



Vulkan 1.3 Launch

Strengthening the
Vulkan Ecosystem

25 January 2022



Vulkan is Everywhere



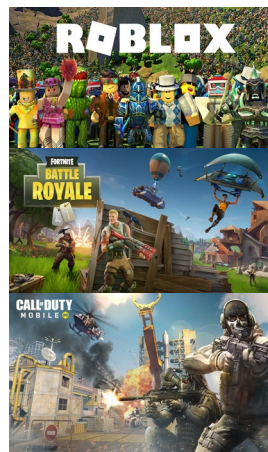
Desktop and Mobile GPUs and SOC's



<http://vulkan.gpuinfo.org/>

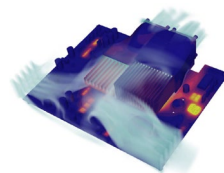


Desktop Games



Mobile Games

**AUTODESK®
FUSION 360®**
Cross-platform post-processing
and display of simulation results



Substance 3D Stager
Cross-platform ray tracing

Applications



Note: The version of Vulkan available will depend on platform and vendor

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Vulkan is Unique



Vulkan is the *only open standard* modern GPU API

Under multi-company governance

Supported by all major GPU vendors

Cross-platform support reduces developer porting effort and costs

Used extensively by games and applications



Windows and Linux
Desktops and Cloud



Mobile



Game Streaming
Platforms



SteamOS



Gaming
Platforms



macOS

Apple Platforms
(via translation layer)

Vulkan's pervasiveness across multiple platforms and markets creates unique ecosystem challenges
Vulkan 1.3 increases the rigor of Vulkan ecosystem and roadmap management

Ecosystem and Roadmap Pre-Vulkan 1.3

Core Vulkan

Fully acceleratable on OpenGL ES 3.1 hardware for pervasive availability in multiple markets including mobile

