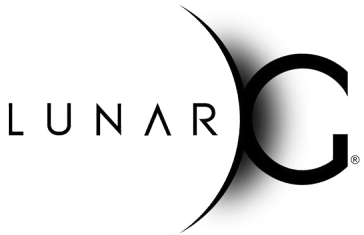


Vulkan SDK Update and Community Feedback

SIGGRAPH 2019

Who is LunarG?

- **3D Graphics Software Consulting Company**
  - Based in Colorado
  - Vulkan, OpenGL, OpenXR, SPIR-V, ...
- **Sponsored by Valve and Google to deliver critical pieces of the Vulkan Ecosystem**
  - Vulkan Loader & Validation Layers
  - Vulkan tools (GFX Reconstruct, apidump, Assistant Layer, …)
  - Vulkan SDK
  - Close collaboration with the Khronos Vulkan Working Group
- **Come learn more about Vulkan at the Khronos BoF day**
  - Wednesday, July 31st
  - J.W Marriott hotel LA Live, Diamond Ballroom 7-10
  - Vulkan sessions beginning at 2PM
  - Networking session with refreshments starts at 5:30PM
    - Visit the LunarG table to get a FREE GIFT!

Agenda

- **We really want this session to be interactive**
  - but will start with some presentation material for context

- **Presentation**
  - What is the Vulkan SDK
    - Intended users
    - Supported platforms
- **Demo**
  - Navigate vulkan.lunarg.com and SDK content
  - Using vkConfig to configure your validation layers
- **Q&A - we are here to answer your questions.**

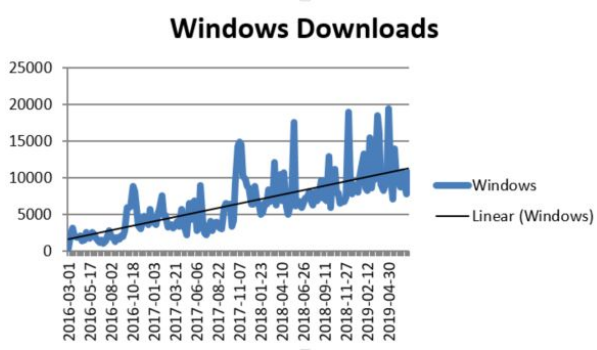
These slides are posted at:
https://www.lunarg.com/siggraph-2019-lunarg-presents-vulkan-ecosystem-topics/

Audience Poll

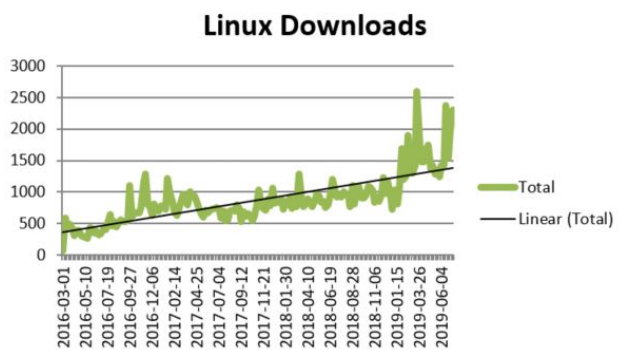
- Who has used the SDK?
- Who has specific questions or feedback for the SDK?

What is the Vulkan SDK?

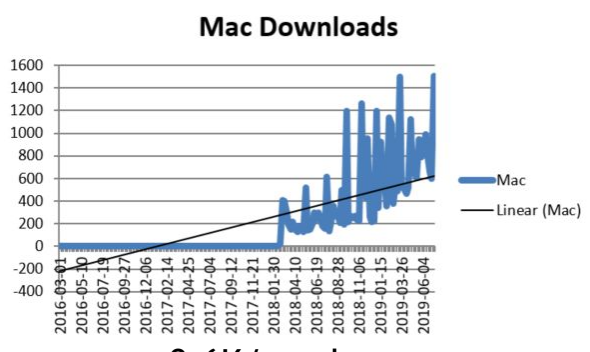
- If you are doing Vulkan application development, the Vulkan SDK is your friend!
- Key layers and tools to aid in the development of your Vulkan application
- Has been available since the initial public launch of Vulkan



~10K/week



~1.5K/week

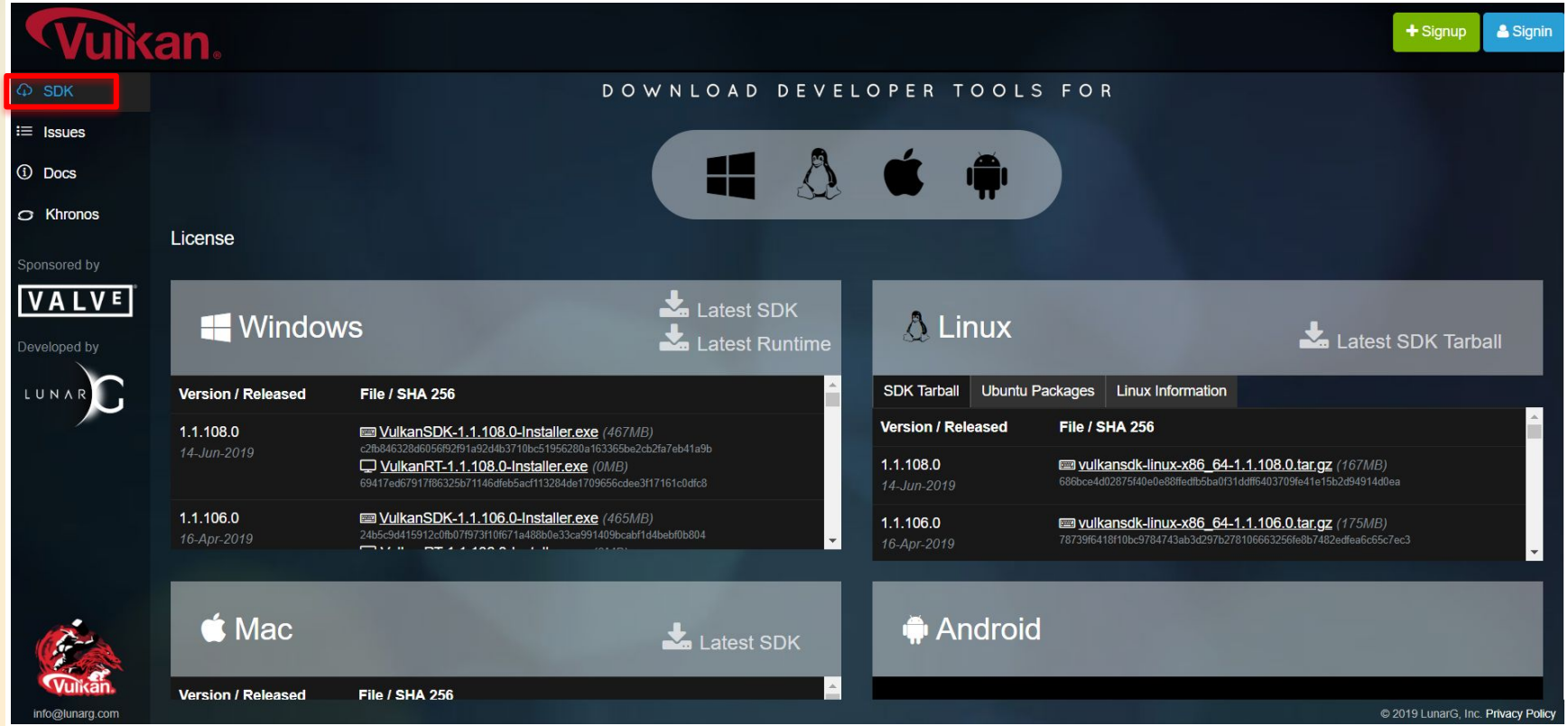


~0.6K/week

- LunarG recently donated the SDK packaging technologies to Khronos
  - Enables Vulkan WG collaboration

Where do I get the Vulkan SDK?

