

Creating and Using Vulkan Profiles

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Presented at the Khronos Vulkanised 2023 Conference

<https://www.lunarg.com/news-insights/white-papers/creating-vulkan-profiles-feb2023/>

Audience questions...

Please, raise your hand if

- You shipped a Vulkan program (tool or application)?
- You have used some of the Vulkan SDK Profiles tools?

Agenda

- A brief presentation of the Vulkan Profiles
- A tutorial on how to create and use a Vulkan Profile
- Based on The Vulkan Profiles Toolset solution whitepaper
 - <https://www.lunarg.com/wp-content/uploads/2022/03/The-Vulkan-Profiles-Toolset-Solution-FEB2022.pdf>
- Slides available on LunarG website
 - <https://www.lunarg.com/news-insights/white-papers/vulkan-sdk-tools-to-use-and-create-vulkan-profiles/>

Vulkan Profiles

What's a Vulkan Profile?

- Released with Vulkan 1.3 and Vulkan Roadmap 2022 profile
- An explicit representation of Vulkan Capabilities
 - Extensions
 - Features
 - Properties
 - Queue properties
 - Formats
 - Etc...
- A solution to communicate about Vulkan capabilities requirement or support
- A solution to make it easier to create more portable Vulkan programs

Vulkan Profiles usages:

- Roadmap profiles:
 - To express guidance on the future direction of Vulkan devices or projects.
 - Eg: Vulkan Roadmap 2022 profile.
- Platform profiles:
 - To express the minimum level of Vulkan capabilities support of a platform.
 - Eg: [Android Baseline 2021 and 2022](#), LunarG Desktop Baseline 2022 profile.
- Device profiles:
 - To express the Vulkan support of a single Vulkan driver for a Vulkan device.
 - Eg: [GPUinfo.org reports](#) and vulkaninfo.
- Engine profiles:
 - To express some rendering code paths requirements of an engine.
 - Eg: Zink OpenGL 4.6 Optimal profile, DXVK D3D11 Level 11.1 Baseline profile
- Etc.

Creating and using a Vulkan Profile

A scenario for this tutorial:

- Our Vulkan application currently requires LunarG Desktop Baseline 2022 profile, a Vulkan 1.1-based profile
- MoltenVK was upgraded to Vulkan 1.2
- We want to upgrade our application to Vulkan 1.2 as a minimum requirement to simplify our code and support
- We want to create a new profile called “LunarG Desktop Baseline 2023” which requires Vulkan 1.2

Listing all devices

All platforms

Windows

Linux

Android

macOS

iOS

Type to filter	1.2	Type to filter					
Device	Max. API version	Latest Driver version	Last submission	Count	Compare		
AMD RADV OVERRIDDEN	1.2.182	21.2.6	2023-01-30 16:09:20	1	Add		
Intel(R) HD Graphics P4600/P4700 (HSW GT2)	1.2.230	22.3.3	2023-01-30 03:39:50	1	Add		
Quadro K2100M	1.2.175	470.161.3.0	2023-01-29 22:07:23	4	Add		
NVIDIA GeForce GTX 660	1.2.175	474.14.0.0	2023-01-29 12:14:08	9	Add		
GeForce MX150	1.2.155	461.72.0.0	2023-01-29 11:32:21	38	Add		
Apple M1 Pro	1.2.236	0.2.2009	2023-01-28 23:51:49	13	Add		
NVIDIA GeForce GTX 670	1.2.175	474.4.0.0	2023-01-28 21:48:52	4	Add		
samsung SM-A127F	1.1.213	38.1.0	2023-01-28 18:56:21	2	Add		
GeForce 920M	1.2.133	450.80.2.0	2023-01-28 18:46:06	12	Add		
Apple M1	1.2.236	0.2.2009	2023-01-28 11:25:33	44	Add		
Intel(R) Iris(TM) Graphics 6000	1.2.236	0.2.2009	2023-01-28 04:42:19	3	Add		
Samsung SM-G980F	1.1.213	38.1.0	2023-01-28 01:46:06	3	Add		
rockchip orangepi5	1.1.200	12.0.0	2023-01-27 17:40:13	1	Add		



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Quadro K2100M	1.2.175	470.161.3.0	2023-01-29 22:07:23	4	Add		
NVIDIA GeForce GTX 660	1.2.175	474.14.0.0	2023-01-29 12:14:08	9	Add		
GeForce MX150	1.2.155	461.72.0.0	2023-01-29 11:32:21	38	Add		
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NVIDIA GeForce GTX 670	1.2.175	474.4.0.0	2023-01-28 21:48:52	4	Add		
samsung SM-A127F	1.1.213	38.1.0	2023-01-28 18:56:21	2	Add		
GeForce 920M	1.2.133	450.80.2.0	2023-01-28 18:46:06	12	Add		
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rockchip orangepi5	1.1.200	12.0.0	2023-01-27 17:40:13	1	Add		



