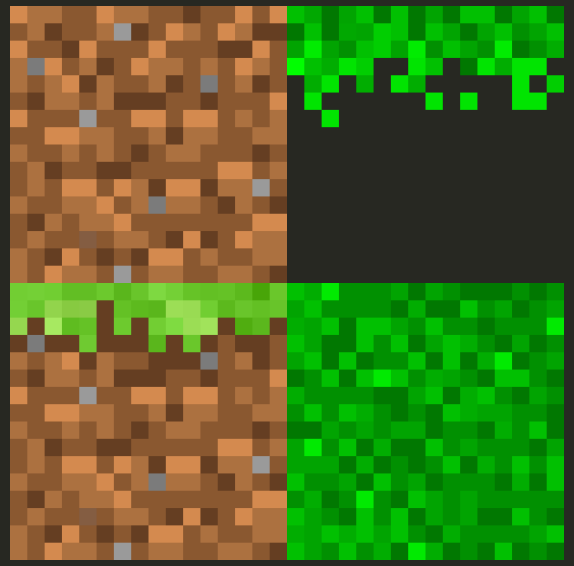
- Generate a block
- Generate many blocks
- Create the player
- Create a skybox

Code structure



Generating a block

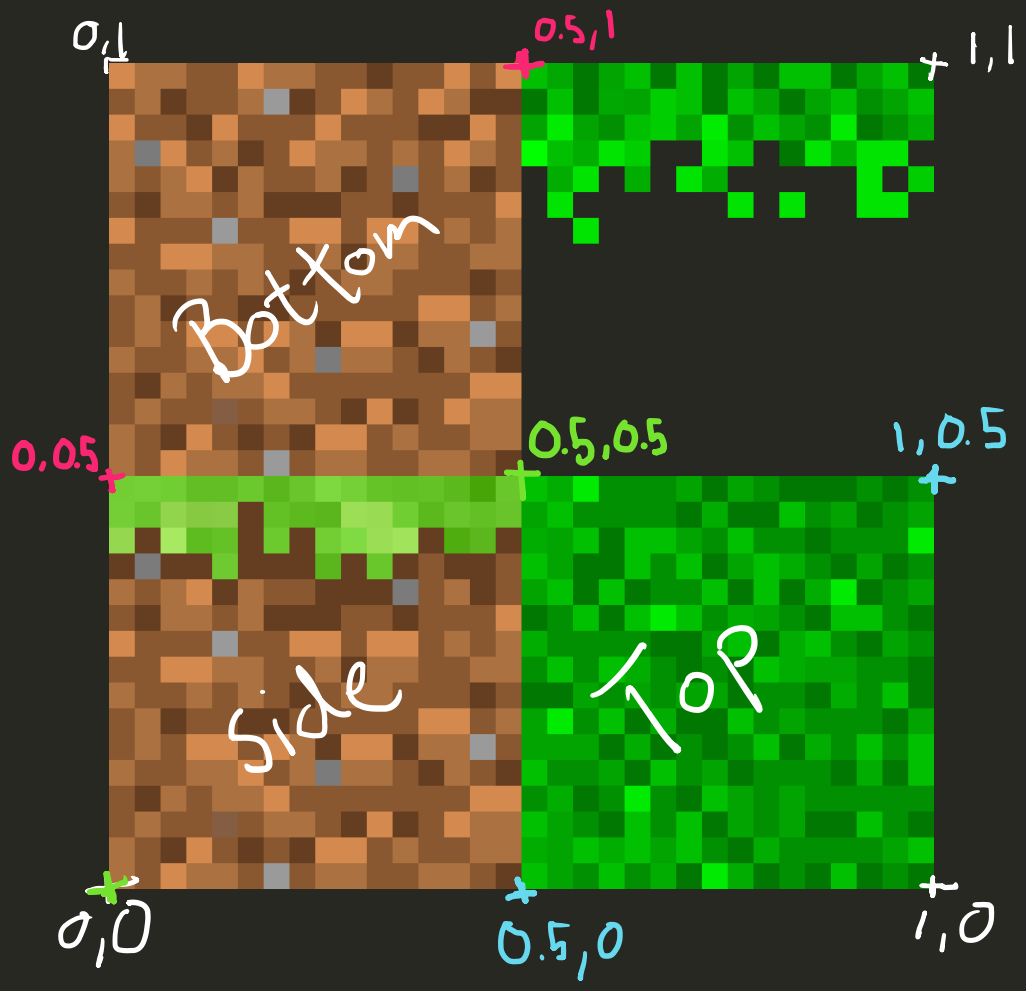
- Implement in world.ts
- Create a box
- Apply dirtblock.png as texture basecolor texture