Download SDK at: vulkan.lunarg.com (Windows, Linux - Ubuntu packages, Linux- Tarball, macOS):



Who are intended users of the Vulkan SDK?

IS:

- **Desktop Vulkan Application developers**
- **Utility layer developers (use the VLF - Vulkan Layer Factory)**
- **Those learning Vulkan - there is a tutorial**

IS NOT:

- **End users just needing a Vulkan loader**
  - Windows: IHVs deliver the loader with their drivers
  - Most major Linux distros include a Vulkan Loader
  - But you can get the most recent loader from the SDK if you want
- **Developing and debugging the layers and tools included in the SDK**
  - Use github development process

SDK Usage Model

IS:

- Be able to configure & run layers and tools included in the SDK
- Ability to see symbols in the layers and tools (good for stack traces)

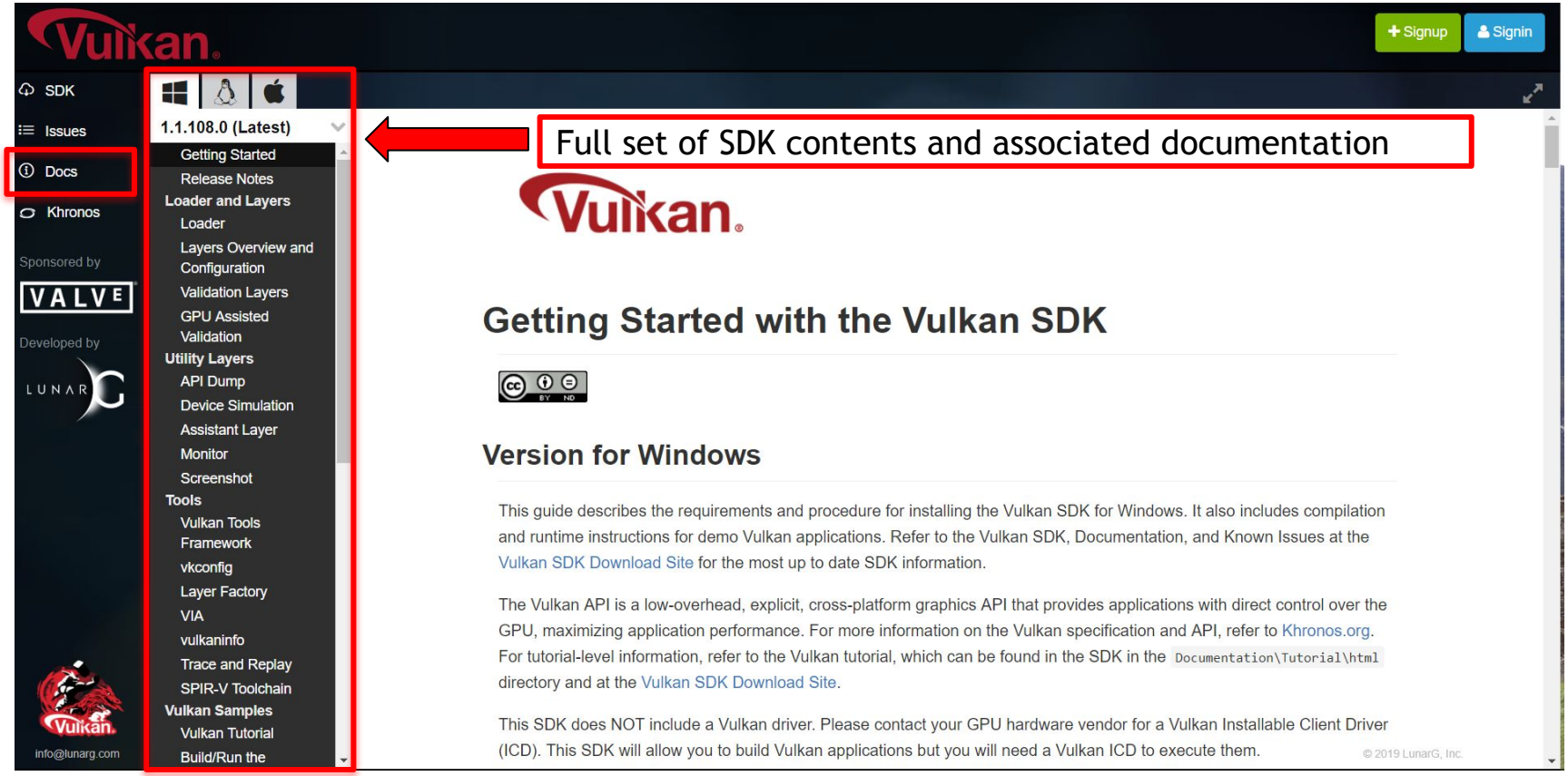
IS NOT:

- Ability to make modifications to layers/tools and upstream changes
- Ability to debug “into” the validation layers, loader, and SDK tools

SDK Releases

- About every 4-6 weeks
- Newer Vulkan header and specification
- Latest loader and validation layers
- Continued enhancements to additional developer tools

SDK contents/docs viewable at vulkan.lunarg.com



GFX Reconstruct (https://github.com/LunarG/gfxreconstruct)

- **MUCH improved capture/replay tool**
- **Currently in Beta mode**
- **Performance Benefits (relative to vktrace/vkreplay)**
  - Up to 2X FPS improvement during capture replay
  - Capture file size reduced up to 50%
- **vktrace/vkreplay will be deprecated in favor of GFX Reconstruct**
  - Fall 2019

GFX Reconstruct Benefits

- **Android is given same priority as desktop in features and support**
- **Automatic code generation to accommodate evolving API**
- **Reliable trimming**
- **Increased portability**
  - X86 vs. x64 differences
  - Cross OS portability (i.e. capture on windows, replay on linux).
  - *Cross vendor GPU support (capture on one GPU, replay on another)*
- **LZ4 compression for capture data**
- ***Future valuable plug-ins with minimal code changes***
  - Generate C code program
  - Data mining utilities (search for feature usage)
  - Extract/replace shaders

*****Items in Italics may not be ready until after vktrace/vkreplay deprecation*

What is the Vulkan Configurator? (vkconfig)

- **GUI tool, included in the Vulkan SDK**
- **“Dashboard” for developing Vulkan apps**
  - (for those who prefer UI)
- **VulkanInfo tab, Layer Manager tab, VIA tab**
- **Layer Manager**
  - Enable explicit layers (e.g. KHRONOS_validation, LUNARG_api_dump)
  - Disable implicit layers (e.g. Optimus)
  - Change layer order
  - Change layer settings

