



Standards for WebVR

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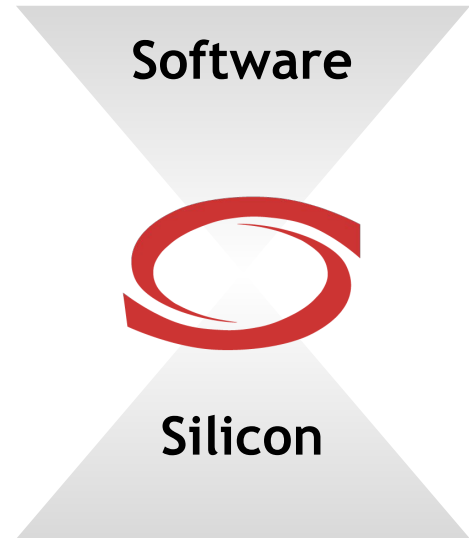
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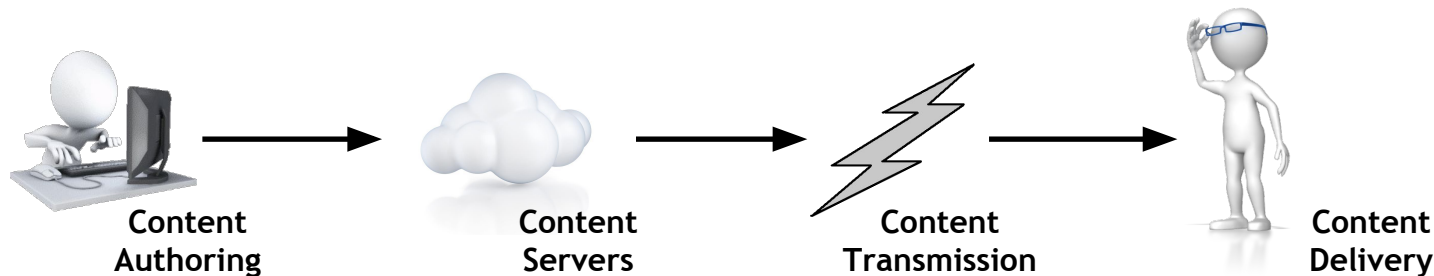
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Khronos Open Standards



Khronos is an open Industry Consortium of over 100 companies creating **royalty-free, open standard APIs** to enable software to access hardware acceleration for **graphics, parallel compute and vision**

Khronos AR/VR Standards



WITHOUT Standards

Tools import/export custom 3D formats and so do not interoperate

Every service/app stores 3D assets in a custom format
-> Silo'd content

Long download times and proprietary code to unpack received 3D assets

Apps have to be ported to each device and often don't use acceleration

WITH Standards

Mix and match tool pipelines through common 3D asset import/export

3D assets are easily understood and used by any application and device

3D assets packed into efficient formats with streaming and compression

APIs provide consistent access to graphics, compute and vision acceleration

Khronos standards useful for AR

COLLADA
Many other authoring formats

glTF
COLLADA

glTF

WebGL **Vulkan**
OpenVX **OpenCL** **OpenGL ES**
OpenGL

WebGL Timeline

Fixed function Pipeline



Programmable Vertex and fragment shaders



32-bit integers and floats
NPOT, 3D/depth textures
Texture arrays
Multiple Render Targets



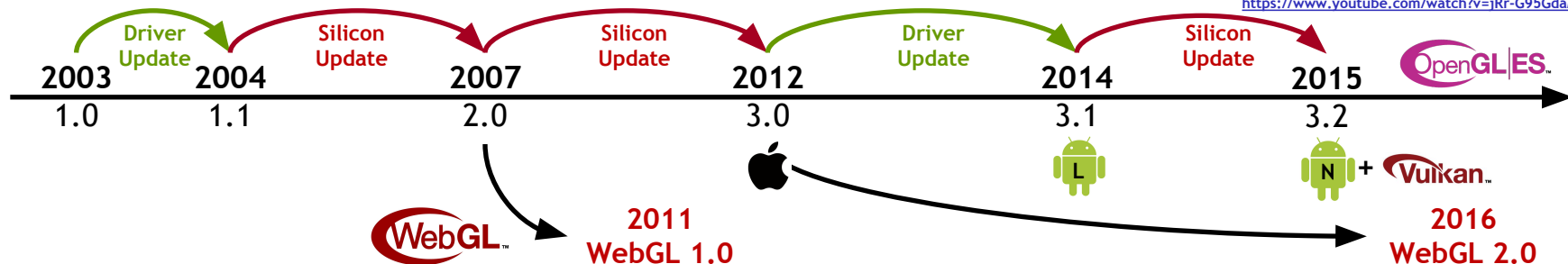
Compute Shaders



Tessellation and geometry shaders
ASTC Texture Compression
Floating point render targets
Debug and robustness for security



Epic's Rivalry demo using full Unreal Engine 4 on mobile
<https://www.youtube.com/watch?v=jRr-G95GdaM>



WebGL 2.0

Enhanced visual quality, performance, features

Instancing | Multiple render targets | Uniform buffers | Transform feedback | Multisampled Renderbuffers | 3D textures
NPOT textures | More texture formats | Occlusion queries | Vertex array objects | Sampler objects | Sync objects
Fragment depth | Primitive restart | ...