Device report for Apple M1 on MacOS

[Device](#) [Properties](#) [Features](#) [Extensions 69](#) [Formats 130](#) [Queue families 1](#) [Memory 4](#) [Surface](#) [Instance](#) [Profiles](#)Search:

Property

Value

Device

Name

Apple M1

Driver version

0.2.2009

Type

INTEGRATED_GPU

API Version

1.2.236

Vendor

Apple

Platform

Name

Osx

Architecture

x86_64

Version

12.6

Report

Submitted by

Marvin

Submitted at

2022-12-25 13:41:40

Reportversion

3.2



Property	Value
Device	
Name	Apple M1
Driver version	0.2.2009
Type	INTEGRATED_GPU
API Version	1.2.236
Vendor	Apple
Platform	
Name	Osx
Architecture	x86_64
Version	12.6
Report	
Submitted by	Marvin
Submitted at	2022-12-25 13:41:40
Reportversion	3.2
Description	MBP M1 2021
Profile JSON [?] Full JSON profile	



Listing listing all reports on Windows

All platforms

Windows

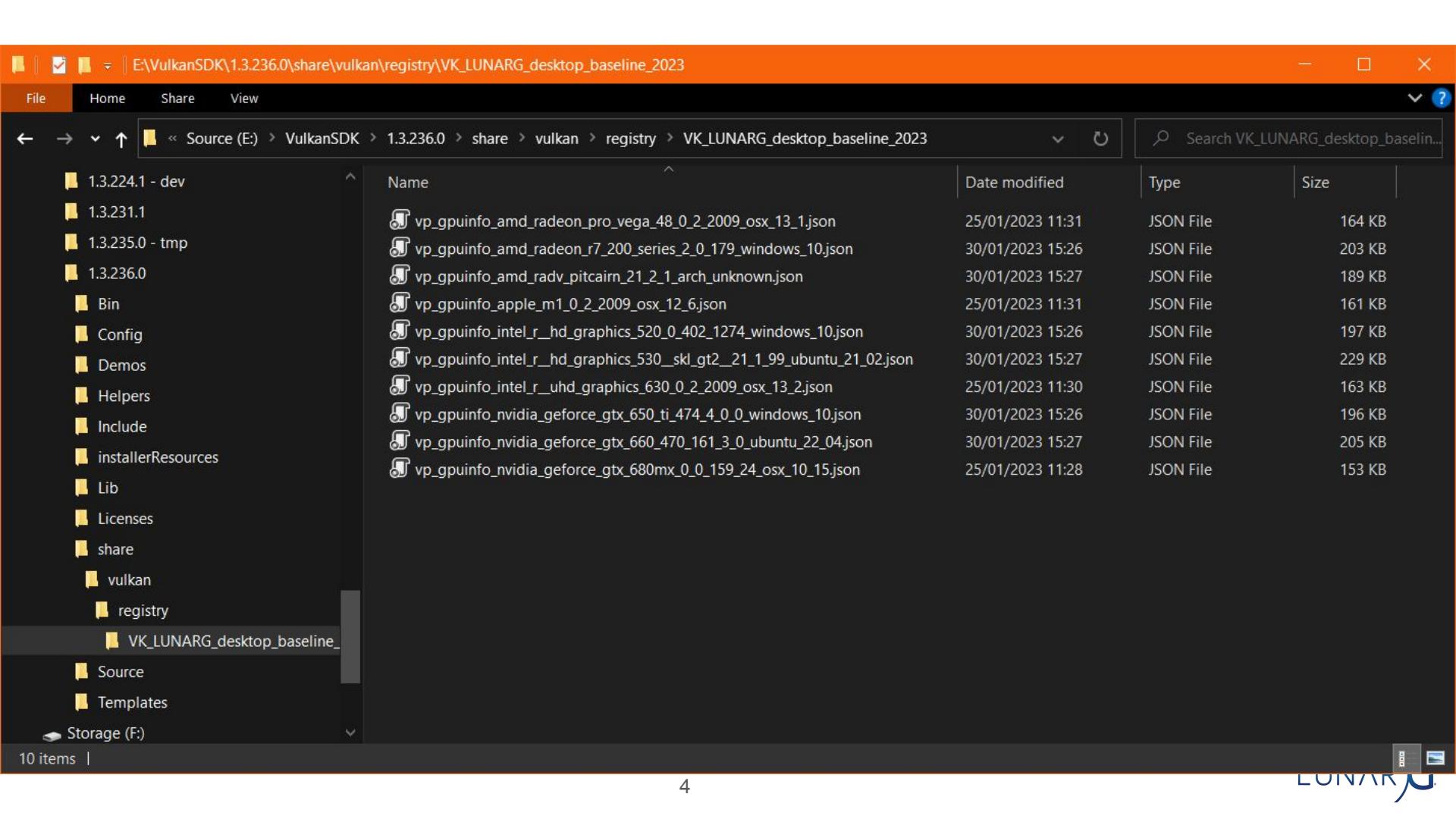
 Linux

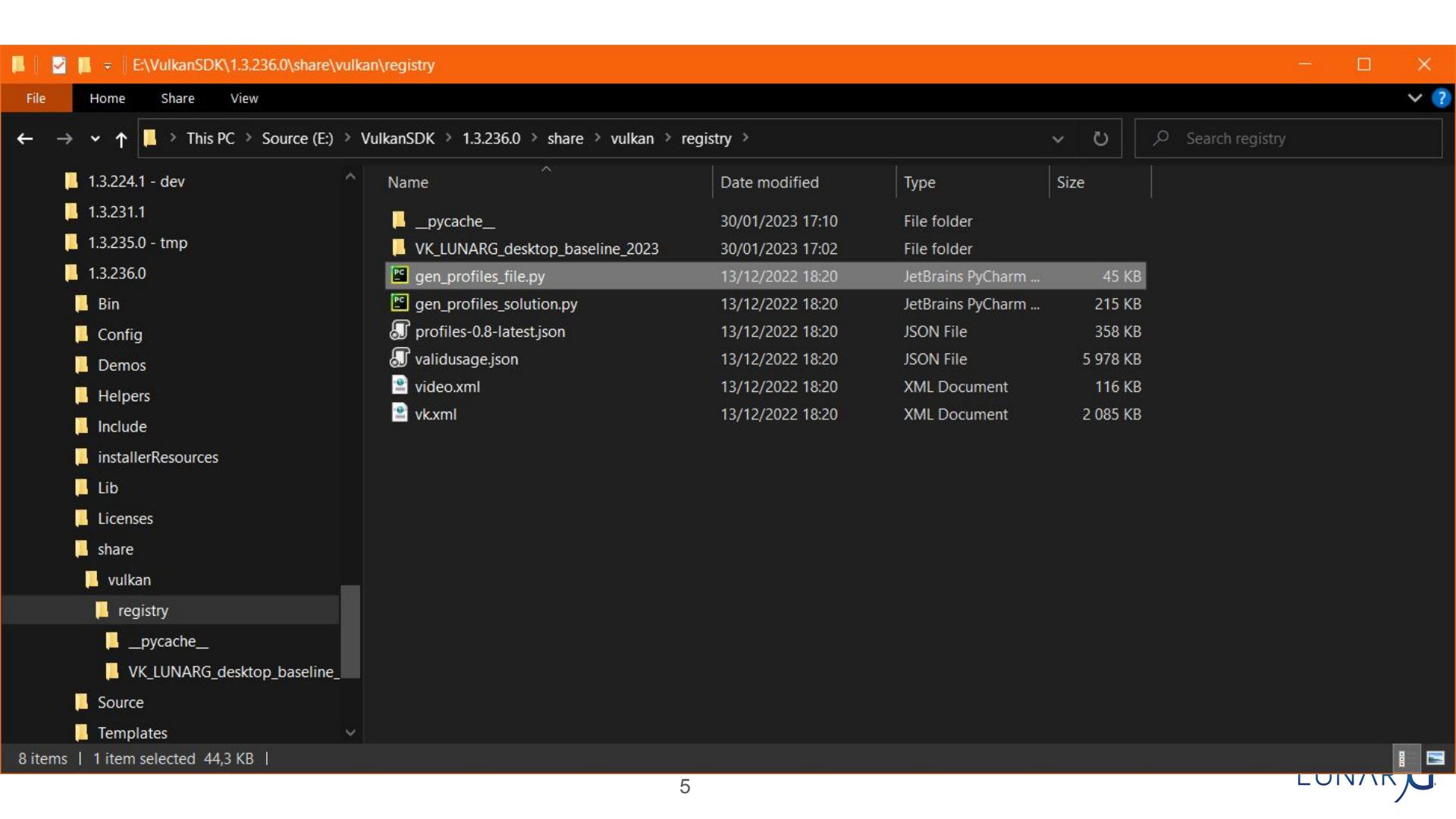
Android

macOS

ios iOS

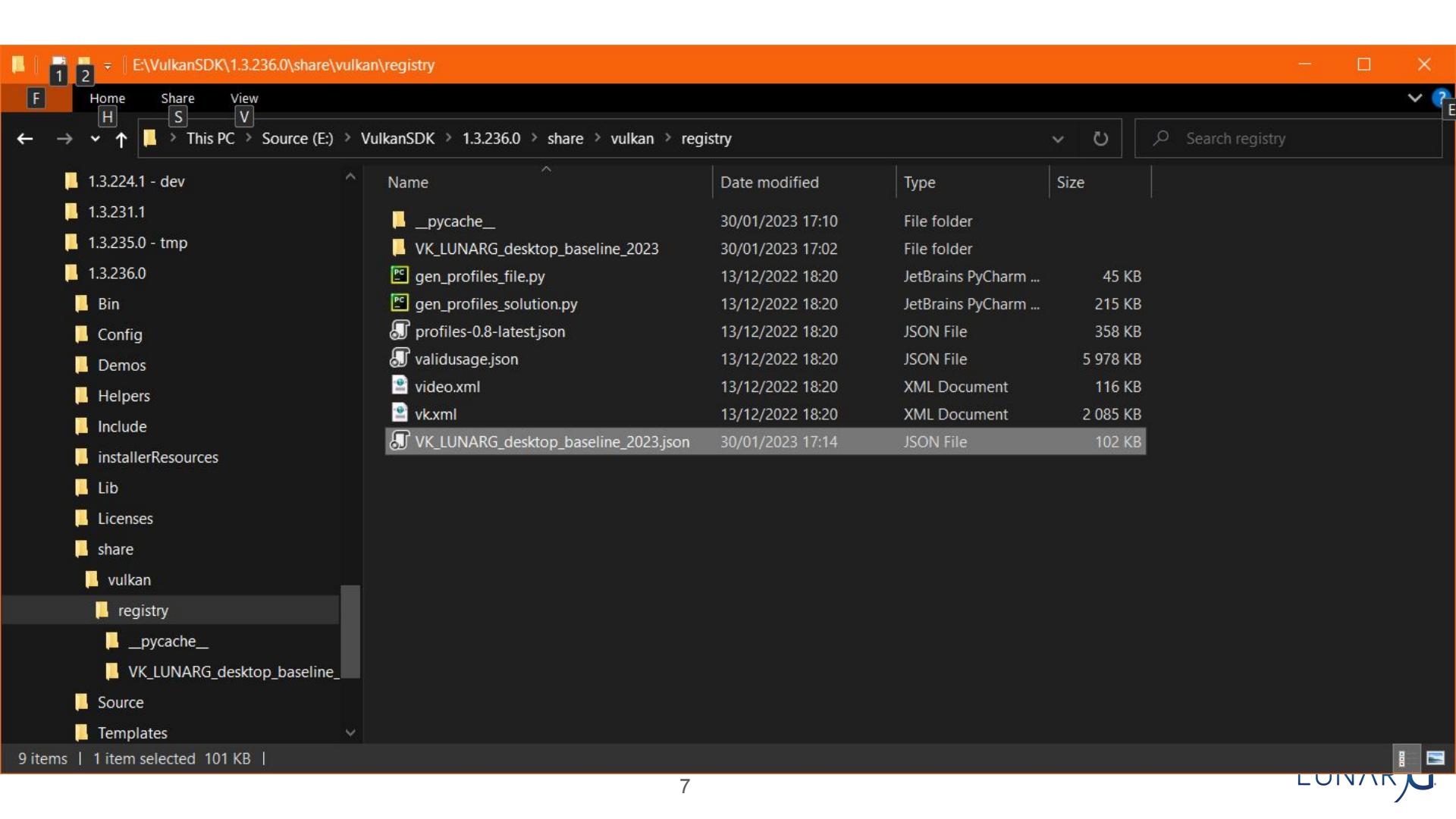
530		Type to filter	1.2	INTEL		Type to filter	Type to filter	Type to filter		
id	Device	Driver	Api	Vendor	Type	OS	Version	Platform	Compare	
15445	Intel(R) HD Graphics 530	100.8854	1.2.151	INTEL	integrated	windows	10	x86_64	Add	
14731	Intel(R) HD Graphics 530	101.1631	1.2.205	INTEL	integrated	windows	10	x86_64	Add	
14457	Intel(R) HD Graphics 530	101.1221	1.2.199	INTEL	integrated	windows	10	x86_64	Add	
14450	Intel(R) HD Graphics 530	101.1404	1.2.204	INTEL	integrated	windows	10	x86_64	Add	
14069	Intel(R) HD Graphics 530	101.1340	1.2.203	INTEL	integrated	windows	10	x86_64	Add	
14005	Intel(R) HD Graphics 530	101.1219	1.2.199	INTEL	integrated	windows	10	x86_64	Add	
13695	Intel(R) HD Graphics 530	101.1192	1.2.197	INTEL	integrated	windows	10	x86_64	Add	
13660	Intel(R) HD Graphics 530	100.9416	1.2.170	INTEL	integrated	windows	10	x86_64	Add	
13435	Intel(R) HD Graphics 530	101.9999	1.2.200	INTEL	integrated	windows	10	x86_64	Add	
13434	Intel(R) HD Graphics 530	101.1122	1.2.196	INTEL	integrated	windows	10	x86_64	Add	
13427	Intel(R) HD Graphics 530	101.1191	1.2.197	INTEL	integrated	windows	10	x86_64	Add	
13425	Intel(R) HD Graphics 530	101.1070	1.2.195	INTEL	integrated	windows	10	x86_64	Add	
13163	Intel(R) HD Graphics 530	100.8142	1.2.135	INTEL	integrated	windows	10	x86_64	Add	