Vulkan Configurator demo

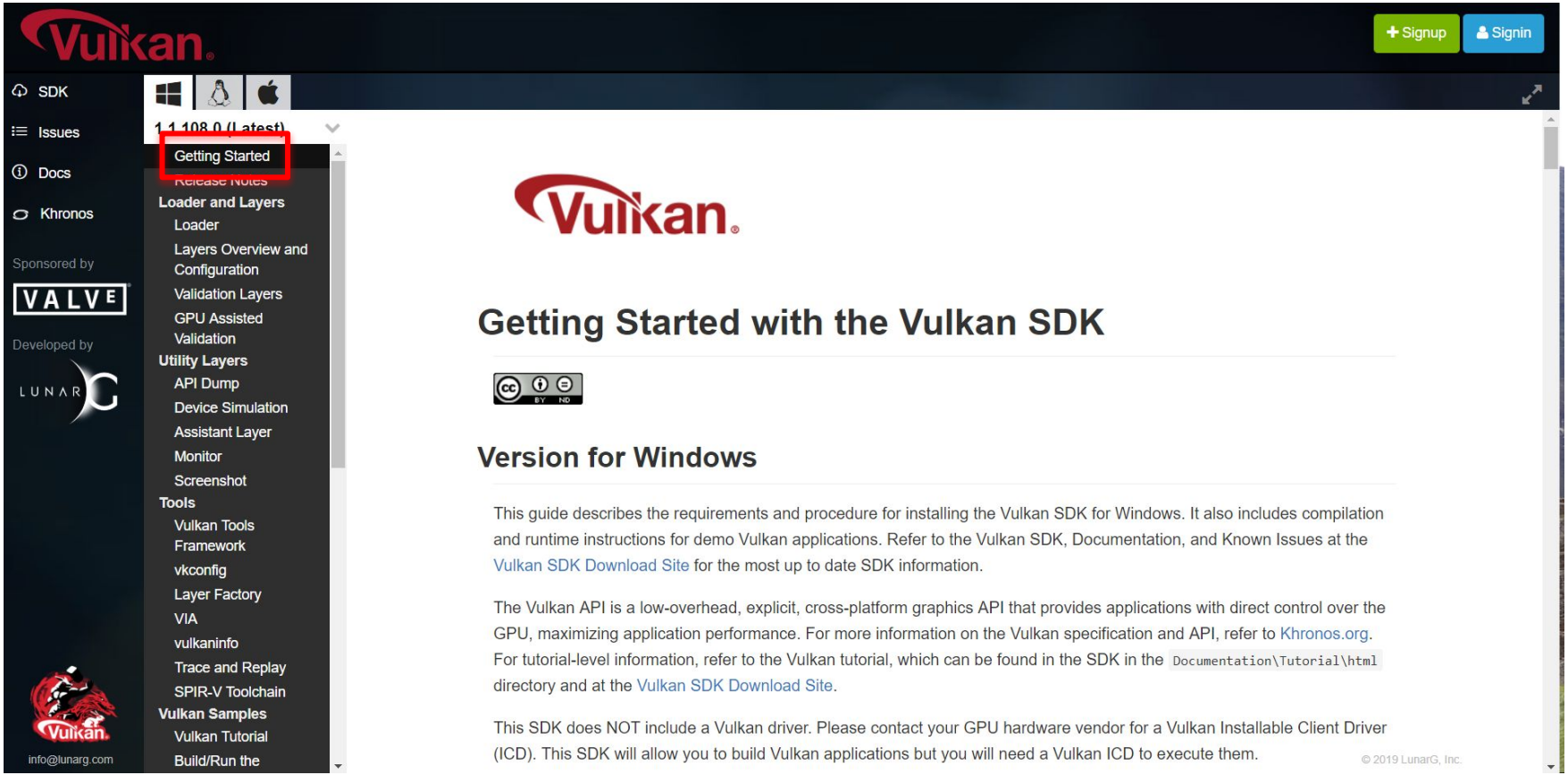
Vulkan Configurator

- Make more layers use layer_settings.txt
- UI improvements are under consideration
- More intelligence for typical development workflow
  - Presets for Vulkan API Validation
  - Presets for API dumping
  - Presets for Shader Validation
  - Etc
- Health tab (distilled version of VulkanInfo and VIA)
- Show validation error log directly in Vulkan Configurator with filtering
- Target only one executable (currently layer override is global)
- Selectable exceptions (a la Visual Studio)

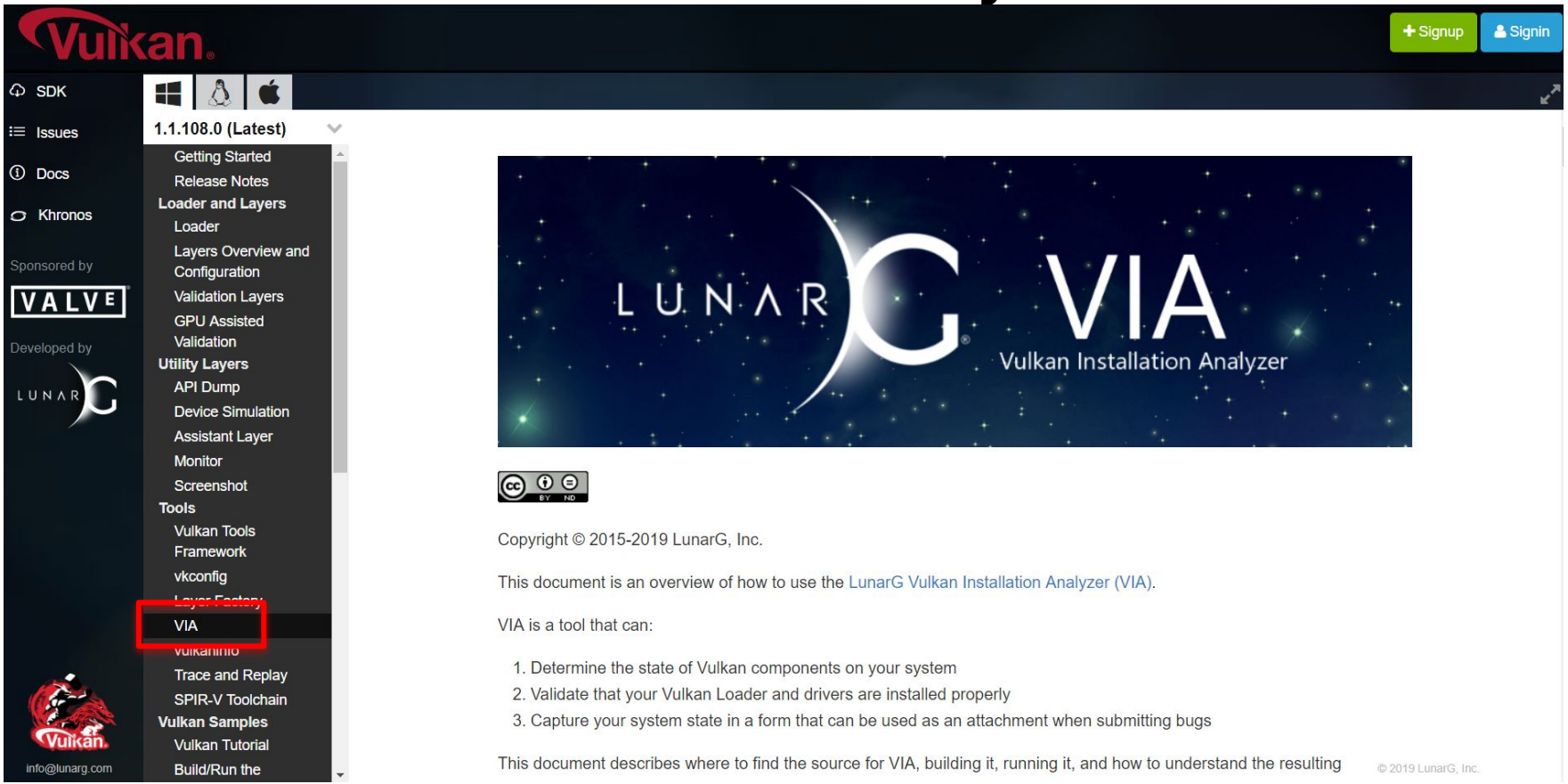
File bugs against github.com/LunarG/VulkanTools!

