Bringing Desktop-Class Creative Expression to the Web

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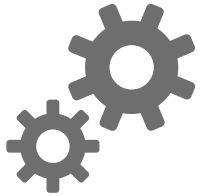
Why Getting Desktop-level Capability is Hard



64-bit/SIMD

> 4GB Memory

File System Access

WCG/HDR

Input Devices

Hardware Encode/Decode

GPU

Clipboard

Going Deeper : Using WebAssembly

Old + New

Applications are a mix of old and new, lots of existing code

Can't Do Everything on GPU

Existing CPU-based code, not all algorithms work well on GPU

Heavily Optimized for 64-bit, SIMD

Code has been optimized over years to take full advantage of modern hardware

Challenge :

- No 64-bit WASM support in browsers
- WASM SIMD not supported in all browsers
- Current SIMD proposal emphasizes portability over performance

Going Deeper : Color

Pro Creatives Need Great Color

Color Management, Wider Color Gamuts, HDR

More Screens Support WCG/HDR

The need for providing content that takes advantage of these screens is growing

End-to-End

Color is an end-to-end problem, need solutions that enable entire workflow

Challenge :

- Standards for color management and WCG are evolving, but not supported everywhere
- Not all modules/APIs work with the color management that does exist (eg WebGL)
- Different industries have their own standards for colorspaces, etc

Going Deeper : File System

Heavy Use of Disk & Filesystem

Documents & Content, Import/Export, Temp files, Cache

Optimized I/O Patterns

Minimize total number of calls, total bytes transferred

Use of Low-Level System Functions

Sparse Files, Memory Mapped Files & Zero Copy, etc

Challenge :

- Current APIs don’t allow for write access to the local file system
- APIs are very high-level and abstract; good for portability but hard to ensure I/O performance
- Proposed APIs like Origin Private Filesystem good for caching, etc but need ways to do import/export

Going Deeper : Hardware Encoding/Decoding

Pro Tools, Pro Formats

Pro media production tools work with many specialized formats

Hardware Support is Critical

Video formats particularly benefit from hardware acceleration

Diverse Hardware Capabilities

Not all devices will support acceleration of any given format

Challenge :

- Accelerated video is available (via VideoElement, and soon WebCodecs) but formats are limited
- Codec licensing and IP aspects are perennial challenges for interoperability
- Possible ways to access pluggable/installable hardware support?

Thank you!

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