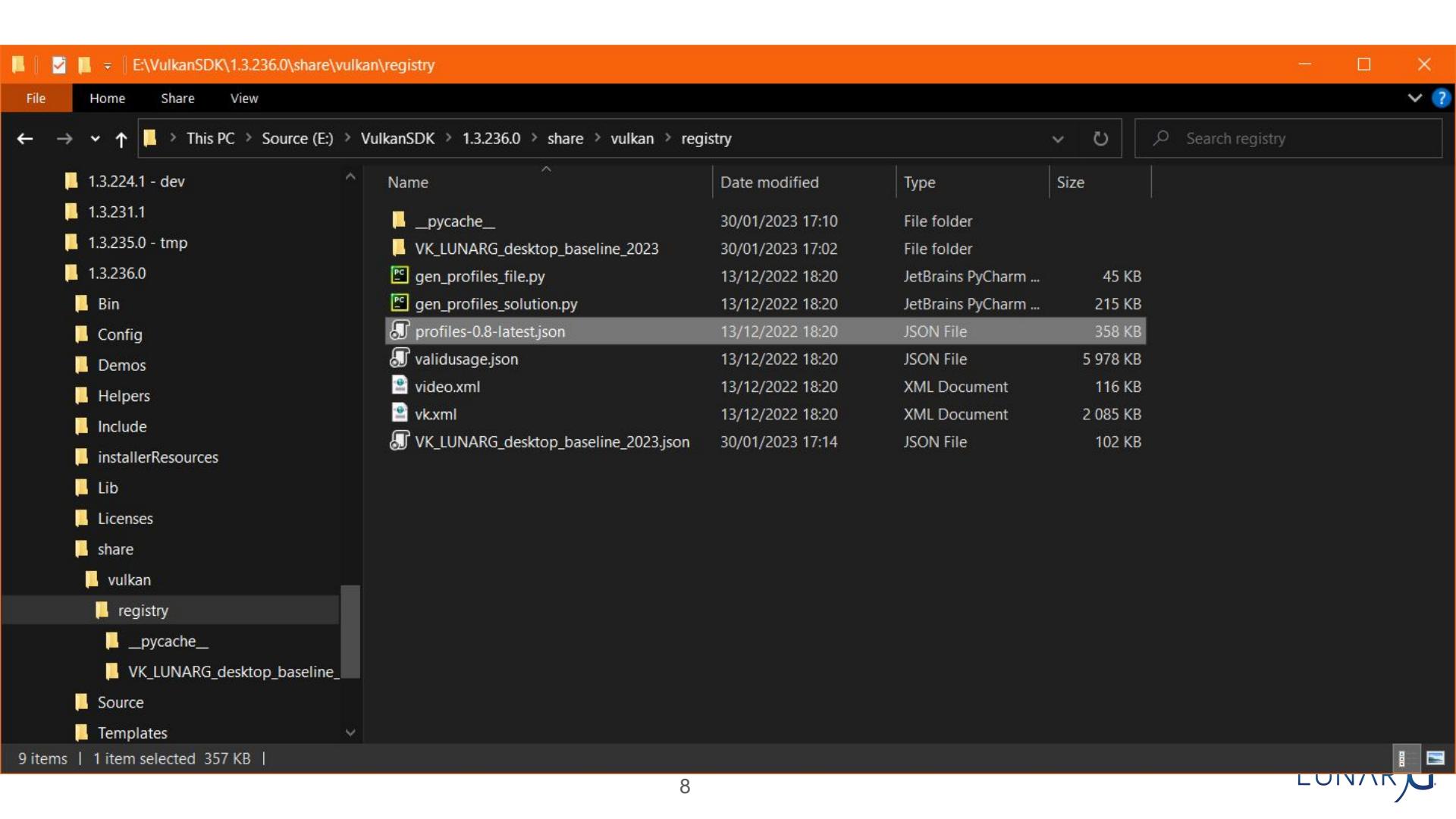




```
Piranha@Piranha MINGW64 /e/VulkanSDK/1.3.236.0/share/vulkan/registry
$ python gen_profiles_file.py --registry vk.xml --input ./VK_LUNARG_desktop_baseline_2023/ -o VK_LUNARG_desktop_baseline_2023.json --profile-desc "Portable
profile for desktop devices" --profile-label "LunarG Desktop Baseline 2023"
Opening: ./VK_LUNARG_desktop_baseline_2023//vp_gpuinfo_amd_radeon_pro_vega_48_0_2_2009_osx_13_1.json
Opening: ./VK_LUNARG_desktop_baseline_2023//vp_gpuinfo_amd_radeon_r7_200_series_2_0_179_windows_10.json
Opening: ./VK_LUNARG_desktop_baseline_2023//vp_gpuinfo_amd_radv_pitcairn_21_2_1_arch_unknown.json
Opening: ./VK_LUNARG_desktop_baseline_2023//vp_gpuinfo_apple_m1_0_2_2009_osx_12_6.json
Opening: ./VK_LUNARG_desktop_baseline_2023//vp_gpuinfo_intel_r_hd_graphics_520_0_402_1274_windows_10.json
Opening: ./VK_LUNARG_desktop_baseline_2023//vp_gpuinfo_intel_r_hd_graphics_530_skl_gt2_21_1_99_ubuntu_21_02.json
Opening: ./VK_LUNARG_desktop_baseline_2023//vp_gpuinfo_intel_r_uhd_graphics_630_0_2_2009_osx_13_2.json
Opening: ./VK_LUNARG_desktop_baseline_2023//vp_gpuinfo_nvidia_geforce_gtx_650_ti_474_4_0_0_windows_10.json
Opening: ./VK_LUNARG_desktop_baseline_2023//vp_gpuinfo_nvidia_geforce_gtx_660_470_161_3_0_ubuntu_22_04.json
Opening: ./VK_LUNARG_desktop_baseline_2023//vp_gpuinfo_nvidia_geforce_gtx_680mx_0_0_159_24_osx_10_15.json
Loading registry file: 'vk.xml'
Building a Vulkan 1.2.170 profile
```

```
Piranha@Piranha MINGW64 /e/VulkanSDK/1.3.236.0/share/vulkan/registry
$ |
```





