Android Baseline 2021 Profile

Simplifying Vulkan Development on Android

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Bottom Line Up Front

- Blog post: [developer.android.com/ndk/guides/graphics/android-baseline-profile](developer.android.com/ndk/guides/graphics/android-baseline-profile)

- The Android Baseline 2021 profile is public in JSON format:
  - [github.com/KhronosGroup/Vulkan-Profiles/blob/master/profiles/VP_ANDROID_baseline_2021.json](github.com/KhronosGroup/Vulkan-Profiles/blob/master/profiles/VP_ANDROID_baseline_2021.json)

- Will be publishing support numbers to Android dashboard:
  - [developer.android.com/about/dashboards](developer.android.com/about/dashboards)
Application Developer Pain Point

- **Goal:** Simplify application development
  - There are 180+ extensions that exist across Vulkan
- **Today:** An application must query multiple “capabilities”:
  - Extensions
  - Features
  - Limits
  - Formats

- Acutely felt by mobile developers
  - Wide range of capabilities across devices

- This is somewhat simplified by Vulkan version numbers
  - Anything "core" to version will not need to be individually queried
  - Meaning a developer will likely need to query version and _less_ of above
  - The release of Vulkan 1.3 makes this the simplest it's been since 1.0
Android Baseline 2021 Profile (ABP)

- Goal: make it easy for developers to create an application that supports the vast majority of currently active Android devices
  - Multiple Android releases
  - Range of older-to-newer, lower-to-higher-end devices

- Initial ABP proposal created using available metrics
- Refined with feedback from Khronos partners

- Needs to be available to developers without updating devices

ABP 2021 Requirements (Subset)

- Minimum Vulkan version number: 1.0.68
- Compressed textures through ASTC and ETC
- Variable colorspace through VK_EXT_swapchain_colorspace
- Sample shading and multisample interpolation through sampleRateShading
- Update the swapchain in parts with VK_KHR_incremental_present
- Shader pointers into uniforms, storage buffs with VK_KHR_variable_pointers

- Dozens of limits
  - maxFramebufferWidth/Height/Layers
  - maxImageDimension*
  - maxBoundDescriptorSets
  - maxComputeWorkGroupInvocations, maxComputeWorkGroupSize

- Dozens of formats
ABP 2021 Support in the Wild

- Vulkan Profiles is an SDK-side change
  - If a device currently has the required Vulkan support, this device should already support the ABP and no over-the-air update will be necessary

- We expect the vast majority of Android devices currently in use to support ABP

- Will be broadcasting the percentage of Android support at
  - developer.android.com/about/dashboards
  - Plan to have this live around the time of SDK release
The Future of ABP

- Committed to a 2022 refresh of the profile later this year
- We will continue to work with Khronos partners
- If you're an Android developer and have an opinion on Android Baseline profile
  - We want to know what extensions, features, etc. you'd like to see added
  - We will be reaching back out shortly for feedback
- Considering differentiating between different form-factors (e.g. phones, wearables, TV, auto)
  - Form factors very different
  - Hardware very similar
- No concrete plans beyond a 2022 refresh
  - We'll likely update when we have demand from ISVs or IHVs
  - Think every other year or so