

Update & AMA

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www.khronos.org

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Khronos Mission



Khronos is an open, non-profit, member-driven industry consortium developing royalty-free standards, and vibrant ecosystems, to harness the power of silicon acceleration for demanding graphics rendering and computationally intensive applications

Khronos Active Initiatives

3D Graphics

Desktop, Mobile, Web Embedded and Safety Critical













3D Assets

Authoring and Delivery





3D Commerce

Portable XR

Augmented and Virtual Reality



Parallel Computation

Vision, Inferencing, Machine Learning













Guidelines for creating APIs to streamline system safety certification

Heterogeneous Communications between offload compute devices

Exploratory Groups

Making High-Level Languages more effective at acceleration offload

Rendering for scientific visualization and data analytics

KH RON OS

Open Source and Open Standards

Two complementary ways to build, open, portable software ecosystems

Open, royalty-free API specifications provide the foundation for many open source projects

Open Standard Organizations

1.Primary product is specifications with CTS
2.Ideal for APIs to subsystems with
multiple implementors

3.Deliberative multi-company governance
4.Membership dues to fund activities
5.NDA and IP Framework protects sensitive roadmap discussions and against patent trolling

Open Source Projects

1.Primary product is implementations2.Ideal for collaboratively implemented subsystems

3.Fast and responsive4.Free to contribute5.Projects protected through CLAs

Open source is vital to build ecosystems around open API standards

KHRON OS

Khronos Principles of Organization

Open membership.
Any company is welcome to join.
One company one vote

Open specifications.
ROYALTY-FREE through a strong,
modern IP Framework: Khronos
members agree not assert patents
against conformant implementations

Open New Initiative Process.

Any member, or non-member, can propose new standards initiatives

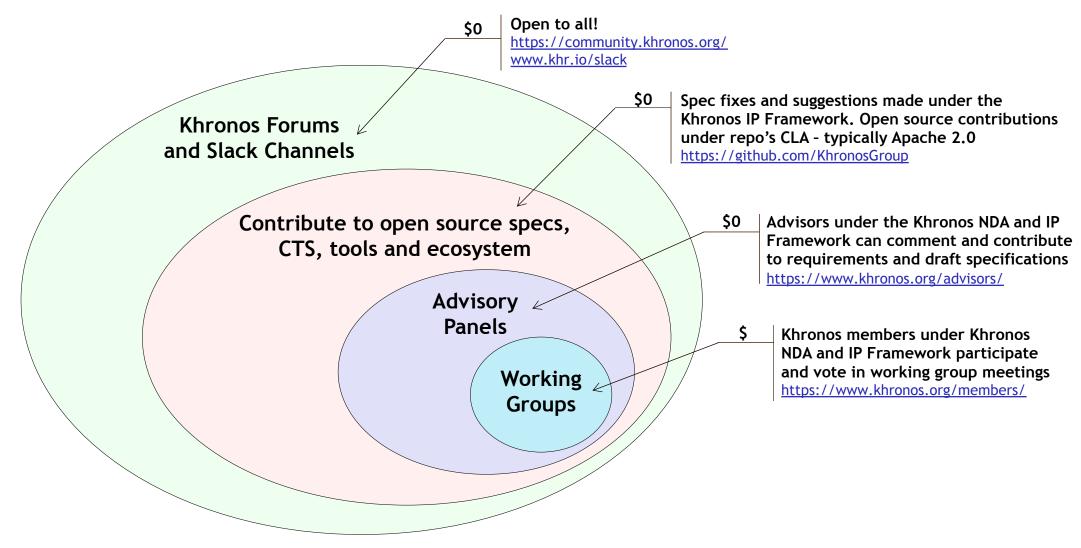


(Increasingly) Open Source Conformance Tests and Adopters Programs for defining conformance, specification integrity and crossvendor portability

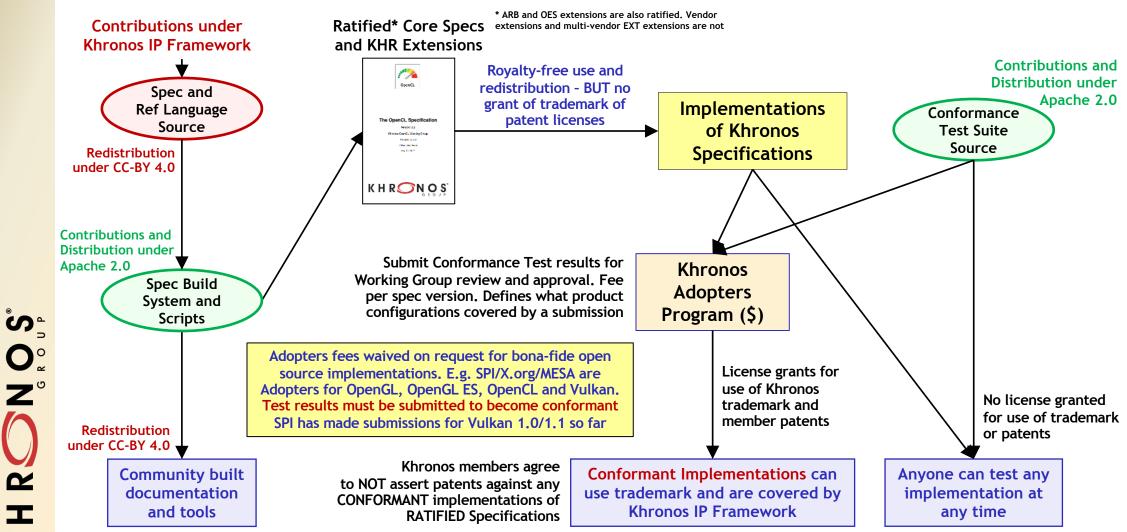
Non-profit organization -Membership and Adopters fees cover operating, marketing and engineering expenses