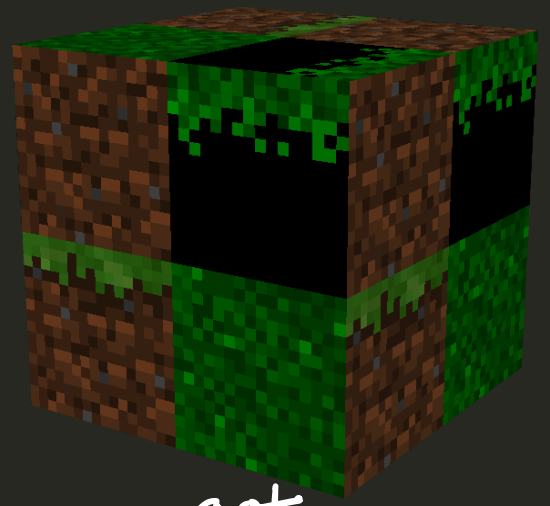


dirtblock.png

Let's code!

Generating a block





got

Want!

Sides : 0,0 → 0.5, 0.5

Bottom : 0, 0.5 → 0.5, 1

Top : 0.5, 0 → 1, 0.5

Generate many blocks

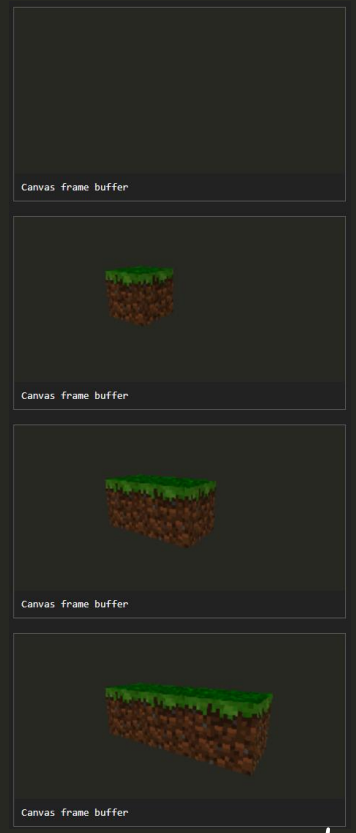
```
for (width) {
   for (depth) {
      generateDirtBlock()
     -- set block position
   }
}
```

Let's code!