JSON Schema Validator



An online, interactive JSON Schema validator. Supports JSON Schema Draft 3, Draft 4, Draft 6, Draft 7 and Draft 2019-09.

[View source code](#)

Select schema:

Custom

Profiles Schema

```
1 {  
2     "$schema": "http://json-schema.org/draft-07/schema#",  
3     "$id": "https://schema.khronos.org/vulkan/profiles-0.8.1-  
4         236.json#",  
5     "title": "Vulkan Profiles Schema for Vulkan 1.3.236",  
6     "additionalProperties": true,  
7     "required": [  
8         "capabilities",  
9         "profiles"  
10    ],  
11    "definitions": {  
12        "status": {  
13            "description": "The development status of the  
14                setting. When missing, this property is inherited  
15                from parent nodes. If no parent node defines it,  
16                the default value is 'STABLE'.",  
17            "type": "string",  
18            "enum": [  
19                "ALPHA",  
20                "BETA",  
21                "STABLE",  
22                "DEPRECATED"  
23            ]  
24        },  
25        "contributor": {  
26            "type": "object",  
27            "additionalProperties": false,  
28            "required": [  
29            ]  
30        }  
31    },  
32    "contributes": {  
33        "type": "object",  
34        "additionalProperties": true,  
35        "required": [  
36            "profile",  
37            "version"  
38        ]  
39    }  
40}
```