<https://www.khronos.org/registry/webgl/specs/latest/2.0/>

Khronos API Standards for WebVR + Issues!

How to Turn Off Pokémon Go Augmented Reality Mode

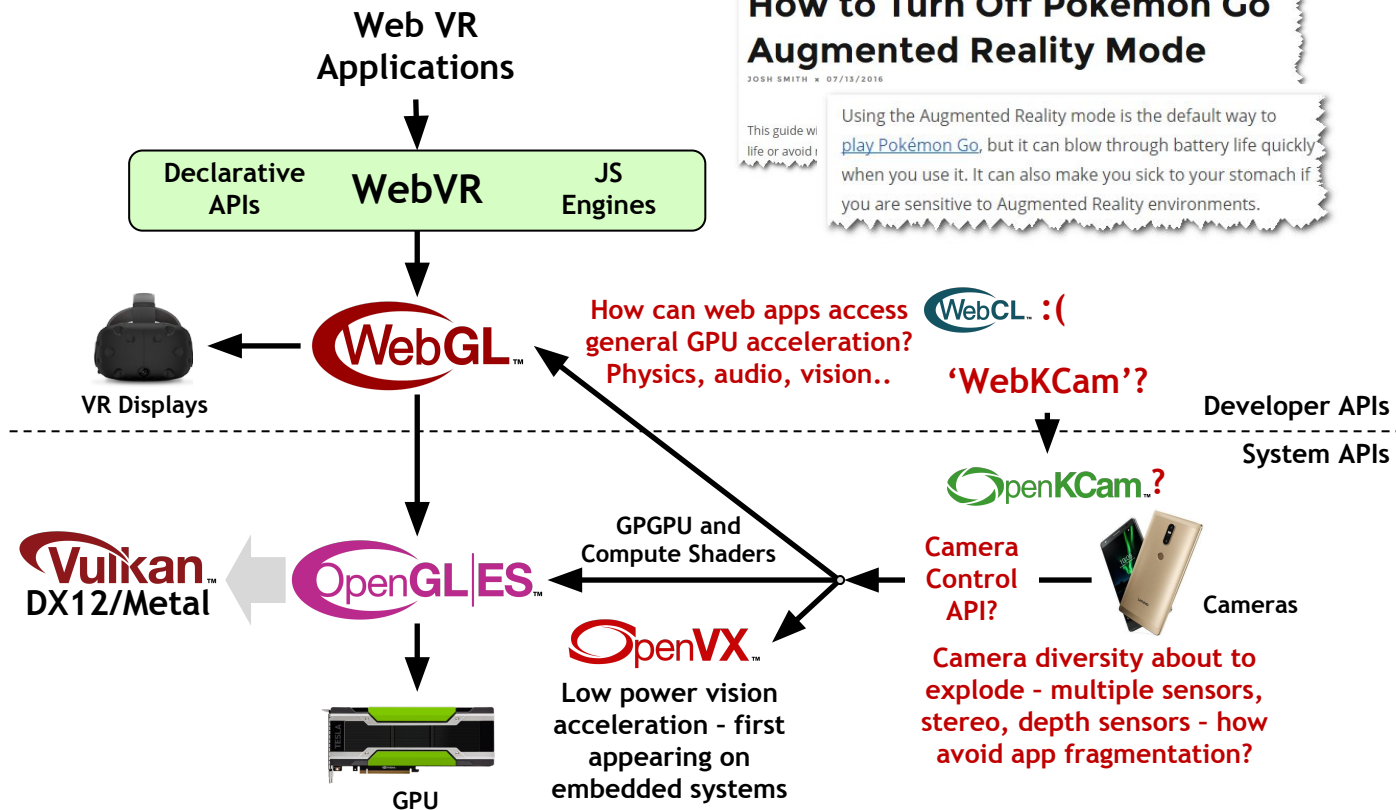
JOSH SMITH x 07/13/2016

This guide will
life or avoid it

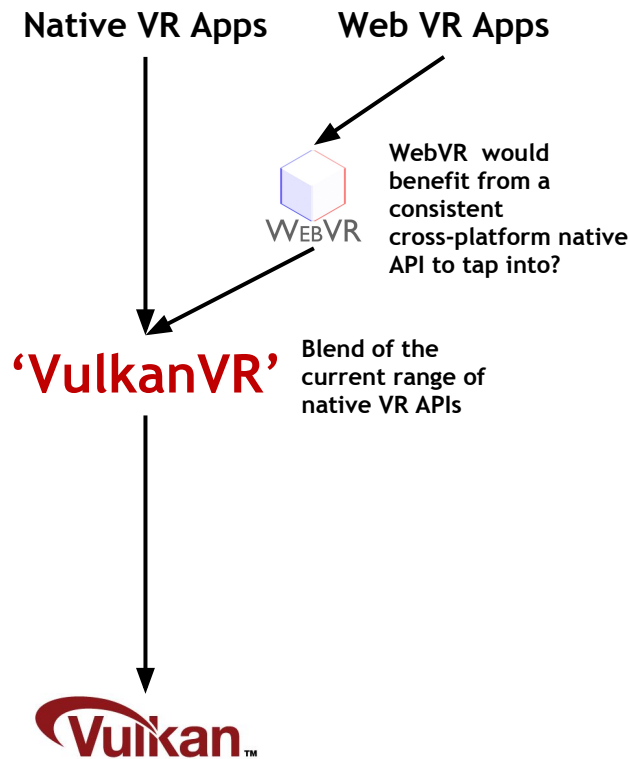
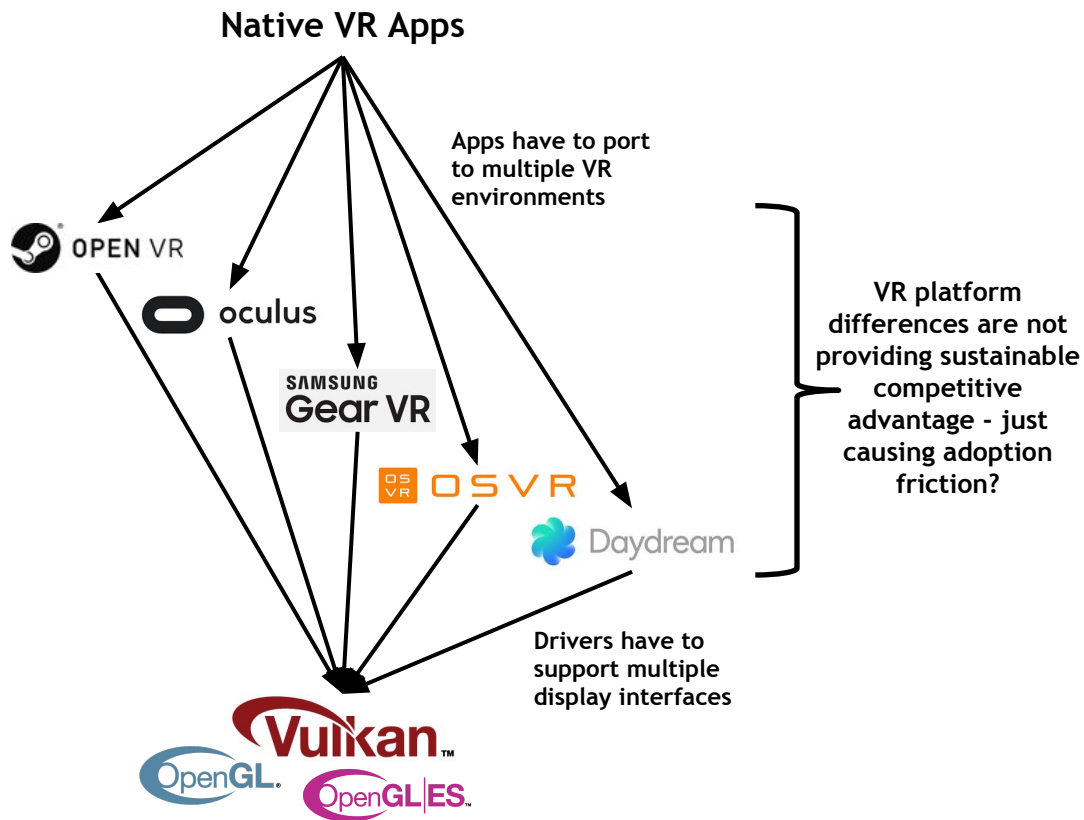
Using the Augmented Reality mode is the default way to play [Pokémon Go](#), but it can blow through battery life quickly when you use it. It can also make you sick to your stomach if you are sensitive to Augmented Reality environments.

Increasing VR capability
being built into GPU
driver stacks - if/how
expose through WebGL?
Direct display access,
multi-projection,
time-warp?, space-warp etc.

Native GPU APIs are
fragmenting - a new
generation WebGL will
be the intersection of
the three main
'explicit' industry APIs?



‘VulkanVR’ Is there a Need?



(Very) Partial SDO Landscape

	Web Technologies		
	Silicon Acceleration		
	X3D and Declarative 3D		
	3D Compression / Declarative AR / audio / video		
	Geospatial frameworks, databases, sensors		

SDO Landscape Cooperation - Suggestions

Discover and agree on problems that can be most effectively solved with a standard

Not all problems are!



Figure out which SDO has closest domain expertise

Determine if they are willing to take on the design



Ensure community has a channel to feed requirements into the SDO

Detailed design contributions may be restricted to SDO members



Regular Meetings - like this one!

To report progress, plan integration, get feedback - and identify new problems

Go to Step 1!