Vulkan in android

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Devices that lack Vulkan support are represented by None. Note that support for one particular version of Vulkan also implies support for any lower version (for example, support for version 1.1 also implies support for 1.0.3). To declare which version of Vulkan your application requires, you should create a element defining android.hardware.vulkan.version. See FEATURE_VULKAN_HARDWARE_VERSION for more details on the hardware version. You can also use android.hardware.vulkan.level to declare a required Vulkan feature level. See FEATURE_VULKAN_HARDWARE_LEVEL for more details on the feature level. Vulkan VersionDistribution None23.0% Vulkan 1.0.316.0% Vulkan 1.161.0% Data collected during a 7-day period ending on June 24, 2022. For more robust and granular Vulkan distribution data, use Reach and devices in the Google Play Console. OpenGL ES version This section provides data about the relative number of devices that support a particular version of OpenGL ES. Note that support for one particular version of OpenGL ES also implies support for any lower version (for example, support for version 2.0 also implies support for 1.1). To declare which version of OpenGL ES your application requires, you should use the android:glEsVersion attribute of the element. You can also use the element to declare the GL compression formats that your application uses. OpenGL ES VersionDistribution GL 2.06.77% GL 3.08.60% GL 3.16.03% GL 3.278.61% For more robust and granular OpenGL ES distribution data, use Reach and devices in the Google Play Console. Android Baseline profile (Vulkan) This section provides data about the relative number of devices that support the Android Baseline profile for Vulkan. Android Baseline profile (Vulkan)Distribution Android Baseline Profile69.2%* None30.8% * If shaderImageGatherExtended is excluded from the profile, device support is 85.0%. Data collected during a 7-day period ending on June 24, 2022. At the moment, there is no easy way to test Vulkan versus OpenGL ES 3.1 on Android. My go to 3D engine Unreal Engine does not support the Android-24 API, so while Vulkan is technically supported, I was not able to get Vulkan working on my Nexus 6P to do this.Instead, I will be using Nvidia's samples for this article to test Vulkan, OpenGL ES 3.1 and OpenGL ES 2.0 on my desktop for performance tests and Unreal Engine for graphics comparisons between Vulkan on mobile with OpenGL ES 2.0, OpenGL ES 3.1. In the Nvidia tests the CPU and GPU usage will all be monitored and the graphics quality will be noted in the Unreal Engine tests. Let's get started with graphics. Graphics comparisonVulkan offers greater performance compared to its OpenGL brothers and greater control of the hardware allowing for a boost in graphics quality do to better optimizations. But how does this translate into the real world?Compared to OpenGL ES 3.1, at least in Unreal Engine made for mobile, there is no difference in graphics. That being said, most games run in OpenGL ES 2,0, and there is a huge difference here, which you can see above. The problem with OpenGL ES 3.1 is that while the graphics look immensely better than OpenGL ES 2.0, the performance hit is so great that games are basically not playable, looking at the image above comparing OpenGL ES 2.0 and 3.1 on my Nexus 6P shows that the exact same scene runs at a third of the frames per second compared to OpenGL ES 2.0. This is where Vulkan comes in, offering at least the same in graphics quality, but with improved performance. So how does Vulkan do? Performance comparisonVulkan does amazing actually, the results show that Vulkan more than triples the FPS compared to OpenGL ES 3.1. There are a few reasons to why this is. First, it may be hard to see in the picture, but my computer's CPU usage is more than doubled on all 8 threads and my computer is able to handle two million fish per second compared to around 900 thousand while using OpenGL ES 3.1. The multithreading capabilities are a lot better with Vulkan, allowing for all 8 cores to get a workout, not just one.The CPU usage reported in task manager is more than likely a bit misleading. I believe this is the case because Vulkan spreads out the load of this example across all 8 cores, instead of just one with OpenGL ES 3.1. So while it is technically using more of my CPU, the CPU is not as stressed as the work is spread out between the cores. Notice that the RAM usage does not change between tests as well.Looking at the draw calls, Vulkan allows for a little more than 3 times the amount compared to OpenGL ES 3.1. A "draw call" is how many objects are being drawn on the screen at a time. Usually, you want this number to be lower, as performance can suffer, but in this case, the new API stomps all over ES 3.1 while still having a higher draw call.Looking at the GPU usage