Backup

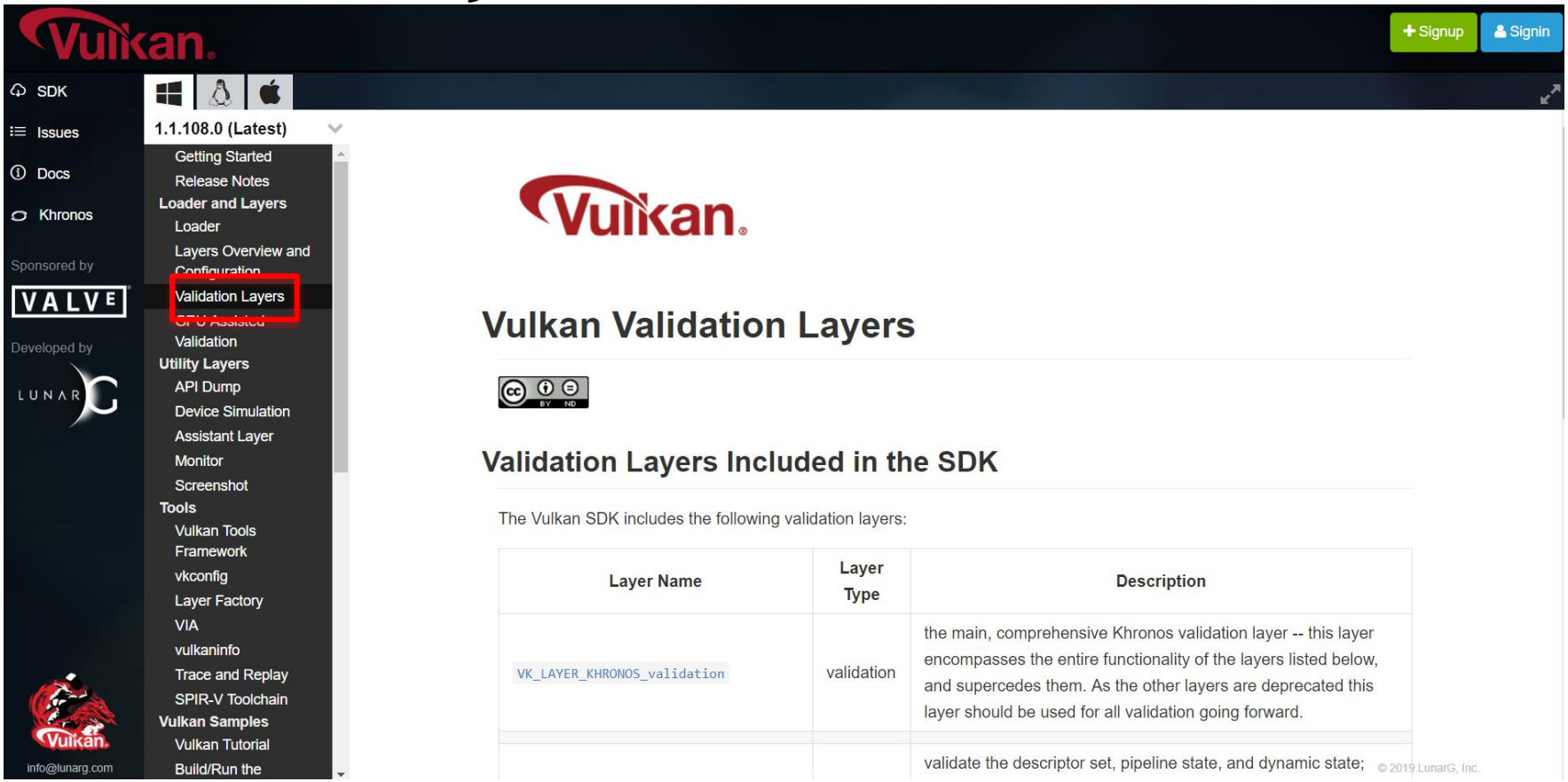
If your first time, be sure to start here



