

# Vulkanised 2026

The 8<sup>th</sup> Vulkan Developer Conference  
San Diego, USA | February 9-11, 2026

## The Vulkan SDK - An Ecosystem Update

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Karen Ghavam, LunarG



# Some quick information about me

- CEO and Engineering Director – LunarG
  - An Independent, private company with Khronos membership
    - Specializing in 3D graphics software solutions for our clients
  - Developing Vulkan Ecosystem components since 2015
    - Generous sponsorship from Valve and Google
- I have been in the computing industry for 45 years
  - 35 years at Hewlett Packard before taking ownership of LunarG in 2015

# The Vulkan SDK (vulkan.lunarg.com)

The screenshot shows the Vulkan SDK website homepage. At the top left is the Vulkan logo. In the top right corner, there are buttons for '+ Signup' and 'Signin'. A left sidebar contains navigation links: SDK, Issues, Docs, Licenses, Khronos, and logos for 'Sponsored by VALVE', 'Developed by LUNAR)G', and 'Delivered by LUNAR XCHANGE'. The main content area features three news items: 'KosmicKrisp and SIGGRAPH 2025 Presentations', 'LunarG Releases Vulkan SDK 1.4.335.0 for Windows, Linux, & SDK 1.4.335.1 for macOS', and 'Initial OpenXR Support in GFXReconstruct'. Below these is a large Vulkan logo and a welcome message: 'Welcome to the community for the Vulkan SDK. You can download the latest Vulkan SDK and get SDK questions answered at this site.' At the bottom, there is a section titled 'DOWNLOAD DEVELOPER TOOLS FOR' with icons for Windows, Linux, Apple, and Android.

Delivered by LunarG in close coordination with the Khronos Vulkan working group

# Vulkan SDK Download Page

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SDK

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DOWNLOAD DEVELOPER TOOLS FOR

Windows Linux Mac

SDK version query and download API

**Windows**

Version Released	File
<b>1.4.335.0</b> 09-Dec-2025	<a href="#">SDK - SDK Installer</a> <b>vulkansdk-windows-x64-1.4.335.0.exe</b> (290MB) 15099ba1c1488177b094fe55c8070e8cb531c0859005ebbaa44a75cfa310c
	<a href="#">SDK Config - Config json</a> <b>config.json</b> (0MB) 00038b797ad1068f2b8a155747db4532b41a8767ad29bb1ed0a1dee6be4338d22
	<a href="#">Runtime - Runtime Installer</a> <b>VulkanRT-x64-1.4.335.0-Installer.exe</b> (24MB) c057b842cc18a2d171800005a923cd0d324892b531cd31e00118e8908bb7d79
	<a href="#">Runtime zip - Zip file of the runtime components.</a> <b>VulkanRT-x64-1.4.335.0-Components.zip</b> (18MB) 4863da2399fb1e16b4c792ca8709e497989e0d82b2c132bb47131cb4976a2
<b>1.4.328.1</b> 08-Oct-2025	<a href="#">SDK - SDK Installer</a> <b>vulkansdk-windows-x64-1.4.328.1.exe</b> (240MB) a8075c8bd538079c2a719a9373994948001db785b48f142ae02425a676348d10c

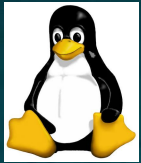
**Linux**


Version Released	File
<b>1.4.335.0</b> 09-Dec-2025	<a href="#">SDK - SDK Installer</a> <b>vulkansdk-linux-x86_64-1.4.335.0.tar.xz</b> (265MB) ccab8047f33e645e302b76d19087b35da3085ad20178473acc230fa3c5f2
	<a href="#">SDK Config - Config json</a> <b>config.json</b> (0MB) 00388b737ad1068f2b8a155747db4532b41a8767ad29bb1ed0a1dee6be4338d22
<b>1.4.328.1</b> 08-Oct-2025	<a href="#">SDK - SDK Installer</a> <b>vulkansdk-linux-x86_64-1.4.328.1.tar.xz</b> (312MB) 241e70b50c91c0d210ed07a7c0338ec05a3e5b0e4c6bba90ba01f02a823adbf
	<a href="#">SDK Config - Config json</a> <b>config.json</b> (0MB) 482049e9807aa337130b21d3cc82106d30b6c57e172e253ed55a338d202aa8
<b>1.4.321.1</b> 18-Jul-2025	<a href="#">SDK - SDK Installer</a> <b>vulkansdk-linux-x86_64-1.4.321.1.tar.xz</b> (291MB) f22a3825bd4d7a32e7a0a920a16d5277b149e938dca03cecc0053762dcbf73