while running these tests, it's about the same, with about 20 percent GPU usage in Unreal Engine and 4 percent for the Nvidia test. OpenGL ES 3.1 used about an extra percent than its newer brother. While this is essentially nothing to my desktop, on a phone this could be a huge difference and we could see 10-20 percent GPU difference possibly. What is actually giving it better performance is the lower level control and relying on the developer more than the drivers to decide where your device's resources go.Looking at this data, Vulkan still will not perform as well as the lower graphics capable OpenGL ES 2.0, as Vulkan displays a lot more on screen and the scenes it can render are a lot more complex, but this is to be expected. Imagination has also observed similar results in their tests. Showing that the CPU load is spread across the four cores and the FPS increases by quite a bit. This test really shows how well the new API works with multiple threads and how much it benefits from doing this. This is an interesting question, as at the time of writing, there are only a few devices that are actually able to utilize Vulkan. While new flagship devices running Android 7.0 will most likely support Vulkan, it will take awhile for developers to integrate the new API into their games, especially since third party engines do not fully have Vulkan integrated for Android, like Unreal Engine. Or not at all, like Unity.All of this will come with time, of course, but I would not hold my breath, as there are a few stars that need to be aligned before your device supports the new API. For reference, Vulkan will be supported on Snapdragon 8xx and up with Adreno 4xx GPUs and up and Exynos 5433, 7420 and 8890 and presumably everything proceeding those models. Once Vulkan is used correctly, games will see a massive jump in quality with very little to no penalties as the API and hardware advances over the years. This is definitely an exciting time to be a developer and gamer. Vulkan looks very promising for not just Android, but also for the desktop. The numbers do not lie, and Vulkan beats OpenGL ES 3.1 no problem. The real question is how fast will developers start implementing the new API in their games. As engines progress and development gets easier, I see no reason why not to.Let us know in comments what you think of these results! The Vulkan Working Group has released the VK_EXT_mesh_shader extension that brings cross-vendor mesh shading to Vulkan and improves functional compatibility with DirectX 12. The new mesh shading pipeline with the task and mesh shading stages provides an alternative to the traditional vertex, tessellation, or geometry shader stages that feed into rasterization. Mesh shaders provide greater flexibility to developers and enable a two-stage approach for efficient culling, level-of-detail management, and procedural generation of geometry. Compared to the traditional pipeline, mesh shaders enable easy access to the topology of generated primitives and developers are free to repurpose shader threads to perform both vertex shading and primitive shading workloads. Khronos will provide a mesh shader open-source sample to support and showcase the new VK_EXT_mesh_shader extension, and an updated shaderc library in the Vulkan SDK is coming soon. For those that wish to try out the new mesh shader on their own GPU; NVIDIA is shipping the new extension in their beta Vulkan drivers today, and experimental support in the open source RADV and ANV drivers are now available. For additional information developers are invited to: Read the deep-dive blog post Mesh Shading for Vulkan. Attend the free Vulkanised Webinar: 'Cross-Vendor Mesh Shading with Vulkan' on Wednesday September 28 . Learn More and Register Check out the new LunarG Windows, Linux, and macOS SDKs for Vulkan header 1.3.224, including the NVIDIA Best Practices, a Vulkan Profiles tool to combine multiple profiles, and the Synchronization Validation inter-buffer-hazards feature (alpha). For the past couple of years, the Raspberry Pi foundation has been working with Igalia to bring Vulkan to the Raspberry Pi 4 platform. Yesterday, they announced that they have achieved Vulkan 1.2 conformance for the Raspberry Pi 4 Model B along with support for various other extensions, bug fixes and performance improvements. Khronos has released three new samples for Vulkan. They include: Usage of the VK_EXT_conditional_rendering extension for conditionally toggling the visibility of sub-meshes of a complex glTF model. View Sample A transcoded version of the API sample Terrain Tessellation that illustrates the usage of the C++ bindings of vulkan provided by vulkan.hpp. View Sample A transcoded version of the API sample Compute N-Body that illustrates the usage of the C++ bindings of vulkan provided by vulkan.hpp. View Sample

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