

Leveraging OpenCV 3.0 on Intel® Graphics Technology with OpenCL™



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Many companies including Intel contribute optimizations for the OpenCL™ code in OpenCV

- Initial work for 2.4.8
- Propagated to 3.0

Upcoming OpenCV 3.0 architecture improves support for **GPUs**

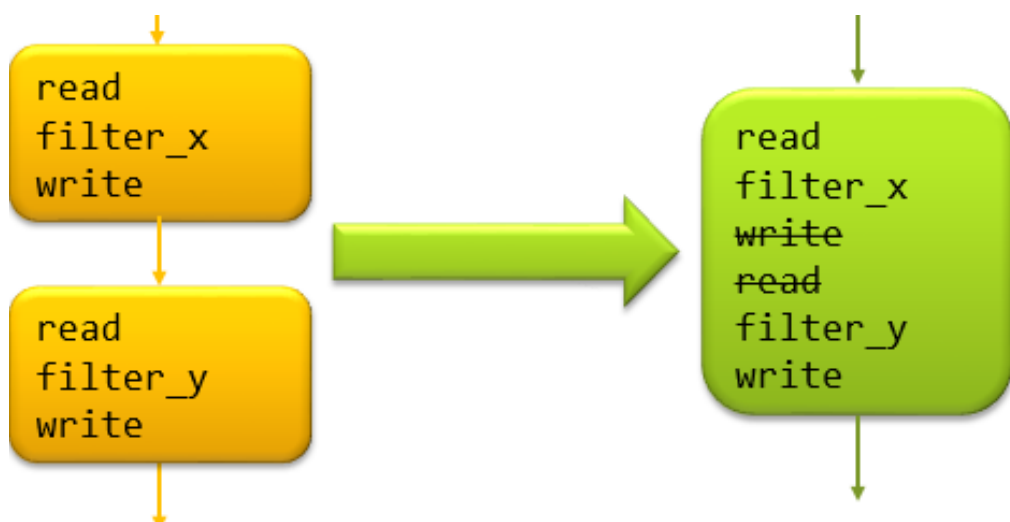
- “Transparent API” enables same code to use CPU or **OpenCL**
- Little or no code changes from existing OpenCV code
- On platforms without OpenCL uses efficient CPU fallback
- Improved use of shared physical memory for integrated GPU perf

Intel optimizations delivered substantial performance improvements

- Most optimizations are general (improve performance on all GPUs)

