IWOCL'21

Trip down the compute pipeline

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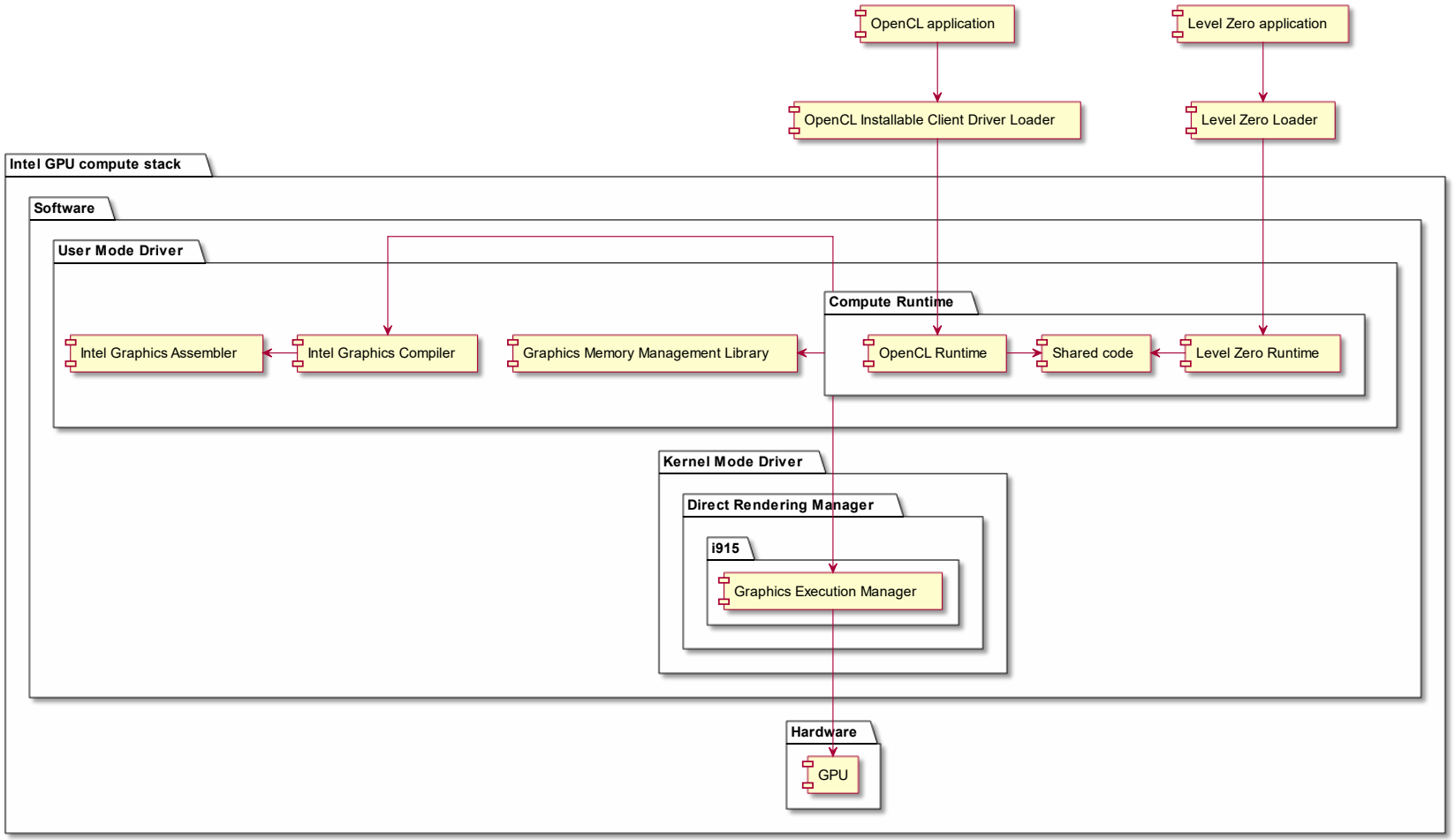
Goals

1. Show how Intel® GPU OpenCL™ stack is built and how components interact with each other when running a simple OpenCL application.
2. Highlight differences in driver's activities when operating on different API concepts like command lists from oneAPI Level Zero and command buffers from Vulkan.

