Optimizing MPEG Encoding

Roel Deckers

Uppsala University

September 16, 2016

Why optimize MPEG?

- Widely used
- Many different steps

Test Machine

Intel i7-4750HW

- Quad core, 8-threads
- 32KiB L1, private
- 256KiB L2, shared
- 6MiB L3, shared
- 128MiB L4, shared victim-cache

25.6 GB/s maximum memory throughput. Measured at 20 GB/s RMW peak performance.
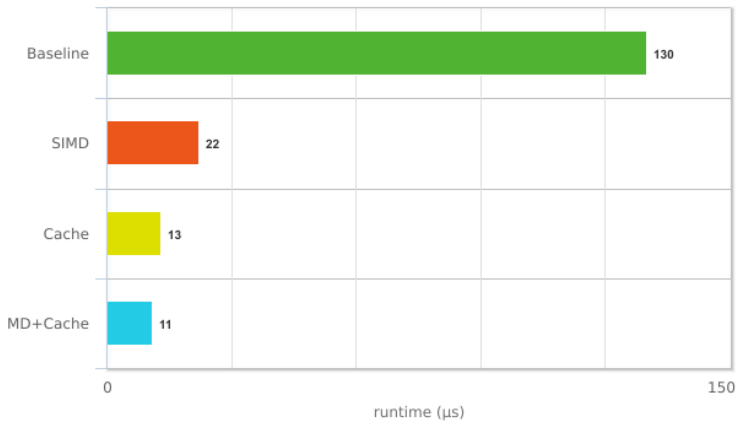
Color Conversion

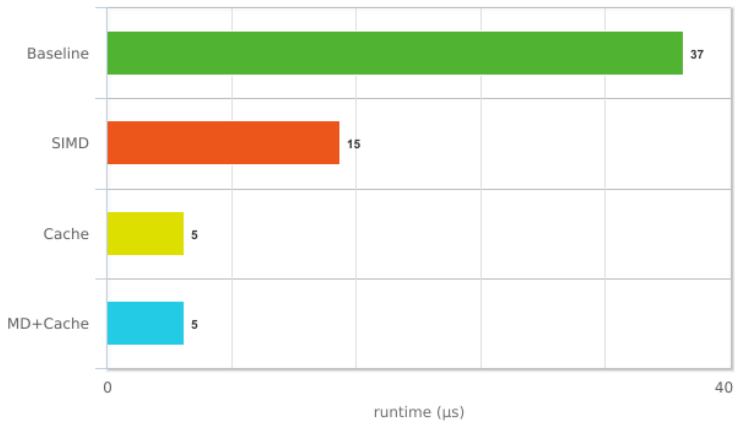
Figure: Single-threaded color-conversion

Color Conversion

Figure: Multi-threaded color-conversion
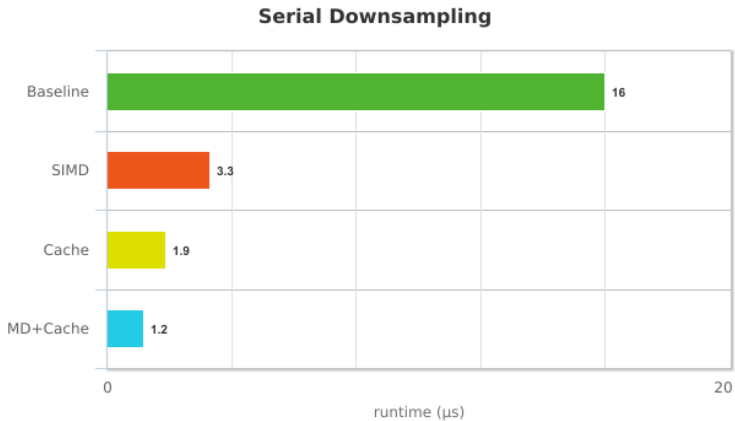
Downsampling

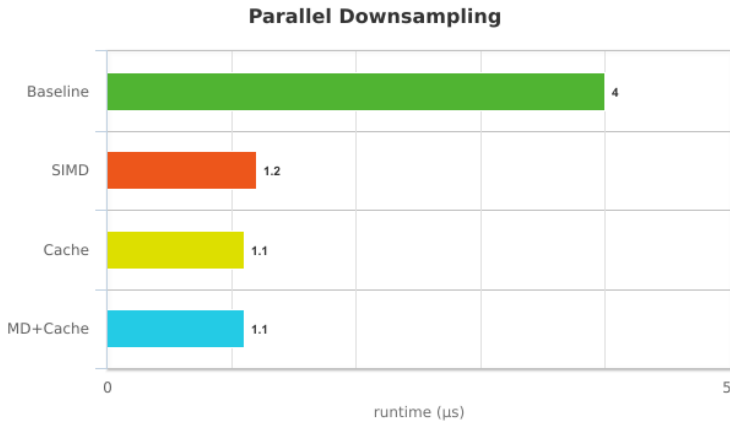Figure: Single-threaded downsampling

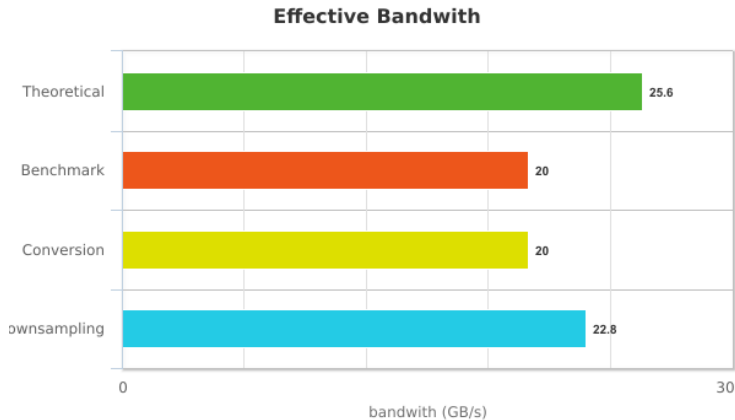# Downsampling

Figure: Multi-threaded downsampling

Bandwith

Figure: Effective Bandwith

Conclusion

- Pay attention to your cache
- SIMD can be useful even when not compute bound
- Memory bandwith matters
- Memory bandwith is hard to optimize for[1]

---

[1]http://codearcana.com/posts/2013/05/18/achieving-maximum-memory-bandwidth.html