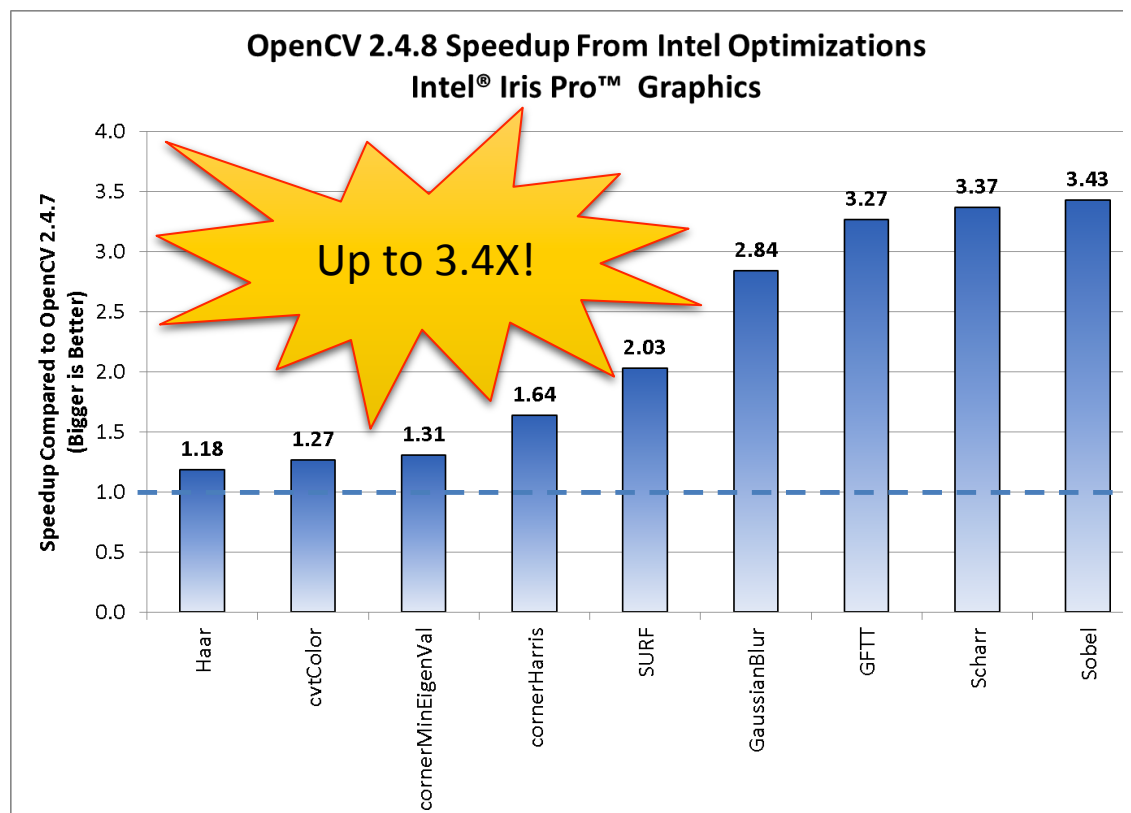
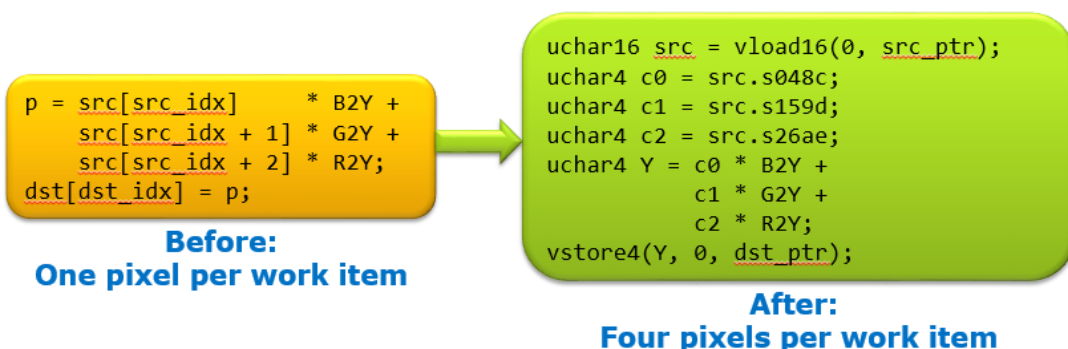
Optimization #1: Reduce memory overdraw with kernel fusion

- Reduces GPU/CPU round trips and associated overheads
- Examples: separable filters like Sobel/Sharr/Blur and combos (cornerHarris)



Optimization #2: Process multiple pixels per work item

- Amortizes GPU scheduling
- Amortizes GPU data path
- Example: cvtColor



Optimizations #3: Host to Device Transfers

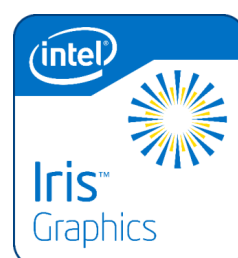
- Host (CPU) and Device (GPU) share the same physical memory
- No transfers for OpenCL buffers (zero copy)!

Take advantage of shared physical memory!

- Allocate system memory aligned to a cache line (64 bytes)
- Allocate an even number of cache lines
- Create buffer with system memory pointer and CL_MEM_USE_HOST_PTR
 - Use clEnqueueMapBuffer() to access data

Optimizations #4:

- Avoid redundant resource allocation/dealloc
- Pre-compile and cache kernels



OpenCV 3.0 is designed to better use of OpenCL™ on Intel® Architecture

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