**Mac**

Version Released	File
<b>1.4.335.1</b> 17-Dec-2025	<a href="#">SDK - SDK Installer</a> <b>vulkansdk-macos-1.4.335.1.zip</b> (316MB) 002407527149eb41041a700303902b054da10d23d48102a3e0f852e802aa104
	<a href="#">SDK Config - Config json</a> <b>config.json</b> (0MB) a4500bae405de30da5535baa3f13beda437d71c47011e0fa4ba0fcf5a5e5eb
<b>1.4.335.0</b> 09-Dec-2025	<a href="#">SDK - SDK Installer</a> <b>vulkansdk-macos-1.4.335.0.zip</b> (317MB) 082119079560141123b8403340f0ee322a872e55cac36810aa33499f55077
	<a href="#">SDK Config - Config json</a> <b>config.json</b> (0MB) 00038b797ad1068f2b8a155747db4532b41a8767ad29bb1ed0a1dee6be4338d22
<b>1.4.328.1</b> 08-Oct-2025	<a href="#">SDK - SDK Installer</a> <b>vulkansdk-macos-1.4.328.1.zip</b> (307MB) 571d8a0788738e402f0b14f29f17b339495d019f3a2af0ba23a3050475023f
	<a href="#">SDK Config - Config json</a>


# Vulkan SDK – Enhancements since Vulkanised 2025



	Vulkan Loader	Vulkan Configurator	Validation Layer	
SPiR-V Optimizer	SPiR-V Tools	Crash Diagnostic Layer	vulkaninfo	Extension Layers
shaderc	SPiR-V Validator	Profiles Toolset	GPUInfo	VOLK
DXC	SPiR-V Reflect	glslang	SLANG	SPiR-V Cross
vkVIA	apidump	Vulkan-HPP	Screenshot	VMA
MoltenVK	SPiR-V Visualizer	SDL & GLM	Monitor	GFX Reconstruct
	X64/ARM Cross Compile	Ubuntu Packages		

# Validation Layer – Improved Errors


SDK 1.4.309.0, March 2025

	Vulkan Loader	Vulkan Configurator	Validation Layer	
SPIR-V Optimizer	SPIR-V Tools	Crash Diagnostic Layer	vulkaninfo	Extension Layers
shaderc	SPIR-V Validator	Profiles Toolset	GPUInfo	VOLK
DXC	SPIR-V Reflect	glslang	SLANG	SPIR-V Cross
vkVIA	apidump	Vulkan-HPP	Screenshot	VMA
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 KosmicKrisp	X64/ARM Cross Compile	Ubuntu Packages		

- The clunky list of Objects at the top of the message is now more dense and easier to read.
- The format of all errors will be:
  - First line: VUID, object list, other metadata
  - Second line: "real message"
  - Third line: spec text and URL
- Output option: JSON format
  - VkDebugUtilsMessengerCallbackDataEXT::pMessage callback is a JSON string
  - Enables parsing.
  - Schema for stability
- Warnings are now on by default.
  - Helps more people to have things such as Undefined Values turned on.


# Validation Layer – Legacy Detection

SDK 1.4.335.1, December 2025

	Vulkan Loader	Vulkan Configurator	Validation Layer	
SPIR-V Optimizer	SPIR-V Tools	Crash Diagnostic Layer	vulkaninfo	Extension Layers
shaderc	SPIR-V Validator	Profiles Toolset	GPUInfo	VOLK
DXC	SPIR-V Reflect	glslang	SLANG	SPIR-V Cross
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- Report warnings when using superseded functionality of the API in Vulkan.
- Not to be removed from the API
  - Newer/better methods exist
- See SDK documentation
  - How to enable
  - Link to current list of Legacy features


# Validation Layer – GPU-AV Validation

	Vulkan Loader	Vulkan Configurator	Validation Layer	
SPIR-V Optimizer	SPIR-V Tools	Crash Diagnostic Layer	vulkaninfo	Extension Layers
shaderc	SPIR-V Validator	Profiles Toolset	GPUInfo	VOLK
DXC	SPIR-V Reflect	glslang	SLANG	SPIR-V Cross
vkVIA	apidump	Vulkan-HPP	Screenshot	VMA
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- Continued progress on filling out GPU-AV validation
  - Example:  
VK\_KHR\_cooperative\_matrix, accelerated matrix multiplication; heavy use in AI and ML
- Current focus on mesh shading and ray tracing

