Vulkan at GDC 2017

Game Developers Conference
San Francisco, February 2017
Vulkan Games and Game Engines

- Dota 2 on Vulkan port of Source 2
- ‘ProtoStar’ demo on Vulkan port of Unreal Engine 4
- Talos Principle on Vulkan port of Serious Engine
- DOOM on Vulkan port of id Tech 6

Doom’s Vulkan patch is a PC performance game-changer. Vulkan support in V1.8.
Vulkan Momentum Continues to Build

Games Studios publicly confirming that work is ongoing on Vulkan Titles

In first 12 months:
#Vulkan Games on PC = 11

In first 18 months:
#DX12 Games on PC = 19


All Major GPU Companies shipping Vulkan Drivers - for Desktop and Mobile Platforms

- AMD
- ARM
- Imagination
- Intel
- NVIDIA
- Qualcomm
- VeriSilicon

Mobile, Embedded and Console Platforms Supporting Vulkan

- Android Nougat
- Nintendo Switch
- Android TV
- Embedded Linux
New Vulkan Functionality at GDC 2017

- Vulkan 1.0.42 released together with new extension sets for VR and multi-GPU
  - [https://www.khronos.org/registry/vulkan/#apispecs](https://www.khronos.org/registry/vulkan/#apispecs)
  - The most requested functionality by developers
  - Building Block approach provides explicit level of control

- Enables developers with key functionality today
  - AND gathers experience and feedback for future Vulkan core spec releases

- First use of KHX extensions
  - Developed by the working group - and ratified - like traditional KHR extensions
  - But will have TEMPORARY lifetime - should NOT be built into production code
  - Enables developer feedback without polluting long-term extension space

- New LunarG SDK for Vulkan Header 1.0.42.0 released today!
  - Includes support for all newly Released Functionality!

- NVIDIA has published [their new Vulkan beta drivers](https://www.khronos.org/registry/vulkan/#apispecs) on day of spec release
  - With full support for all the new v1.0.42 extensions
  - Plus building block Vulkan extensions for VRWorks on Maxwell and Pascal
Vulkan Extension Sets

• Multiview extension set
  - Render geometry to multiple surfaces, each with its own viewing parameters
  - Can efficiently render stereo pairs or environment maps

• Sharing extension set
  - Share memory and synchronization primitives across process and instance boundaries
  - Useful for implementing real-time rendering system such as VR runtimes

• Explicit Multi-GPU extension set
  - Treat multiple GPUs as a single logical device
  - Application can implement Alternate Frame Rendering, Split Frame Rendering or VR SLI

• Descriptor Update extension set
  - Alternate ways to update resource references between draw or compute dispatch calls
  - More efficient when a fixed set of resources must be updated repeatedly
  - More convenient for legacy applications
Vulkan Multi-GPU and Virtual Reality Support

- Native multi-GPU support for NVIDIA SLI and AMD Crossfire platforms
  - WDDM must be in “linked display adapter” mode
  - The most common use case - does NOT support dGPU/iGPU

- Explicit control of how GPUs cooperate to enable a variety of operating modes
  - AFR (alternate frame), SFR (Sequential frame) and VR SLI Stereo view rendering

- A “device group” is a set of physical devices that support multi-GPU rendering
  - Acts as single logical device - makes adding device group support as easy as possible
  - Only access each physical GPU in a device group when need explicit control:
    - Memory allocation and binding resources
    - Command Buffer Recording/Submission
    - Synchronization