Agenda for WebGL segment

- Demos
- WebGL 2.0 Update
- WebGL 2.0 Compute
- Key extensions being developed
  - KHR_parallel_shader_compile
  - WEBGL_multi_draw and WEBGL_multi_draw_instanced
  - WEBGL_video_texture
- WebGL in multithreaded WebAssembly
- Acknowledgments
- WebGL Meetup
Demos

- Filament
- Wolfenstein Ray-Traced with WebGL 1.0
- Babylon.js
- Three.js
WebGL 2.0 Update

● WebGL working group is focusing on conformance - getting all implementations to pass the top-of-tree conformance test suite
  ○ Both WebGL 1.0 and 2.0
● Many corner cases of the OpenGL and OpenGL ES specs have been uncovered and resolved since last snapshot
● Will lead to improved portability of applications
● Also resolving bug reports from customers and turning these into conformance tests where applicable and possible
● Please keep these coming!
WebGL 2.0 Compute

- Single largest recent WebGL advancement is support for compute shaders
- Developed by Intel’s Web Graphics team in Shanghai
- Adds OpenGL ES 3.1 compute shaders to WebGL
- Draft specification is online
- Available in current Chromium builds on Windows and Linux
Trying WebGL 2.0 Compute

- Use Chrome Canary on Windows or Dev Channel on Linux
- On Windows:
  - --use-cmd-decoder=passthrough --enable-webgl2-compute-context
  - Optionally: --use-angle=gl
- On Linux:
  - --use-cmd-decoder=passthrough --enable-webgl2-compute-context --use-gl=angle
- First ComputeBoids demo from Intel
- More compute shader demos coming online
- Good way to start experimenting with compute shaders on the web today
- Discuss on webgl-dev-list
KHR_parallel_shader_compile

- **Extension** being developed by Intel’s Web Graphics team in Shanghai
- Fixes longstanding customer complaints about slow WebGL shader compiles
- Compiles become async and parallel with small app changes
- Try in Chrome today with --enable-webgl-draft-extensions
Multi-Draw

- **WEBGL_multi_draw** and **WEBGL_multi_draw_instanced** decrease the CPU overhead of issuing draw calls
- WebGL extensions developed by Google
- Application receives gl_DrawID in shaders; works well with uniform updates batched into UBOs with WebGL 2.0
- Supported via emulation even on platforms without the native multi-draw extensions
- **Results from microbenchmarks** are impressive: 3-6x improvements in common case, up to 70x (!) in some situations
Trying multi-draw today

- Test in Chromium with --enable-webgl-draft-extensions
- Please tell us how it’s working for you on webgl-dev-list
WEBGL_video_texture

- **Extension** being developed by Intel’s Web Graphics team in Shanghai
- Supports zero-copy video uploads into WebGL textures
- **Implementation** is landing in Chromium now
- Seeing up to 47% speedups on some content
- Will appreciate your feedback; please watch Khronos’ [public_webgl](https://public_webgl.com) list
WebGL in Multi-threaded WebAssembly

- Support for multithreading in WebAssembly is beginning to ship in browsers.
- This makes it increasingly possible to take large, complex C++ code bases and just “compile for the web”.
- Unreal Engine and Unity’s HTML5 export paths both contain experimental WebAssembly multithreading support.
- Can even access this functionality from Rust!
- Try it in your projects via Emscripten and please report any problems you encounter.
Acknowledgments

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Dean Jackson, Apple
Geoff Lang, Google
James Darpinian, Google
James Helferty, NVIDIA
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WebGL Meetup

Come to Khronos’ GDC WebGL Meetup and see the latest web based graphics techniques!

Wednesday, March 20

Galvanize SF, 44 Tehama Street

6:30 - 9:00 PM

https://www.khronos.org/events/2019-gdc#gdc_webgl