# Validation Layer – VK\_EXT\_descriptor\_heap


SDK 1.4.341.0, February 2026

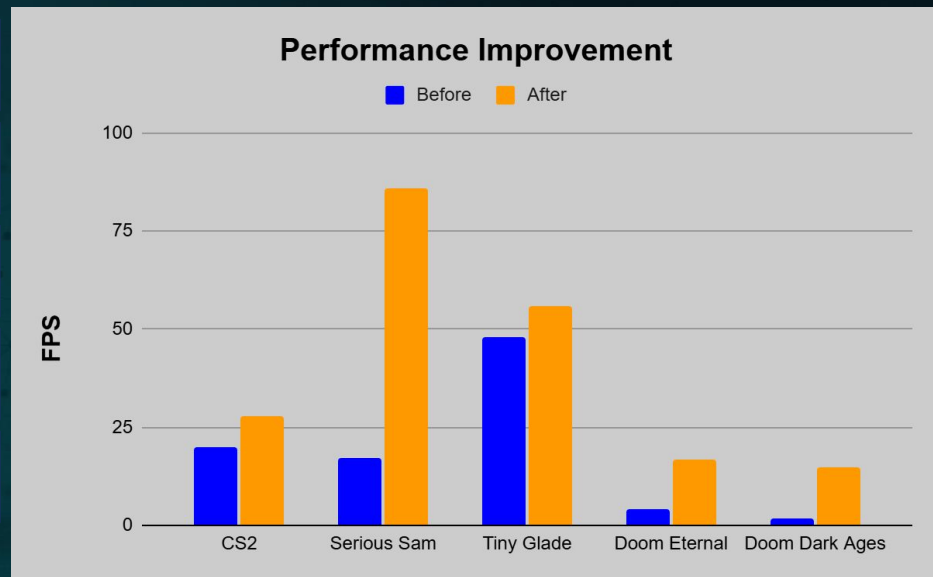
	Vulkan Loader	Vulkan Configurator	Validation Layer	
SPIR-V Optimizer	SPIR-V Tools	Crash Diagnostic Layer	vulkaninfo	Extension Layers
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- CPU based validation included
- 16K lines of code!
  - 12K for tests
  - 4K for validation checks
- GPU based validation coming in next SDK

# Validation Layer – Sync Val Perf Improvements



SDK 1.4.341.0, February 2026

	Vulkan Loader	Vulkan Configurator	Validation Layer	
SPIR-V Optimizer	SPIR-V Tools	Crash Diagnostic Layer	vulkaninfo	Extension Layers
shaderc	SPIR-V Validator	Profiles Toolset	GPUInfo	VOLK
DXC	SPIR-V Reflect	glslang	SLANG	SPIR-V Cross
vkVIA	apidump	Vulkan-HPP	Screenshot	VMA
MoltenVK	SPIR-V Visualizer	SDL & GLM	Monitor	GFX Reconstruct
	X64/ARM Cross Compile	Ubuntu Packages		



# Vulkan Configurator (vkconfig3)

SDK 1.4.304.1, February 2025

	Vulkan Loader	Vulkan Configurator	Validation Layer	
SPIR-V Optimizer	SPIR-V Tools	Crash Diagnostic Layer	vulkaninfo	Extension Layers
shaderc	SPIR-V Validator	Profiles Toolset	GPUInfo	VOLK
DXC	SPIR-V Reflect	glslang	SLANG	SPIR-V Cross
	apidump	Vulkan-HPP	Screenshot	VMA
MoltenVK	SPIR-V Visualizer	SDL & GLM	Monitor	GFX Reconstruct
	X64/ARM Cross Compile	Ubuntu Packages		

- Tab based GUI for ease of use.  
Tabs for
  - Vulkan Layers configuration
  - Vulkan Layers Paths
  - Vulkan Drivers
  - Vulkan Application Launching
  - Vulkan Diagnostics
  - Vulkan Documentation

# Vulkan Configurator – Diagnostics Tab

## SDK 1.4.3130, May 2025

Vulkan Configurator 3.4.1-20251208

Vulkan Layers Vulkan Layers Paths Vulkan Drivers Application Launcher **Diagnostics** Documentation Preferences About

Diagnostic Logs

Vulkan Development Status - [Refresh] [Home]