BUT

No clearly communicated roadmap for hardware evolution past OpenGL ES 3.1

Optional core features signal functionality that may become pervasive

BUT

No guarantee of WHEN that functionality will be pervasive and on WHAT platforms



Vulkan 1.0
February 2016



Vulkan 1.1
March 2018



Vulkan 1.2
January 2020

Vulkan Extensions

Expose new hardware functionality and API improvements for developers

BUT

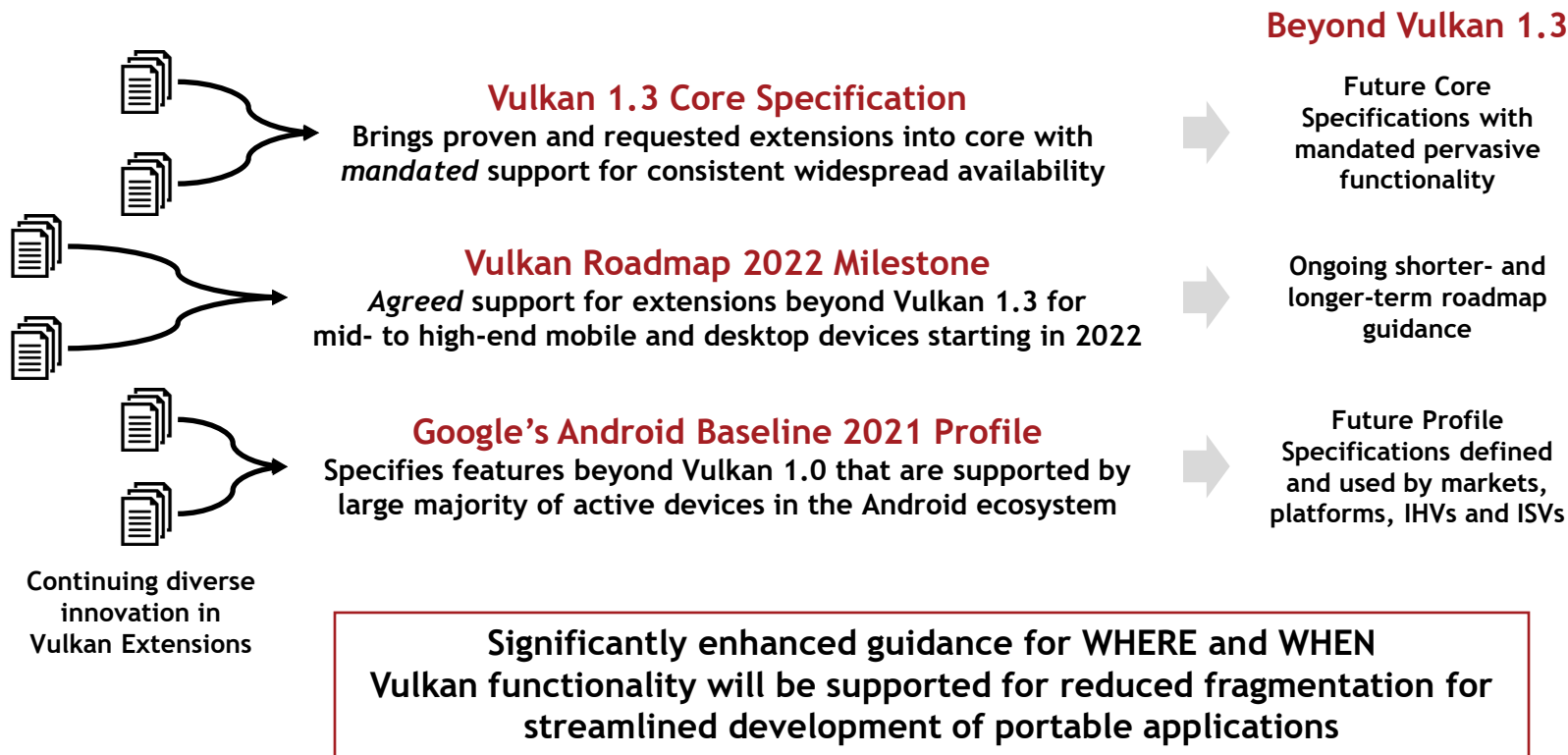
Extensions are optional, so availability varies by vendor, platform and across markets such as desktop and mobile



Over 180 Vulkan KHR and EXT extensions plus over 100 vendor extensions

Vulkan's continued diverse expansion and evolution complicates how developers can know WHERE and WHEN functionality will be reliably available

Vulkan 1.3 Ecosystem Evolution



Vulkan 1.3 Core Specification

Supportable on OpenGL ES 3.1-class hardware
For widespread deployment

Integrates significant requested functionality proven as extensions
Mandated support for new functionality ensures availability on all Vulkan 1.3 implementations

Dynamic rendering to enable simplified API use without subpasses

Dynamic State reduces number of needed pipeline objects to avoid hitching

Streamlined management of shader pipeline compilations

Buffer device addresses to use pointers

Finer control over subgroup sizes and mapping

Dot product function for efficient machine learning acceleration

Synchronization2 API for easier queue submission, events, and pipeline barriers

And more... 23 extensions in total

Conformant Vulkan 1.3 beta drivers shipping from multiple vendors, including
AMD and NVIDIA, that support the Vulkan Roadmap 2022 milestone

Vulkan Roadmap 2022 Milestone

Working Group-agreed support for a new functionality baseline Beyond Vulkan 1.3

For mid- to high-end mobile and desktop devices with rollout starting in 2022

Vulkan 1.3 specification includes [list of additional extensions](#) with mandated limits and formats (e.g., raised minimums for image dimensions and subgroup size)

Significant jump in functionality

[Descriptor Indexing](#) for ‘bindless’ operations

Cross-vendor subgroup consistency: minimum size, shader support and supported operations