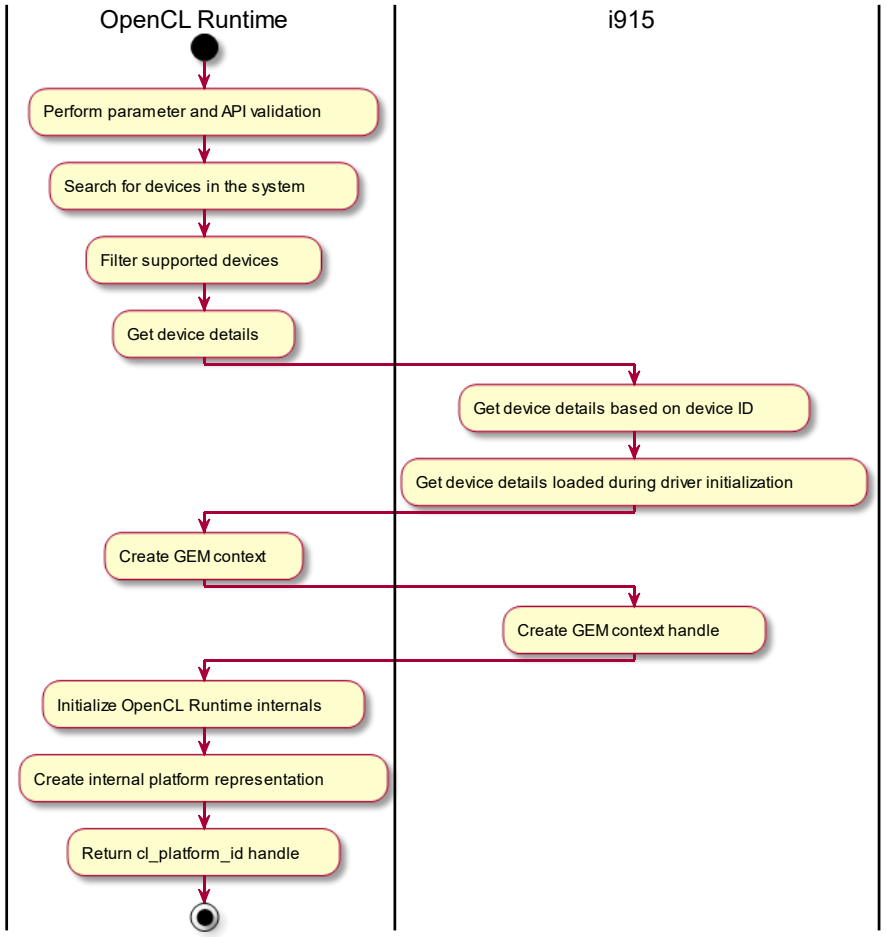
Components

Components

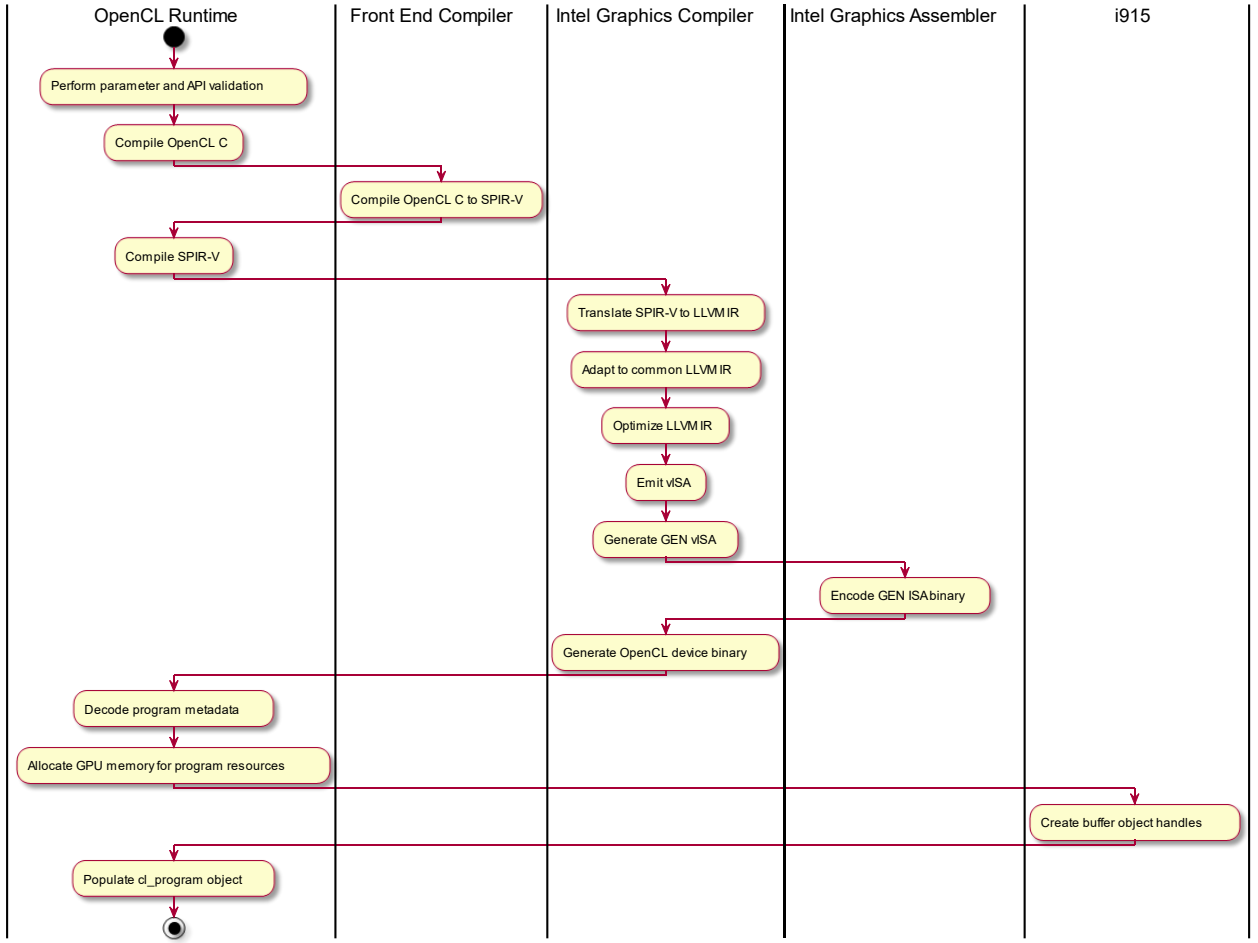

OpenCL application
Level Zero application
OpenCL Installable Client Driver Loader
Level Zero Loader
Intel GPU compute stack
Software
User Mode Driver
Compute Runtime
Intel Graphics Assembler
Intel Graphics Compiler
Graphics Memory Management Library
OpenCL Runtime
Shared code
Level Zero Runtime
Kernel Mode Driver
Direct Rendering Manager
i915
Graphics Execution Manager
Hardware
GPU