Vulkan Configurator 3.4.1 - 20251208:

- Vulkan API version: 1.4.335
- Build: Windows x86-64 Release
- Qt version: 6.9.2 Static-Release
- \${SDK\_VERSION}: 1.4.335.0
- \${VULKAN\_SDK}: C:\VulkanSDK\1.4.335.0

System Information:

- Windows 11 Version 25H2
- CPU architecture: x86\_64
- Logical CPU core count: 12

Vulkan Configurator Settings:

- Vulkan Layers configuration scope: Any Running Vulkan Executable
  - \* Loader settings: C:\Users\karen\AppData\Local\LunarG\vulkan\vk\_loader\_settings.json
  - \* Layers settings: C:\Users\karen\AppData\Local\LunarG\vkconfig\override\vk\_layer\_settings.txt
- Active Vulkan Loader Configuration: 'Validation'
- Use system tray: false
- Use layer developer mode: false
- \${VULKAN\_BIN}: C:\VulkanSDK\1.4.335.0\Bin
- \${VULKAN\_PROFILES}: C:\VulkanSDK\1.4.335.0\Config\VK\_LAYER\_KHRONOS\_profiles
- \${VULKAN\_HOME}: C:\Users\karen\VulkanSDK
- \${VULKAN\_DOWNLOAD}: C:\Users\karen\VulkanSDK\Releases

'Validation' Layers Configuration:

- Vulkan Layers Selection and Execution Order:
  - \* Vulkan Layers Located by the Vulkan Application: auto
  - \* VK\_LAYER\_LUNARG\_api\_dump - 1.4.335 (Explicit layer): auto
    - Layer manifest path: C:\VulkanSDK\1.4.335.0\Bin\VkLayer\_api\_dump.json
    - Layer settings export: enabled
  - \* VK\_LAYER\_LUNARG\_crash\_diagnostic - 1.4.335 (Explicit layer): auto
    - Layer manifest path: C:\VulkanSDK\1.4.335.0\Bin\VkLayer\_crash\_diagnostic.json
    - Layer settings export: enabled
  - \* VK\_LAYER\_LUNARG\_gfxreconstruct - 1.4.335 (Explicit layer): auto
    - Layer manifest path: C:\VulkanSDK\1.4.335.0\Bin\VkLayer\_gfxreconstruct.json
    - Layer settings export: enabled
  - \* VK\_LAYER\_LUNARG\_monitor - 1.4.335 (Explicit layer): auto
    - Layer manifest path: C:\VulkanSDK\1.4.335.0\Bin\VkLayer\_monitor.json
    - Layer settings export: enabled
  - \* VK\_LAYER\_LUNARG\_screenshot - 1.4.335 (Explicit layer): auto
    - Layer manifest path: C:\VulkanSDK\1.4.335.0\Bin\VkLayer\_screenshot.json
    - Layer settings export: enabled
  - \* VK\_LAYER\_KHRONOS\_validation - 1.4.335 (Explicit layer): on
    - Layer manifest path: C:\VulkanSDK\1.4.335.0\Bin\VkLayer\_khronos\_validation.json
    - Layer settings export: enabled
  - \* VK\_LAYER\_KHRONOS\_profiles - 1.4.335 (Explicit layer): auto
    - Layer manifest path: C:\VulkanSDK\1.4.335.0\Bin\VkLayer\_khronos\_profiles.json
    - Layer settings export: enabled
  - \* VK\_LAYER\_KHRONOS\_shader\_object - 1.4.335 (Explicit layer): auto
    - Layer manifest path: C:\VulkanSDK\1.4.335.0\Bin\VkLayer\_khronos\_shader\_object.json
    - Layer settings export: enabled

