WebGL Updates for SIGGRAPH Asia 2020

WebGL Working Group, Khronos
October 2020

Agenda

Cool WebGL Stuff

WebGL 2.0 Universal Availability

Improved WebGL Sandboxing in Firefox

Better WebXR Performance in Edge

Higher-Quality Universal Compressed Textures

High-Bit-Depth Textures

Improved Geometry Batching

Future Directions

Cool WebGL Stuff

- Lots of great web sites and products using WebGL are released every day!
- Khronos' WebGL working group tries to find and highlight these to the community
- They're sent via email every couple of weeks to the WebGL Dev List
  - Also archived on this blog
- Please join the community, and share your own creations and findings!

WebGL 2.0 Universally Available

- WebGL 2.0 is finally coming to all major operating systems
  - iOS in particular!
- Collaboration with Apple since June 2019
- Integrated ANGLE project into WebKit as the WebGL backend
- Available for testing now (October 2020):
  - Safari Technology Preview on macOS
  - Safari in iOS 14.2 betas
- Significantly improved WebGL 1.0 conformance
- WebGL 2.0 passing >98% of conformance; aiming for 100%
- Follow progress of the project
- You can now rely on availability of WebGL 2.0 essentially everywhere!
- Upgrade your applications to WebGL 2.0 now!

Improved WebGL Sandboxing in Firefox

- Firefox is strengthening its WebGL security by adding a GPU sub-process
- WebGL API calls are sent to this process for validation and execution
- The JavaScript process no longer accesses the GPU directly
- Shipping today in Firefox Nightly on Windows and macOS!
- Try it and report any issues via product feedback!

Better WebXR Performance in Edge

- OVR_multiview is on by default
  - Improves performance of XR content on the web
- Microsoft is adding support for multiple GPUs to Chromium on Windows for XR scenarios. Try out the experimental support!
  - --enable-blink-features=webxr-multi-gpu command line argument

Higher-Quality Universal Compressed Textures

- **Basis Universal released as open-source!**
  - One single “supercompressed” texture format for all GPUs!
  - The advantages of GPU compressed textures, with the file size of JPEGs!
- WebAssembly module - works in all browsers
- KTX 2.0 incorporates Basis Universal’s technology!
- Using Basis Textures in Three.js
- KHR_texture_basis extension for glTF
- WebGL now supports BPTC (BC6H / BC7) and RGTC (BC4 / BC5) compressed textures
  - Enables higher-quality supercompressed textures on the web!

Higher-Bit-Depth Textures

- EXT_texture_norm16
- Community approved
  - Shipping in Chromium
- Provides new 16-bit signed/unsigned normalized fixed point renderbuffer and texture formats for better memory usage and precision
- Widely available on devices with hardware support
  - Several driver bugs have been worked around and reported to hardware vendors
- Available in emscripten
- Support for image decoding with 16 bits per channel is being implemented

Improved Geometry Batching

- WEBGL_multi_draw
  - Community approved
  - Reduce the CPU overhead of issuing draw calls
  - Widely supported across devices supporting instanced draws
  - Results from microbenchmarks are impressive: 3-6x improvements in common case, up to 70x (!) in some situations
  - Available in emscripten
- WEBGL_draw_instanced_base_vertex_base_instance
- WEBGL_multi_draw_instanced_base_vertex_base_instance
  - Help reduce CPU overhead with static batching and provide better instancing functionality
  - Available on most desktop/latest mobile platforms with emulation when necessary
  - Good results from microbenchmarks; also provide better functionality and simplify applications
  - Test in Chromium with --enable-webgl-draft-extensions
  - Available in emscripten

Future Directions

- Performance and quality of WebGL implementations will continue to be the highest priority for the WebGL working group
- Customers' requests for their highest-priority WebGL extensions will be considered on a case-by-case basis
- Future evolution of GPU-accelerated graphics and compute on the web is being developed by all browser vendors in the W3C's WebGPU community group
- All are welcome to participate!

Thank you!

Please come to the live Q&A session!

December 10, 10 AM Singapore Time

December 9, 7 PM Pacific time