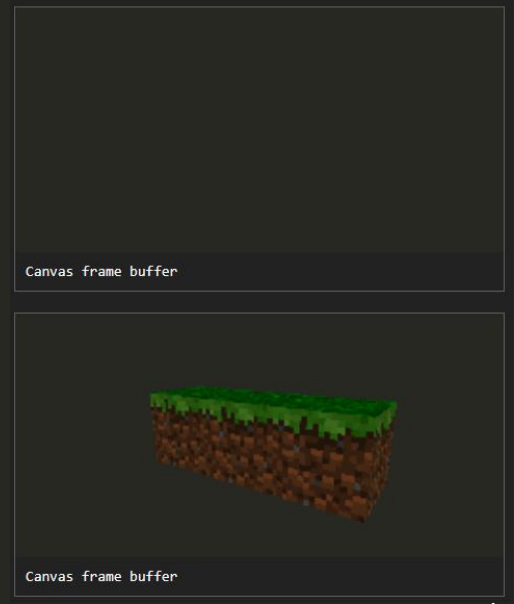
Merge all blocks
to a single mesh

Or

use Instances



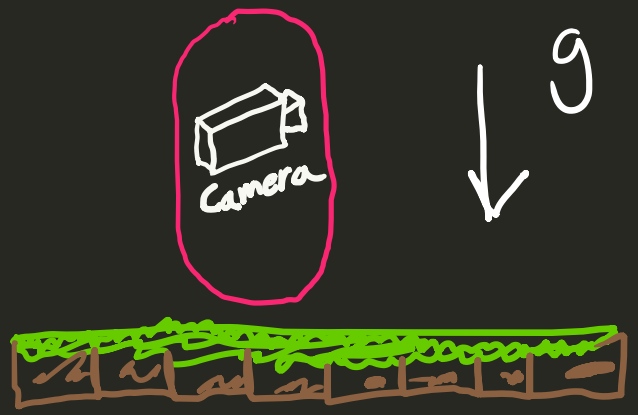
What we got

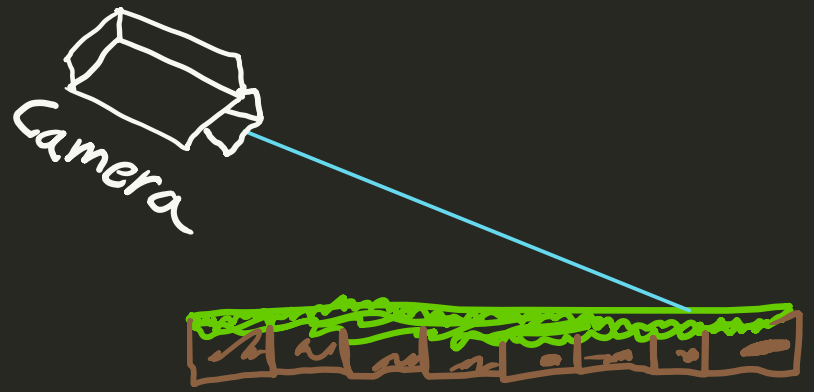


What we want

Create the player

- First person camera
- Gravity
- Collision with blocks
- World Controls





Raycast

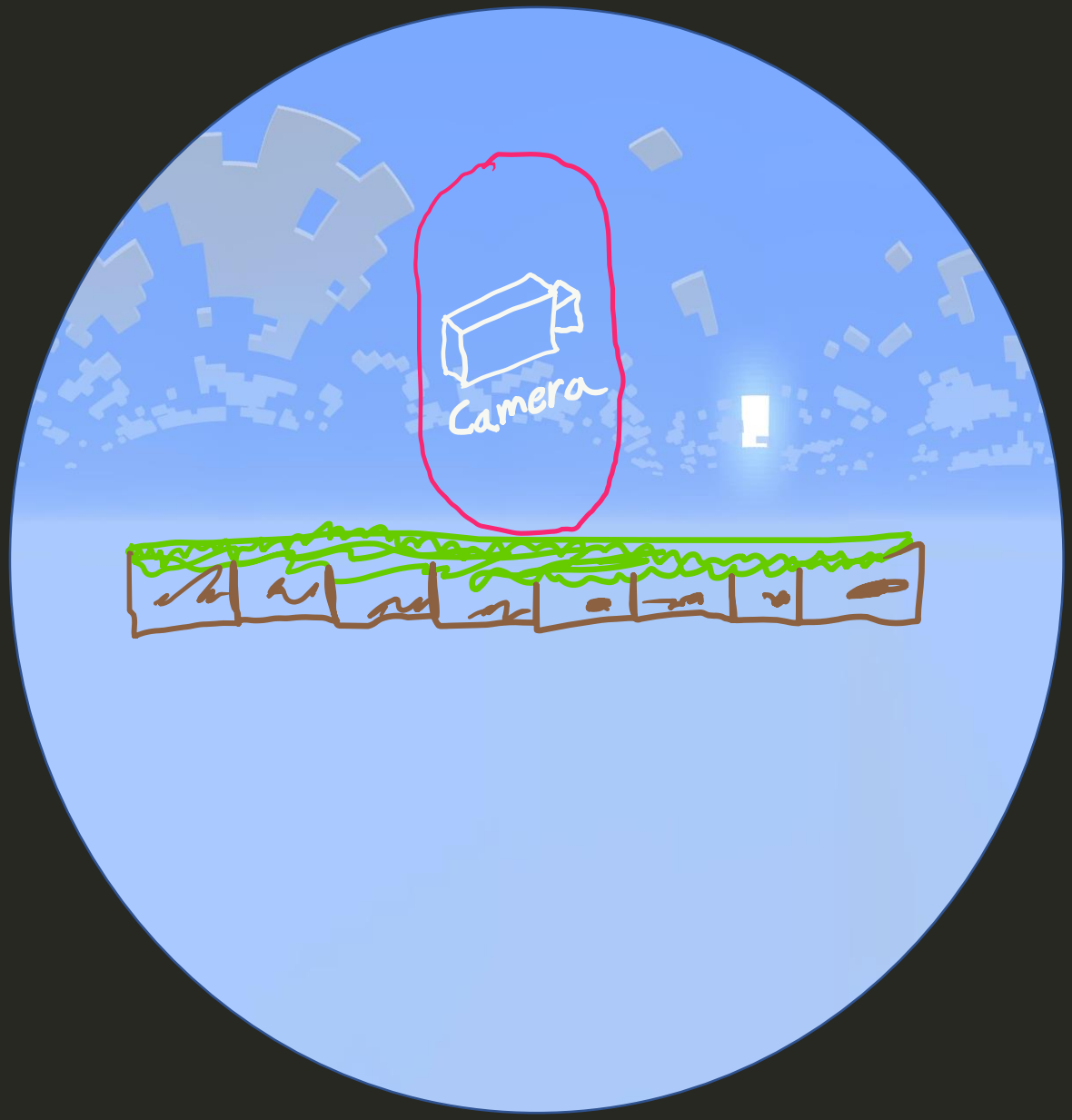
- Did we hit?
- Is hit within 8 units?
- was it a mesh?