Enable Vulkan Loader Log to all Vulkan applications

Errors  Warnings  Information  Debug Additional Areas:  Layers  Drivers

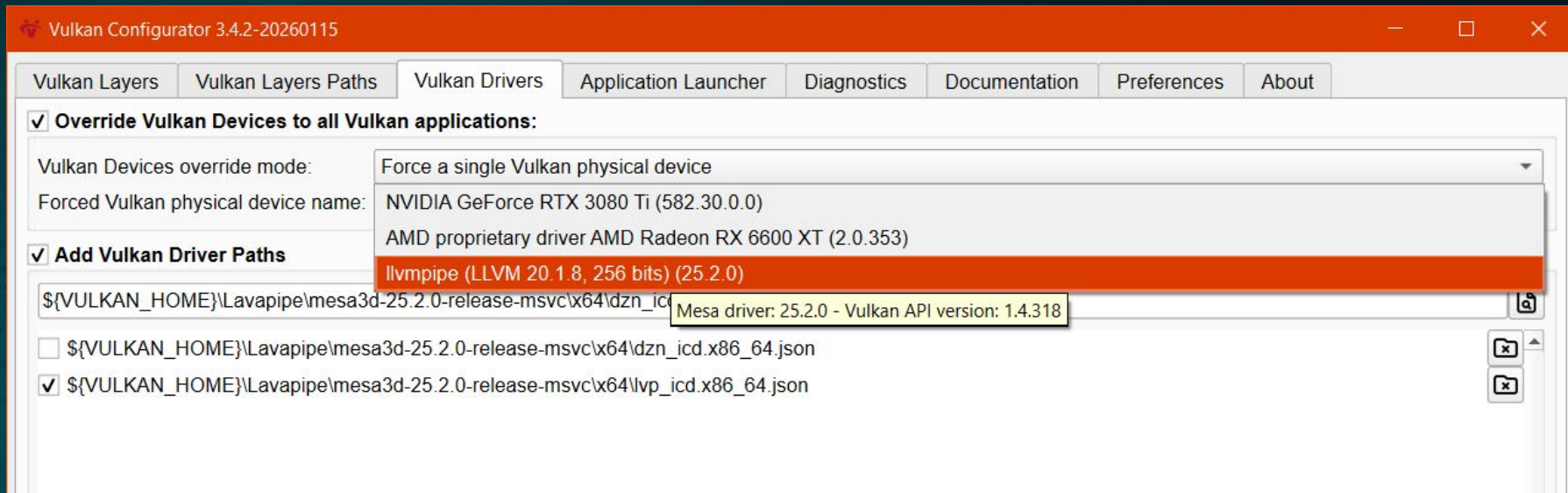
Vulkan SDK directories

Open: [Folder Icon] [Home Icon] [Refresh Icon]

- Removal of vkVIA
- All diagnostic information on Diagnostics tab

# Vulkan Configurator – Vulkan Driver Selection

## SDK 1.4.335.0, December 2025

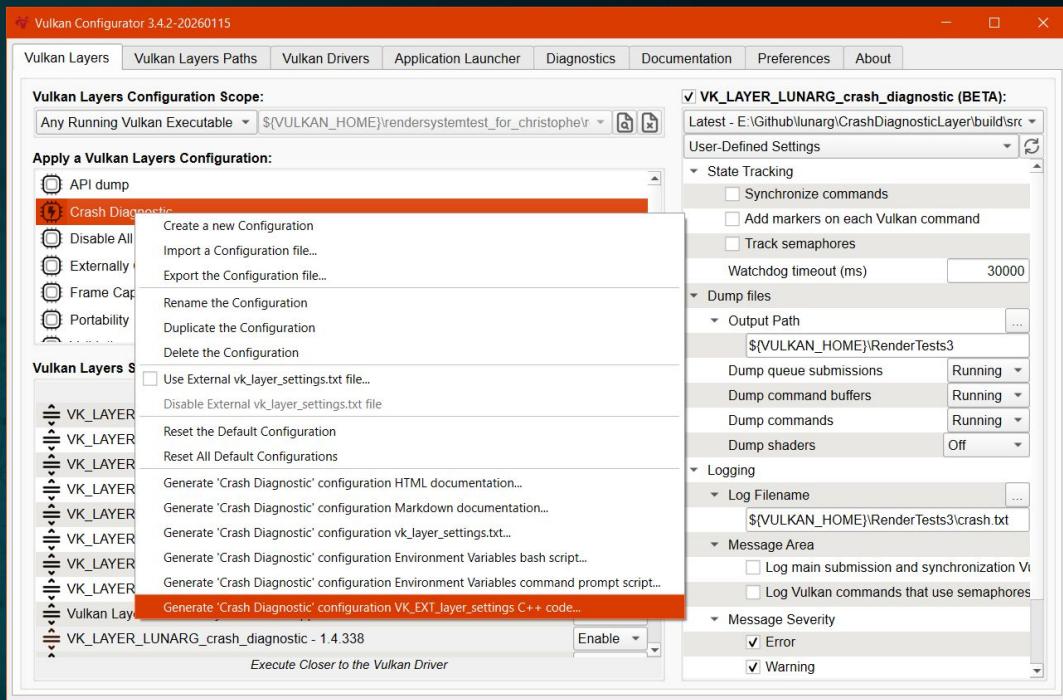


- Add additional Vulkan drivers (e.g. lavapipeline)
- Force selection of a Vulkan physical device
- Order the list of Vulkan physical devices

