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What is the technology?

- Extends JavaScript to allow interactive 3D graphics in browser
- Executes on the GPU
- Implemented using HTML5 canvas element
- Based on OpenGL ES 2.0
- Relatively new, so still not very secure
Brief Historical Overview

- Grew out of the first Canvas 3D experiments
- First prototypes demonstrated in 2006
- First implementations in 2007 by Firefox and Opera
- WebGL Working Group
How does it work?

<canvas id="canvas" width="500" height="500"></canvas>

<script type="text/javascript">

// init
var canvas = document.getElementById("canvas");
var gl = canvas.getContext("experimental-webgl");

// load buffers
...
    gl.bufferData(gl.ARRAY_BUFFER, new Float32Array(vertices), gl.STATIC_DRAW);
...

// draw buffers
...
    gl.drawArrays(gl.TRIANGLES, 0, triangleVertexPositionBuffer.numItems);
...
</script>
OpenGL Comparison

// WebGL
var vboId;

... 

vboId = gl.createBuffer();
gl.bindBuffer(gl.ARRAY_BUFFER, vboId);

var vertices = [
    0.0, 1.0, 0.0,
    -1.0, -1.0, 0.0,
    1.0, -1.0, 0.0
];
gl.bufferData(
    gl.ARRAY_BUFFER,
    new Float32Array(vertices),
    gl.STATIC_DRAW);

// OpenGL
GLuint vboId;

... 

glGenBuffers(1, &vboId);

glBindBuffer(GL_ARRAY_BUFFER, vboId);

GLfloat vertices[] = {
    0.0, 1.0, 0.0,
    -1.0, -1.0, 0.0,
    1.0, -1.0, 0.0
};
glBufferData(GL_ARRAY_BUFFER,
    sizeof(vertices),
    vertices,
    GL_STATIC_DRAW);
Pros & Cons

- No plug-ins required
- Works on most browsers
- Uses GPU for rendering
- Uses OpenGL syntax
- Several libraries for use

- Security leaks
- GPU w/ shaders required
- Not supported by MS/IE
- Requires HTML5
Where is it used?

www.google.com/maps

http://mrdoob.com/lab/javascript/webgl/voxels_liquid/

http://www.everyday3d.com/j3d/demo/008_Lightmap.html

http://aleksandarrodric.com/p/jellyfish/

For a lot more tech demos:
http://www.chromeexperiments.com
Where to learn more

http://learningwebgl.com

...yeah, that's really all you need.