Left click remove block

Right click add block

Skybox

- Infinitly large sphere
- Sky texture
- Unaffected by light



Cool, but why do I need 3D on the web?

Graphic is more than just games!

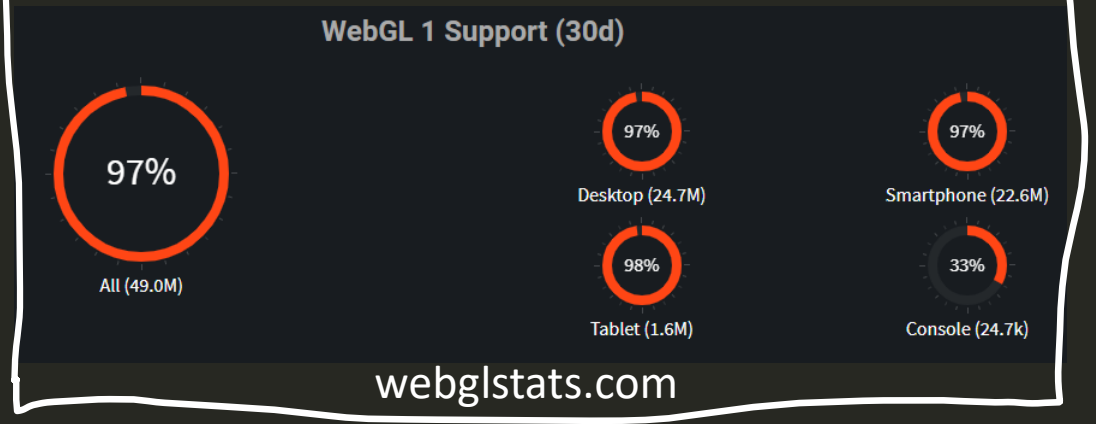
- Interactivity
- Visualizations
- Effects

Example of a business case.

heroforge.com customizing and 3D printing tabletop miniatures

Easy

- Large range of supported devices.
- No need to install anything



Resources

- github.com/bowald/startuphack-meetup-intro-to-3d
- Babylon.js documentation
- Babylon.js tutorials
- ThreeJS, Another 3D framework
- SpectorJS, Good for debugging
- WebGL Tutorial, Mozillas introduction to webGL