# Vulkan Configurator-Generate Layer Settings Files


## SDK 1.4.341.0 December 2025

- vk\_layer\_settings.txt
- Environment variables scripts
- VK\_EXT\_layer\_settings C++ helper library



# X64/ARM Cross Compiling


SDK 1.4.313.0 May 2025

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- To enable Windows X64 and Windows ARM application development on each platform
  - Include Windows ARM libraries with Windows X64 SDK
  - Include Windows X64 libraries with Windows ARM SDK

# Canonicalize-ids

SDK 1.4.321.0 July 2025


	Vulkan Loader	Vulkan Configurator	Validation Layer	
<b>SPIR-V Optimizer</b>	SPIR-V Tools	Crash Diagnostic Layer	vulkaninfo	Extension Layers
shaderc	SPIR-V Validator	Profiles Toolset	GPUInfo	VOLK
DXC	SPIR-V Reflect	<b>glslang</b>	SLANG	SPIR-V Cross
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- glslang spirv-remap utility moved to the SPIRV-Tools repository

- Optimization pass called canonicalize-ids.
- This is where it should have been originally
  - When this optimization pass was created, spirv-opt didn't yet exist

# SDL3


SDK 1.4.328.0, October 2025

	Vulkan Loader	Vulkan Configurator	Validation Layer	
SPIR-V Optimizer	SPIR-V Tools	Crash Diagnostic Layer	vulkaninfo	Extension Layers
shaderc	SPIR-V Validator	Profiles Toolset	GPUInfo	VOLK
DXC	SPIR-V Reflect	glslang	SLANG	SPIR-V Cross
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- SDL3 now included


# No More Ubuntu Packages

SDK 1.4.321.0 July 2025

	Vulkan Loader	Vulkan Configurator	Validation Layer	
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- Due to resource challenges and limited usage of the packages
- Packages older than two years removed with each SDK release

# GFXReconstruct


	Vulkan Loader	Vulkan Configurator	Validation Layer	
SPIR-V Optimizer	SPIR-V Tools	Crash Diagnostic Layer	vulkaninfo	Extension Layers
shaderc	SPIR-V Validator	Profiles Toolset	GPUInfo	VOLK
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vkVIA	apidump	Vulkan-HPP	Screenshot	VMA
MoltenVK	SPIR-V Visualizer	SDL & GLM	Monitor	GFX Reconstruct
 KosmicKrisp	X64/ARM Cross Compile	Ubuntu Packages		

- Focus on Android quality for capture and replay
  - Android HW Buffer
  - Window orientations
  - Pageguard improvements
- CI enhancements to remove regressions:
  - 60 Real World workloads for Android

# KosmicKrisp

## SDK 1.4.335.0 December 2025



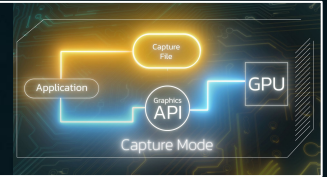
	Vulkan Loader	Vulkan Configurator	Validation Layer	
SPIR-V Optimizer	SPIR-V Tools	Crash Diagnostic Layer	vulkaninfo	Extension Layers
shaderc	SPIR-V Validator	Profiles Toolset	GPUInfo	VOLK
DXC	SPIR-V Reflect	glslang	SLANG	SPIR-V Cross
vkVIA	apidump	Vulkan-HPP	Screenshot	VMA
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- A Vulkan® on Metal® Mesa 3D Graphics driver
  - Leverage the Mesa Vulkan driver framework!
- Vulkan 1.3 conformant (1.4 coming)
  - Eliminates need for Vulkan® Portability™
- As of SDK 1.4.335.0, included in the macOS SDK
- WIP: MoltenVK functionality parity
  - Most apps are usable today (e.g. Blender)
- Performance tuning: next priority

- Richard's talk on Wednesday
  - "KosmicKrisp" – Conformant Vulkan for Apple Hardware"



Come to the LunarG Table!  
See KosmicKrisp & GFXReconstruct



Take the 2026 Vulkan  
Ecosystem Survey!



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**Shading Languages  
Symposium 2026**