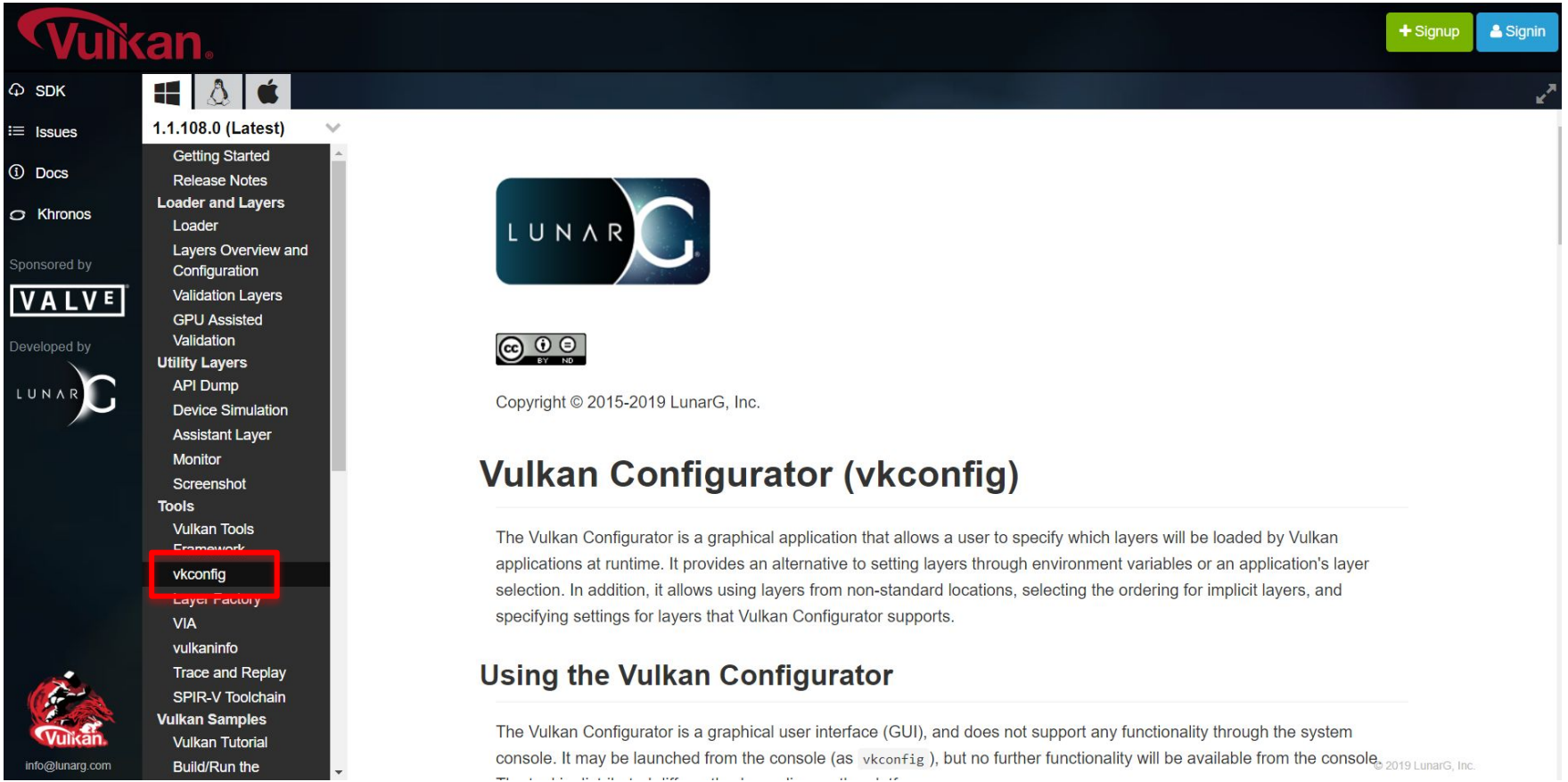
VIA - Vulkan Installation Analyzer



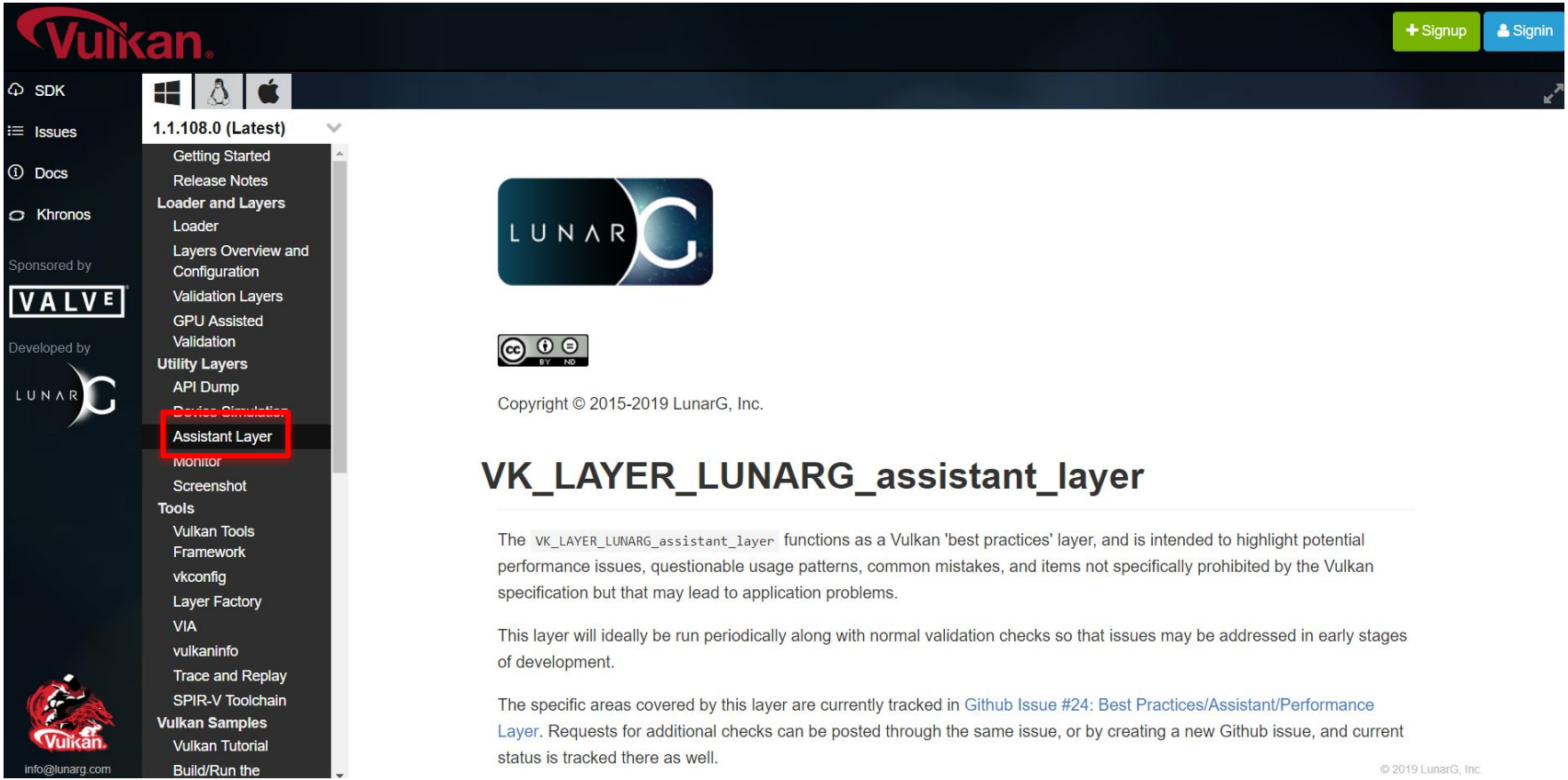
Validation Layers - Fundamental



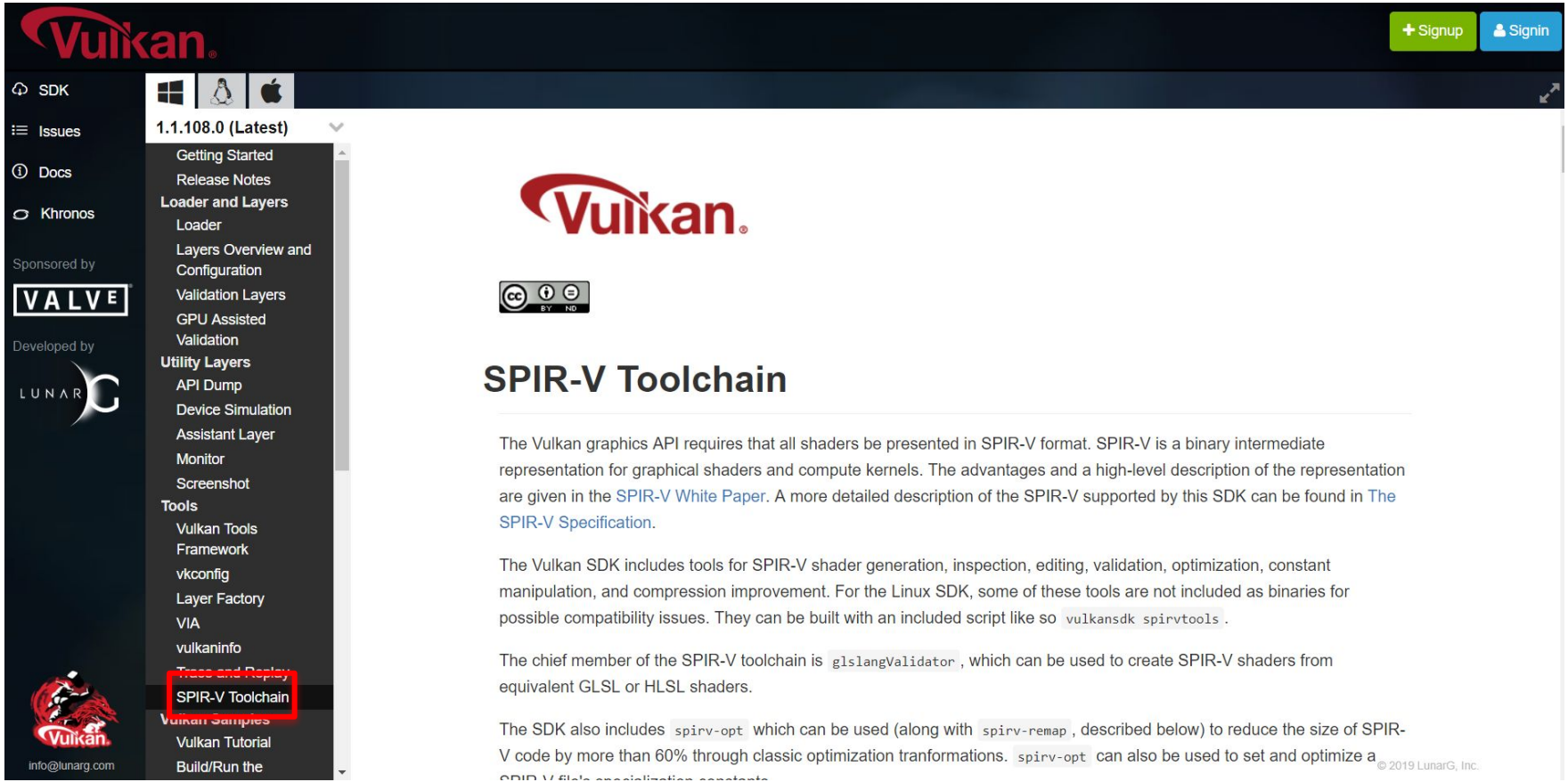
Vulkan Configurator (vkconfig)