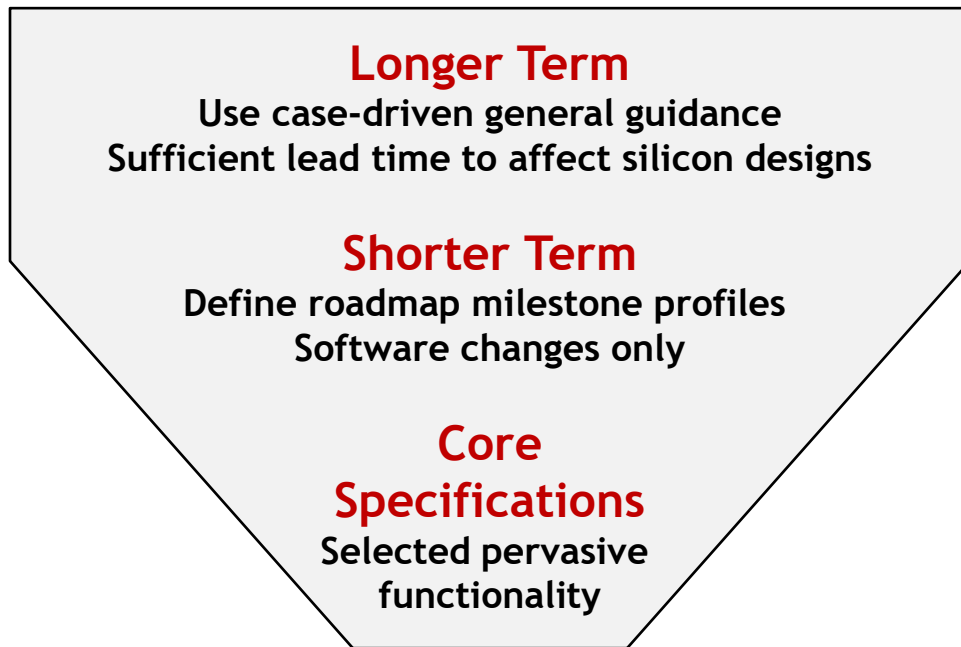
Multiple process scheduling

And much more...

Anisotropic filtering, Y’CBCR sampling, buffer scalar block layouts, depth and depth bias clamping, mirror-clamp-to-edge sampling, independent blending, sample rate shading, precise occlusion queries, fragment stores and atomics, standard sample locations, and full 32-bit draw indices