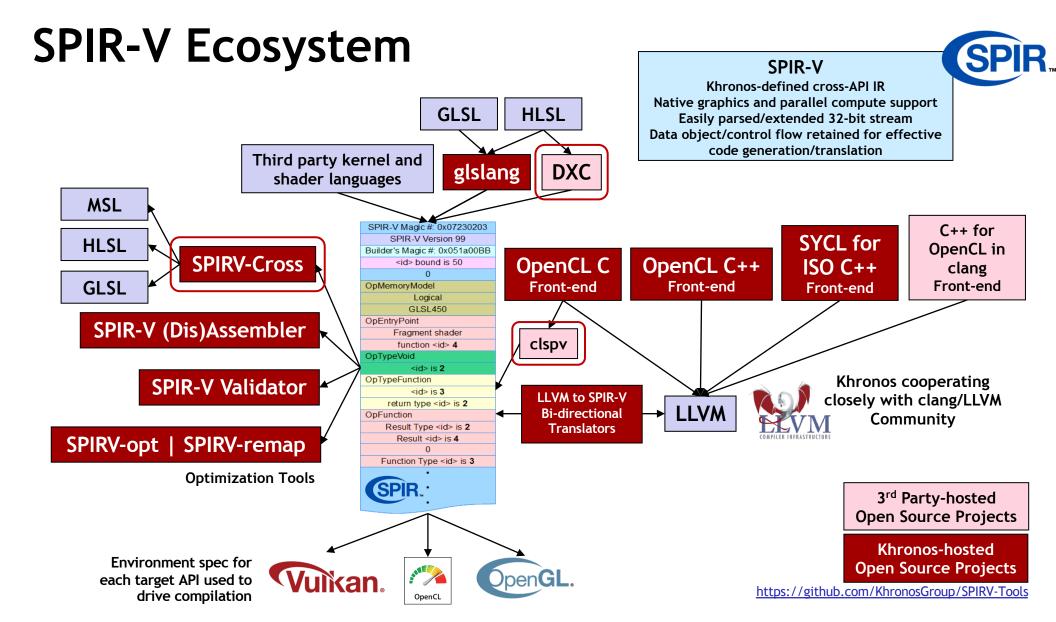
Invest where there is strong industry momentum and relevance - let Darwinism rule!

Khronos Ecosystem Engagement



Khronos Specification and Adoption Flow





Open Source Layering Projects

Breaking through platform fragmentation

Vulkan adding more compute for fuller Vulkan added extensions Vulkan added OpenGLsupport for OpenCL kernel deployment to ease layering of DX style line extension Layers **Vulkan DX12** DX9-11 **OpenGL** OpenCL OpenGL ES **Over** Vulkan is an effective porting **GLOVE** DXVK clspv Vulkan Zink vkd3d layer for app clvk Angle VK9 portability and stack simplification gfx-rs **OpenGL** Angle Ashes **Vulkan Portability** enables multi-**DX12** gfx-rs vendor layered subsets to be gfx-rs gueryable and DX9-11 Angle Ashes conformant MoltenVK Growing interest to offset Metal Angle **Apple deprecation?** gfx-rs PORTABILITY

> Demand for Vulkan everywhere, even if no native drivers on platform

Need for consistent OpenGL ES everywhere, primarily for WebGL

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Vulkan Portability Initiative

Enabling Vulkan applications on platforms without native drivers by layering cleanly gueryable subsets of Vulkan over DX12, Metal and other APIs



Open source tools, SDKs and libraries to bring Vulkan 1.0 applications to Apple using Metal

Multiple Layered Vulkan Implementations

Additional open source run-times over additional backends E.g. gfx-rs for Vulkan over Metal and DX12 - useful for Vulkan on UWP platforms such as Windows 10 S, Polaris, Xbox One. Secondary backends include OpenGL/D3D11

> https://github.com/gfx-rs/gfx https://github.com/gfx-rs/portability

Portability Extension

Layered implementations can portably expose what Vulkan functionality is not supported



Extend Vulkan Conformance Test Suite

To handle layered implementations - what is present must work!

Enhanced Vulkan Layers

Extend DevSim/Validation Layers to flag or simulate gueries for features not present

Inviting Closer Collaboration

Both organizations are working to enable developers with an effective, royalty-free graphics ecosystem





How can we better work together?