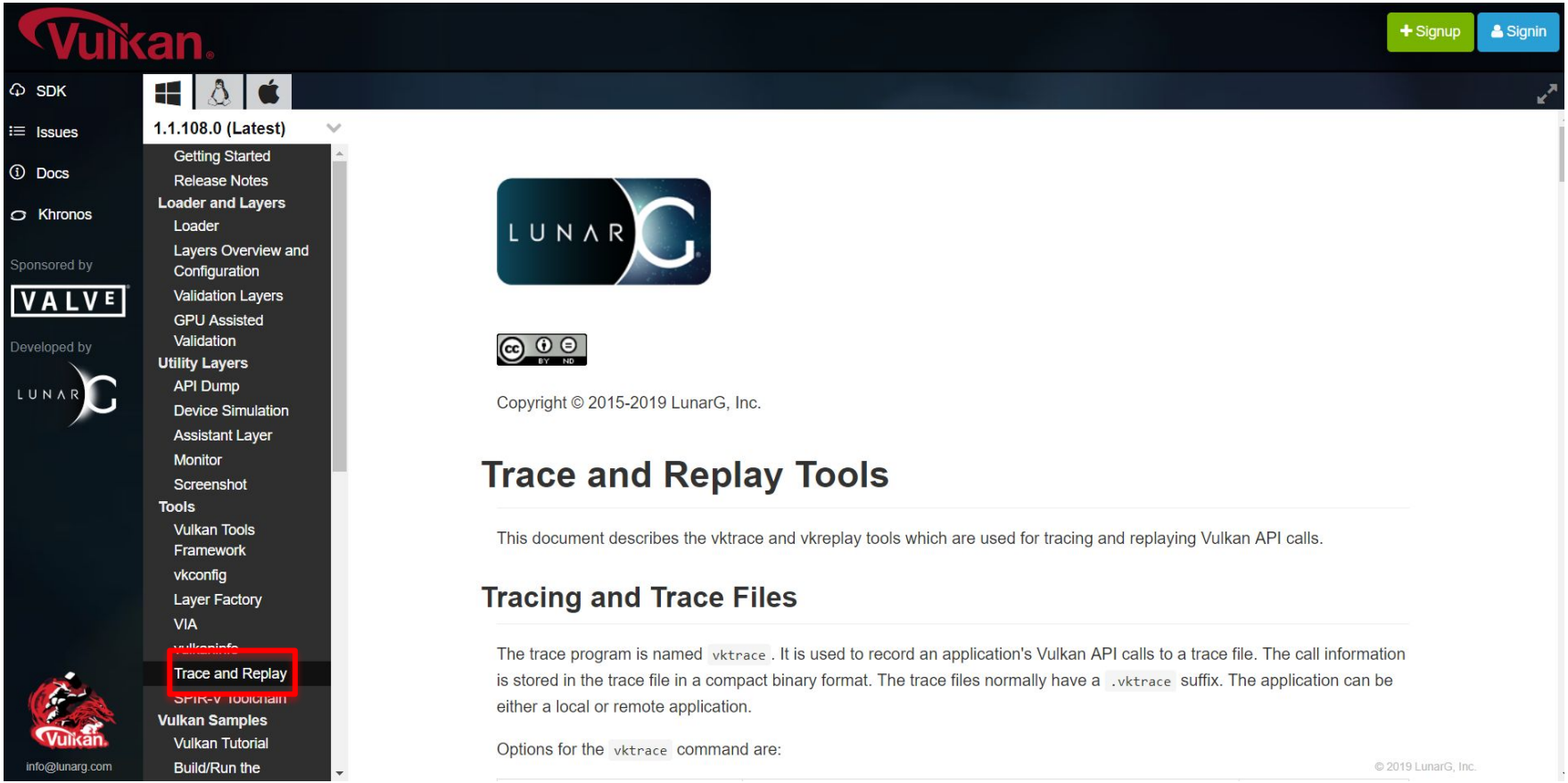
Assistant Layer



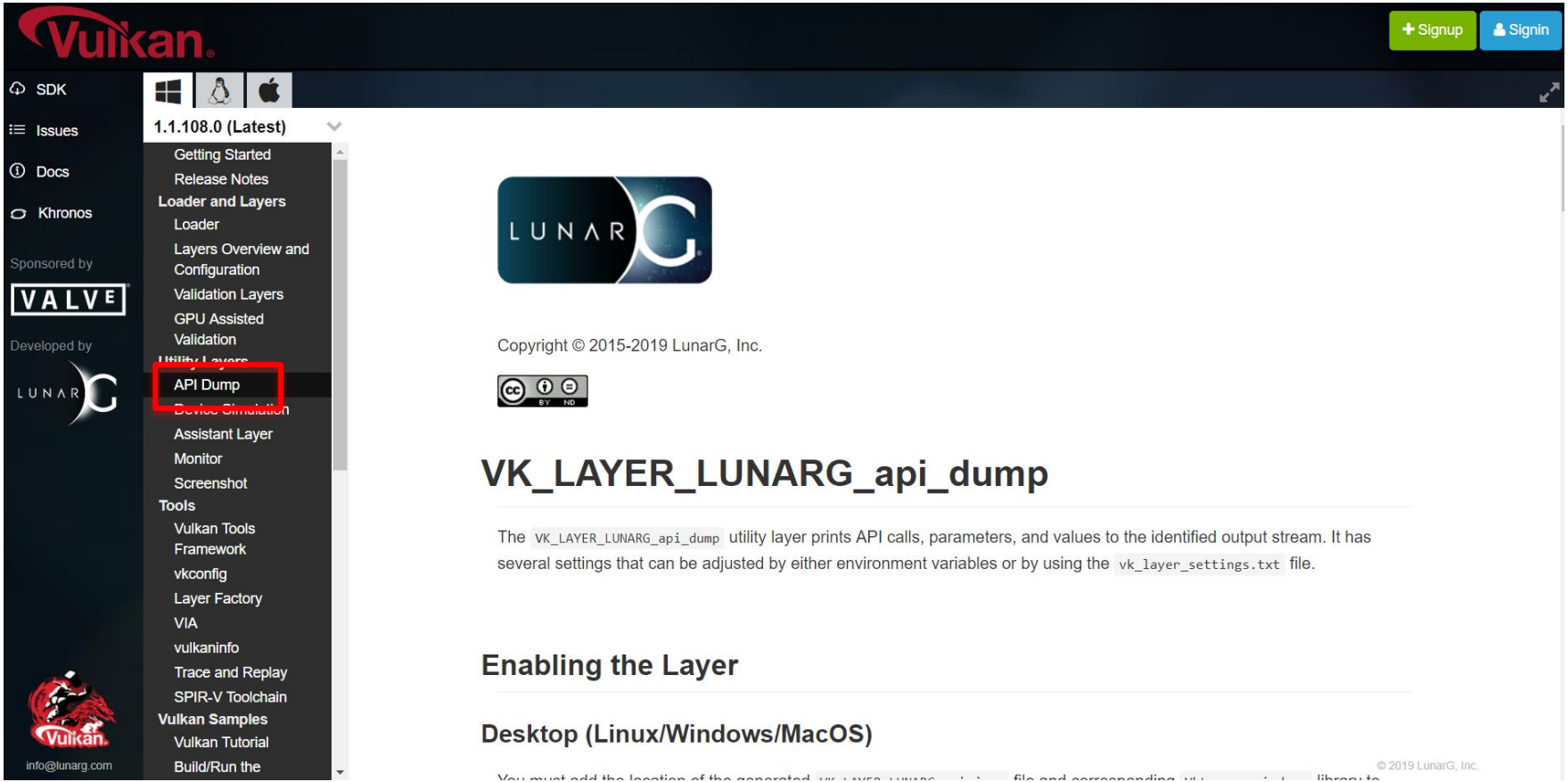
SPIR-V Tool Chain



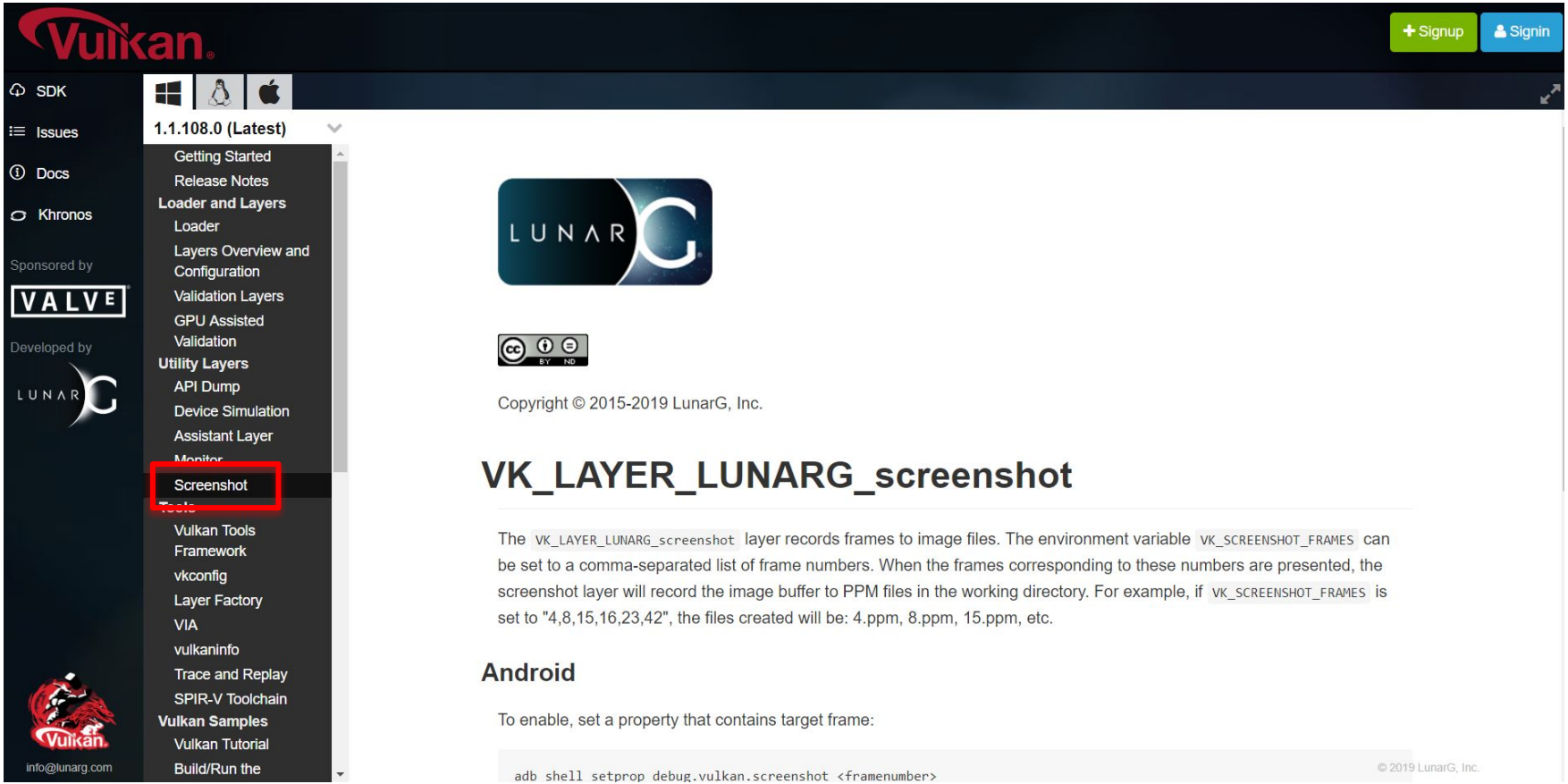
vktrace/vkreplay



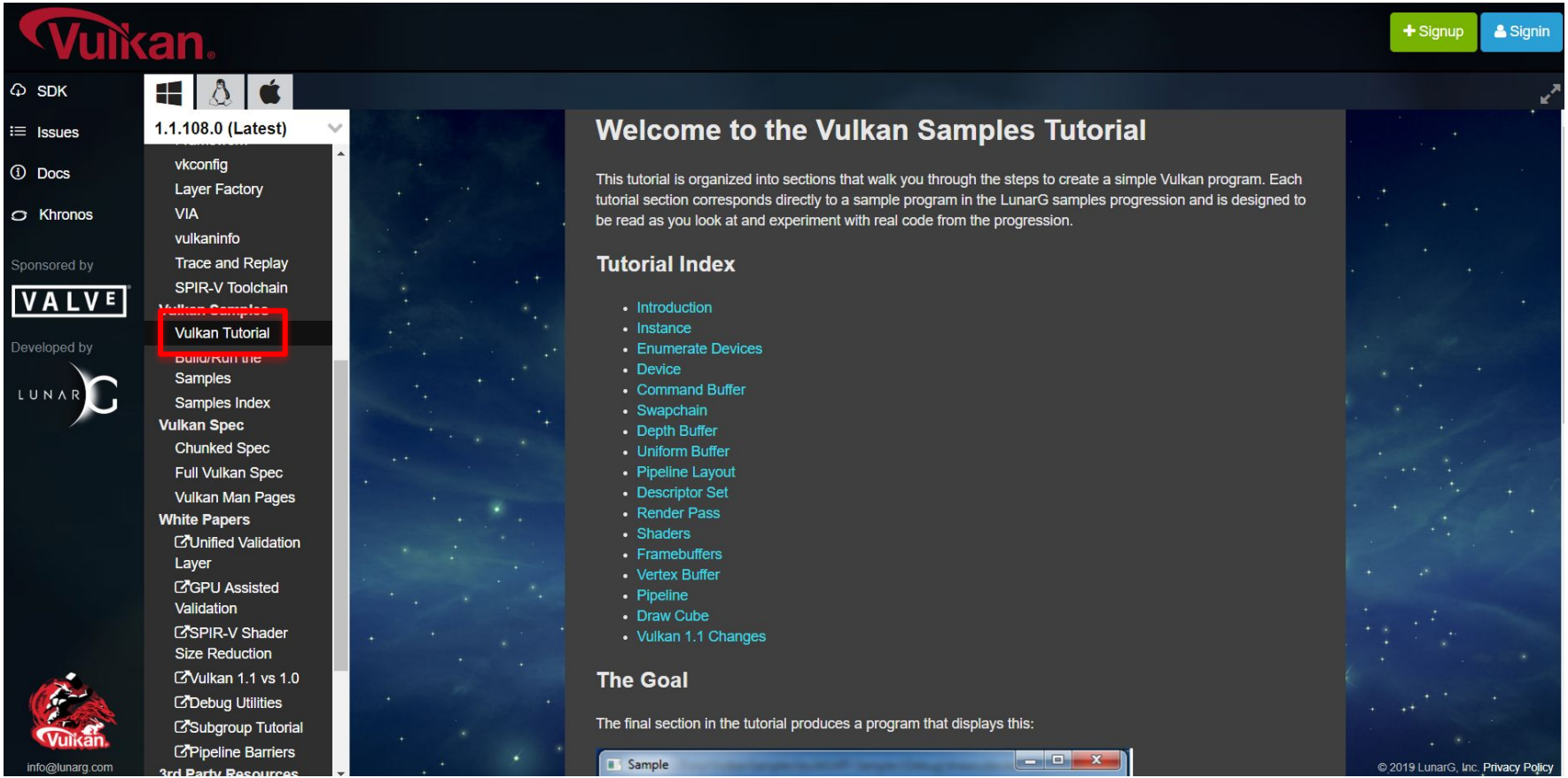
apidump



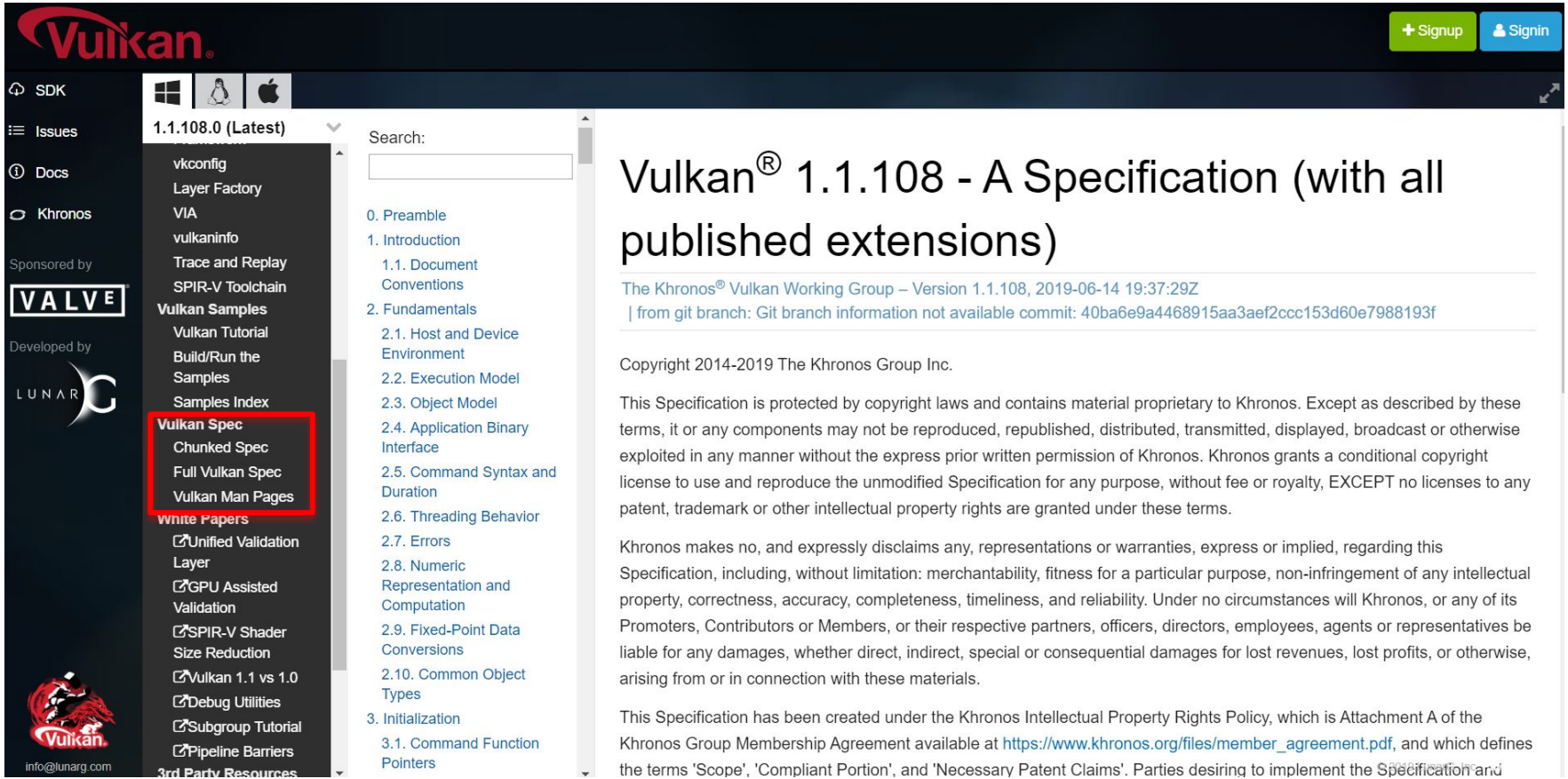
Screenshot Layer



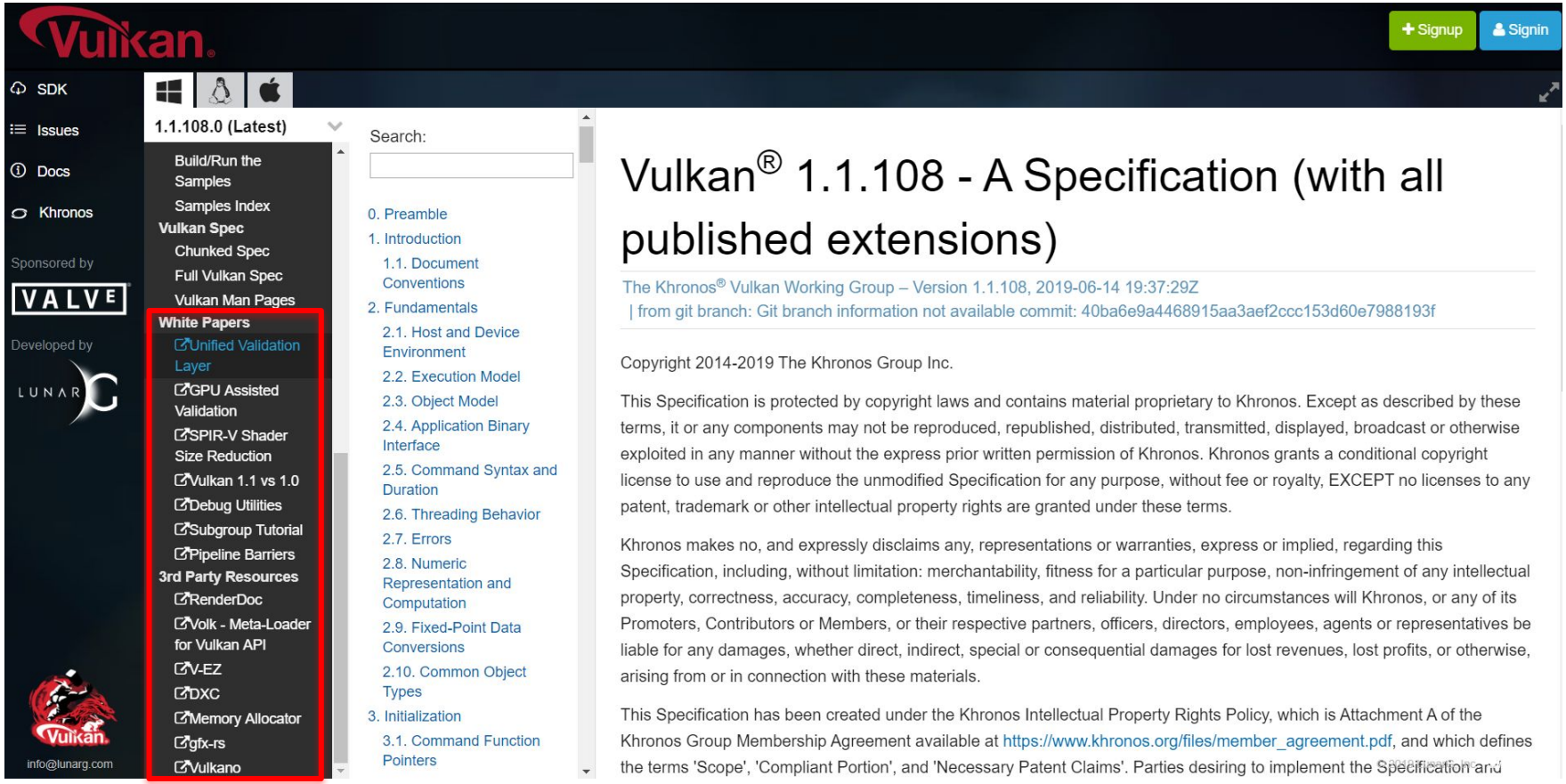
Vulkan Tutorial



Vulkan Specification



White Papers & Third Party Resources



What is Included in the Vulkan SDK?

Getting Started	First time user? Definitely start here...
VIA - Vulkan Installation Analyzer	Verifies your Vulkan installation
Vulkaninfo	For each GPU, identifies available extensions, properties, formats, etc. Also indicates available Vulkan Layers
Vulkan Loader	Application interfaces with the Loader which does the discovery of ICD's and available Vulkan Layers