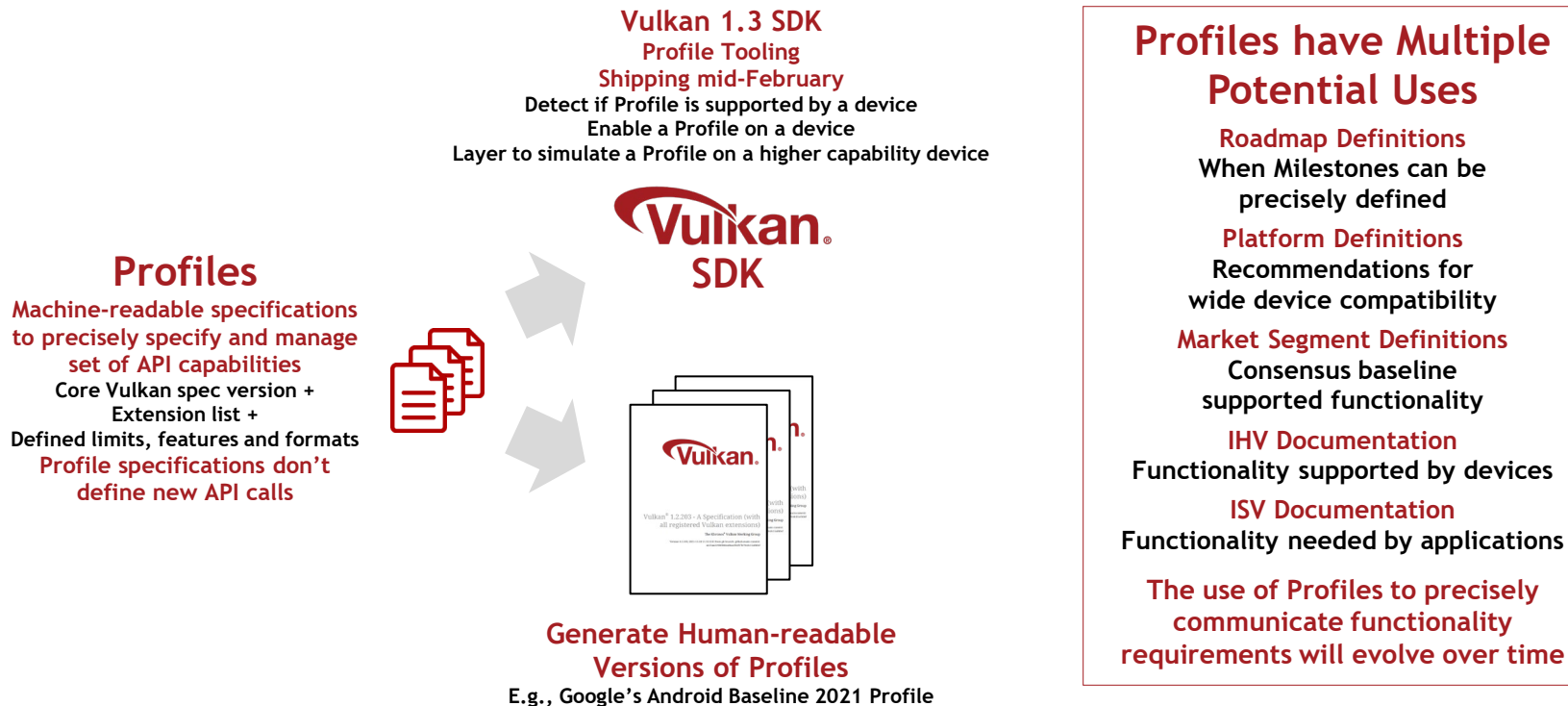
The first of an ongoing series of Vulkan roadmap specifications and guidance documents giving roadmap guidance

Vulkan Roadmap Guidance Pipeline



Vulkan Working Group will develop and maintain a public pipeline of roadmap guidance documentation

Vulkan Profile Specifications



Android Baseline 2021 Profile

Google-defined Vulkan Profile for the Android platform

Defines functionality beyond Vulkan 1.0 supported on the vast majority of current Android devices

Even without the need for an over-the-air updates

Built-in collaboration with Khronos partners to ensure the greatest support for all future devices

Simplified developer experience

Reduces dozens of API queries to just a few

Consistent support for dozens of different limits and formats

Sensible defaults set to reduce implicit assumptions and cognitive load for developers

Pushing Vulkan on mobile forward

Compressed textures through ASTC and ETC

Variable colorspace through VK_EXT_swapchain_colorspace

Sample shading and multisample interpolation through sampleRateShading

Dozens of other Vulkan extensions, features, limits, and formats

The Android Baseline 2021 Profile makes it easy for developers to create an application that supports the vast majority of currently active Android devices

<https://developer.android.com/ndk/guides/graphics/android-baseline-profile>



More Information

- Vulkan: <https://www.vulkan.org/>
 - Press Release: <https://KHR.io/xj>
 - Final specification: <https://KHR.io/vulkan13spec>
 - Spec GitHub Repo: <https://KHR.io/vulkan13github>
 - Discord Link for community discussion: <https://KHR.io/vulkan13discord>
 - Vulkan 1.3 Blog post: <https://www.khronos.org/blog/vulkan-1.3-and-roadmap-2022>
 - Google Android Baseline 2021 Profile blog:
<https://www.khronos.org/blog/vulkan-1.3-and-roadmap-2022>

Free Vulkanised Webinar on February 1, 2022

Will go into more depth on all these updates!

Registration is open here

<https://www.khronos.org/events/vulkanised-webinar-february-2022>