Input JSON: VP_LUNARG_desktop_baseline_2023

```
1 {  
2     "$schema": "https://schema.khronos.org/vulkan/profiles-  
3         0.8.0-170.json#",  
4     "capabilities": {  
5         "baseline": {  
6             "extensions": {  
7                 "VK_EXT_descriptor_indexing": 2,  
8                 "VK_EXT_host_query_reset": 1,  
9                 "VK_EXT_image_robustness": 1,  
10                "VK_EXT_inline_uniform_block": 1,  
11                "VK_EXT_memory_budget": 1,  
12                "VK_EXT_robustness2": 1,  
13                "VK_EXT_subgroup_size_control": 2,  
14                "VK_EXT_texel_buffer_alignment": 1,  
15                "VK_EXT_vertex_attribute_divisor": 3,  
16                "VK_KHR_16bit_storage": 1,  
17                "VK_KHR_8bit_storage": 1,  
18                "VK_KHR_bind_memory2": 1,  
19                "VK_KHR_create_renderpass2": 1,  
20                "VK_KHR_dedicated_allocation": 3,  
21                "VK_KHR_depth_stencil_resolve": 1,  
22                "VK_KHR_descriptor_update_template": 1,  
23                "VK_KHR_device_group": 4,  
24                "VK_KHR_driver_properties": 1,  
25                "VK_KHR_external_fence": 1,  
26                "VK_KHR_external_memory": 1,  
27                "VK_KHR_external_semaphore": 1,  
28                "VK_KHR_get_memory_requirements2": 1.  
29            }  
30        }  
31    }  
32}
```

✓ No errors found. JSON validates against the schema

An online, interactive JSON Schema validator. Supports JSON Schema Draft 3, Draft 4, Draft 6, Draft 7 and Draft 2019-09.

 View source code

Select schema:

Custom

Input JSON:

```
1 {  
2     "$schema": "http://json-schema.org/draft-07/schema#"  
3     "$id": "https://schema.khronos.org/vulkan/profiles-0.8.1-  
4     236.json#",  
5     "title": "Vulkan Profiles Schema for Vulkan 1.3.236",  
6     "additionalProperties": true,  
7     "required": [  
8         "capabilities",  
9         "profiles"  
10    ],  
11    "definitions": {  
12        "status": {  
13            "description": "The development status of the  
14            setting. When missing, this property is inherited  
15            from parent nodes. If no parent node defines it,  
16            the default value is 'STABLE'.",  
17            "type": "string",  
18            "enum": [  
19                "ALPHA",  
20                "BETA",  
21                "STABLE",  
22                "DEPRECATED"  
23            ]  
24        },  
25        "contributor": {  
26            "type": "object",  
27            "additionalProperties": false,  
28            "required": [  
29                "The required schema  
30            ]  
31        }  
32    }  
33}
```

```
1 {  
2     "$schema": "https://schema.khronos.org/vulkan/profiles-  
3     0.8.0-170.json#",  
4     "capabilities": {},  
5     "baseline": {},  
6     "extensions": {  
7         "VK_EXT_descriptor_indexing": 2,  
8         "VK_EXT_host_query_reset": 1,  
9         "VK_EXT_image_robustness": 1,  
10        "VK_EXT_inline_uniform_block": 1,  
11        "VK_EXT_memory_budget": 1,  
12        "VK_EXT_robustness2": 1,  
13        "VK_EXT_subgroup_size_control": 2,  
14        "VK_EXT_texel_buffer_alignment": 1,  
15        "VK_EXT_vertex_attribute_divisor": 3,  
16        "VK_KHR_16bit_storage": 1,  
17        "VK_KHR_8bit_storage": 1,  
18        "VK_KHR_bind_memory2": 1,  
19        "VK_KHR_create_renderpass2": 1,  
20        "VK_KHR_dedicated_allocation": 3,  
21        "VK_KHR_depth_stencil_resolve": 1,  
22        "VK_KHR_descriptor_update_template": 1,  
23        "VK_KHR_device_group": 4,  
24        "VK_KHR_driver_properties": 1,  
25        "VK_KHR_external_fence": 1,  
26        "VK_KHR_external_memory": 1,  
27        "VK_KHR_external_semaphore": 1,  
28        "VK_KHR_get_memory_requirements2": 1  
29    }  
30 }
```

The required schema versions don't match,

the profile could use unreleased capabilities at the time of Vulkan Header 170 release

Khronos Schemas - Vulkan

[Home](#) [Model 3D](#) [Vulkan](#)