Vulkan Validation Layers	Validate correct Vulkan API usage by your application
Vulkan Configurator (vkconfig)	GUI Configurator for Vulkan Layers
Assistant Layer	Identifies bad Vulkan API usage (that still may be conformant)
SPIR-V Tool Chain	Tools for SPIR-V shader generation, inspection, editing, validation, optimization, constant manipulation, and compression improvement.
api_dump	Dump the api calls and parameters used by your application in human readable form

What is Included in the Vulkan SDK?

vktrace/vkreplay **(to be replaced with GFX Reconstruct)**	Vulkan API trace and replay tool. Very useful for creating trace files for sharing issues, regression testing, and debugging with IHVs.
Screenshot Layer	Convert frames to image files by specifying a frame number, or list of frames
Vulkan Layer Factory	Want to create your own layer? Based on the canonical Vulkan layer model, the VLF facilitates the creation of Vulkan Layers. The layer factory hides the majority of the loader-layer interface, layer boilerplate, setup and initialization, and complexities of layer development.
Vulkan Tutorial	Our tutorial is very basic and will walk you through the steps to create a very simple Vulkan program
Vulkan Specification and Vulkan Headers	With each Vulkan SDK release, we include the appropriate version of the Vulkan Specification and headers.
White Papers and links to 3rd Party resources	We have collected some white papers and links to 3rd party resources that are useful