Driver’s workflow

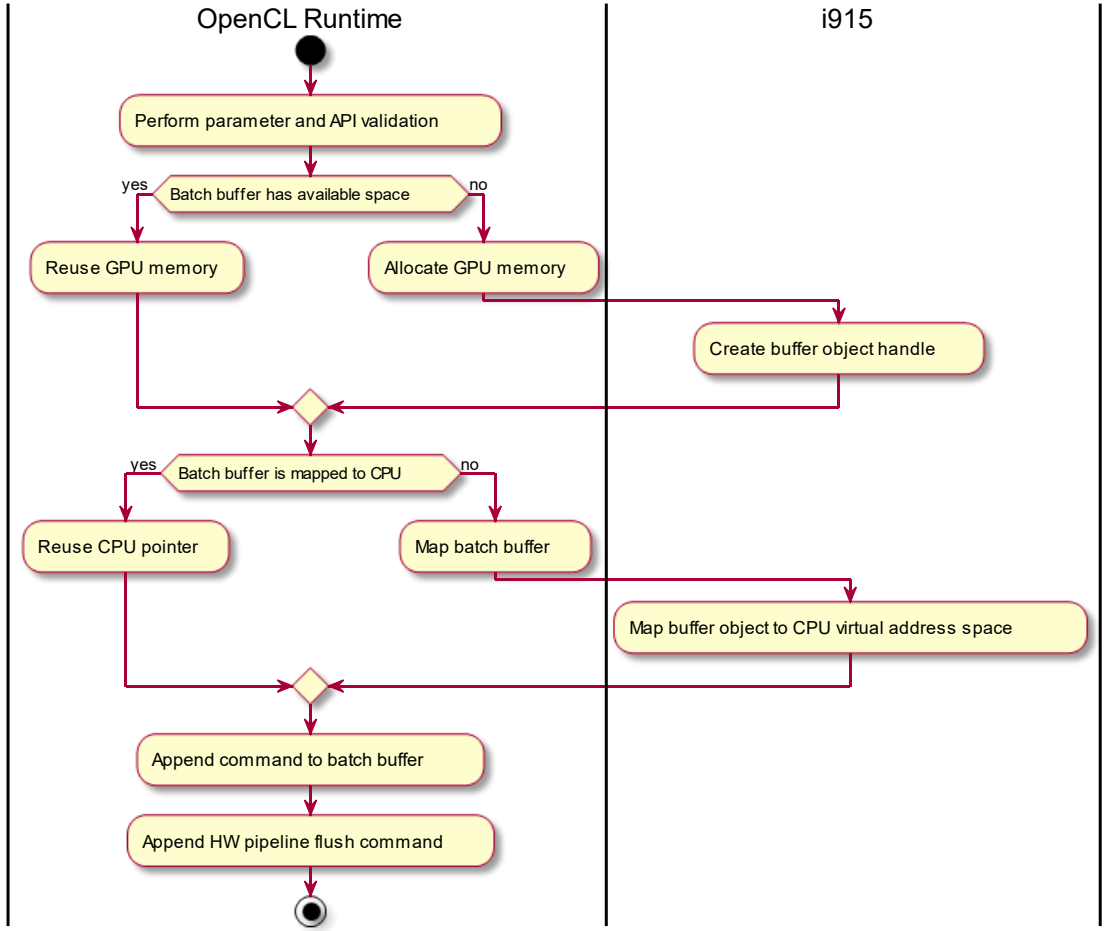
clGetPlatformIDs



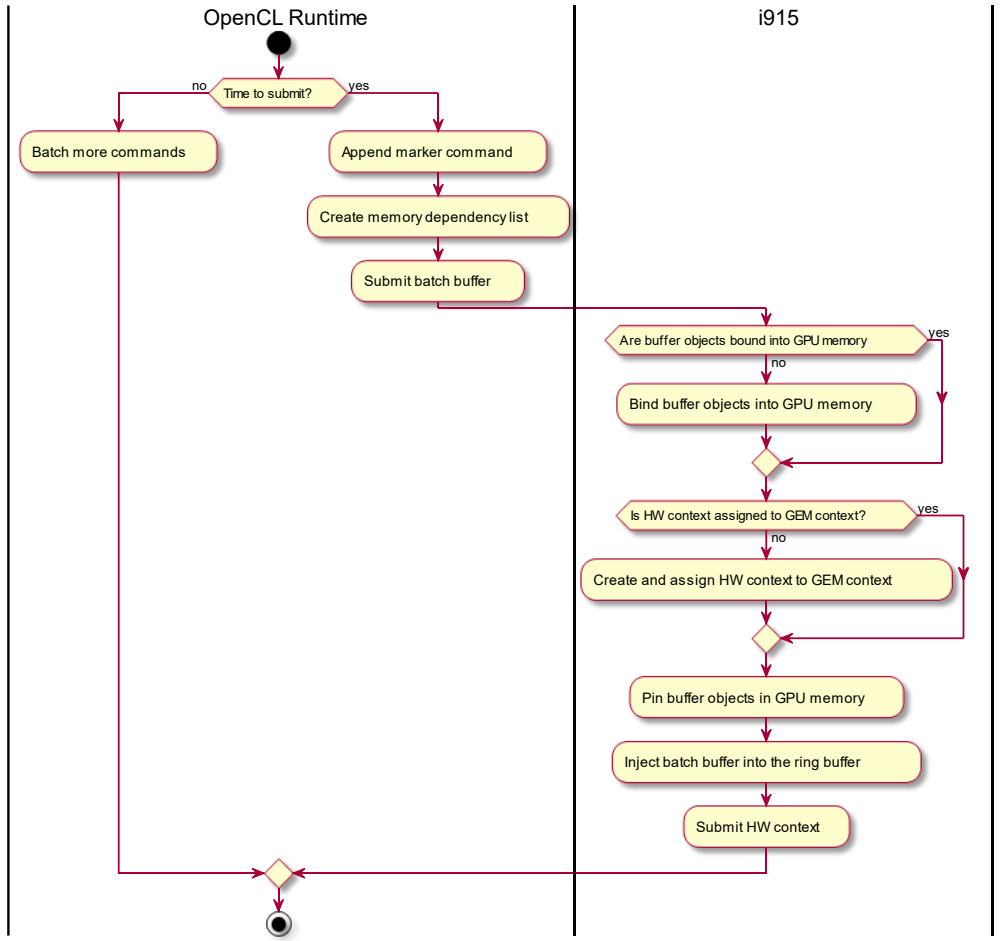
clBuildProgram



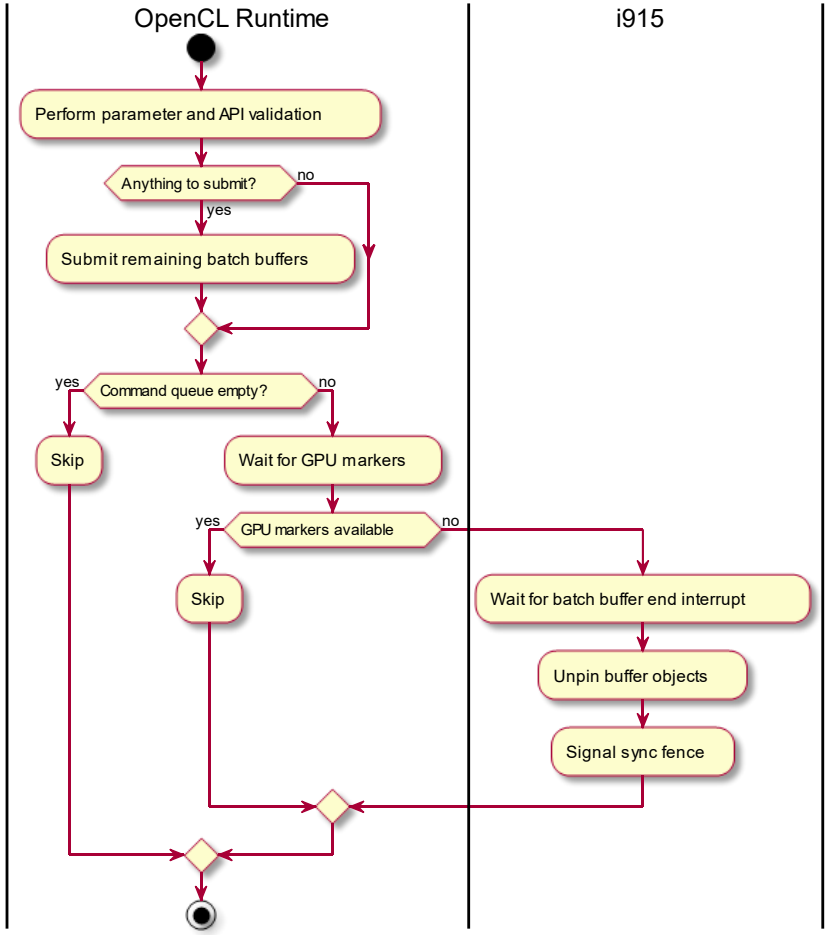
clEnqueue* - command creation



clEnqueue* - command submission



clFinish


OpenCL Runtime
i915
Perform parameter and API validation
Anything to submit?
no
yes
Submit remaining batch buffers
yes
Command queue empty?
no
Skip
Wait for GPU markers
yes
GPU markers available
no
Skip
Wait for batch buffer end interrupt
Unpin buffer objects
Signal sync fence

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