- [devsim_1_0_0.json](#)
- [devsim_1_1_0.json](#)
- [devsim_1_2_0.json](#)
- [devsim_VK_EXT_descriptor_indexing_1.json](#)
- [devsim_VK_EXT_host_query_reset_1.json](#)
- [devsim_VK_EXT_sampler_filter_minmax_1.json](#)
- [devsim_VK_EXT_scalar_block_layout_1.json](#)
- [devsim_VK_KHR_16bit_storage_1.json](#)
- [devsim_VK_KHR_8bit_storage_1.json](#)
- [devsim_VK_KHR_buffer_device_address_1.json](#)
- [devsim_VK_KHR_depth_stencil_resolve_1.json](#)
- [devsim_VK_KHR_imageless_framebuffer_1.json](#)
- [devsim_VK_KHR_maintenance2_1.json](#)
- [devsim_VK_KHR_maintenance3_1.json](#)
- [devsim_VK_KHR_multiview_1.json](#)
- [devsim_VK_KHR_portability_subset-provisional-1.json](#)
- [devsim_VK_KHR_sampler_ycbcr_conversion_1.json](#)
- [devsim_VK_KHR_separate_depth_stencil_layouts_1.json](#)
- [devsim_VK_KHR_shader_atomic_int64_1.json](#)
- [devsim_VK_KHR_shader_float16_int8_1.json](#)
- [devsim_VK_KHR_shader_float_controls_1.json](#)
- [devsim_VK_KHR_shader_subgroup_extended_types_1.json](#)
- [devsim_VK_KHR_timeline_semaphore_1.json](#)
- [devsim_VK_KHR_uniform_buffer_standard_layout_1.json](#)

- profiles-0.8.0-152.json
- profiles-0.8.0-153.json
- profiles-0.8.0-154.json
- profiles-0.8.0-155.json
- profiles-0.8.0-156.json
- profiles-0.8.0-157.json
- profiles-0.8.0-158.json
- profiles-0.8.0-159.json
- profiles-0.8.0-160.json
- profiles-0.8.0-161.json
- profiles-0.8.0-162.json
- profiles-0.8.0-163.json
- profiles-0.8.0-164.json
- profiles-0.8.0-165.json
- profiles-0.8.0-166.json
- profiles-0.8.0-167.json
- profiles-0.8.0-168.json
- profiles-0.8.0-169.json
- profiles-0.8.0-170.json
- profiles-0.8.0-171.json
- profiles-0.8.0-172.json
- profiles-0.8.0-173.json
- profiles-0.8.0-174.json
- profiles-0.8.0-175.json
- profiles-0.8.0-176.json
- profiles-0.8.0-177.json
- profiles-0.8.0-178.json
- profiles-0.8.0-179.json
- profiles-0.8.0-180.json
- profiles-0.8.0-181.json
- profiles-0.8.0-182.json
- profiles-0.8.0-183.json
- profiles-0.8.0-184.json
- profiles-0.8.0-185.json
- profiles-0.8.0-186.json
- profiles-0.8.0-187.json

JSON Schema Validator - Newtonsoft x https://schema.khronos.org/vulkan/... x +

jsonschemasvalidator.net

JSON Schema Validator

Save

newtonsoft.com

An online, interactive JSON Schema validator. Supports JSON Schema Draft 3, Draft 4, Draft 6, Draft 7 and Draft 2019-09.

View source code

Select schema: Custom

Input JSON:

```
1 {  
2     "$schema": "http://json-schema.org/draft-07/schema#",  
3     "$id": "https://schema.khronos.org/vulkan/profiles-0.8.1-170.json#",  
4     "title": "Vulkan Profiles Schema for Vulkan 1.2.170",  
5     "additionalProperties": true,  
6     "required": [  
7         "capabilities",  
8         "profiles"  
9     ],  
10    "definitions": {  
11        "status": {  
12            "description": "The development status of the setting. When missing, this property is inherited from parent nodes. If no parent node defines it, the default value is 'STABLE'.",  
13            "type": "string",  
14            "enum": [  
15                "ALPHA",  
16                "BETA",  
17                "STABLE",  
18                "DEPRECATED"  
19            ]  
20        },  
21        "contributor": {  
22            "type": "object",  
23            "additionalProperties": false,  
24            "required": [  
25            ]  
26        }  
27    }  
28}
```

```
1 {  
2     "$schema": "https://schema.khronos.org/vulkan/profiles-0.8.0-170.json#",  
3     "capabilities": {},  
4     "baseline": {},  
5     "extensions": {  
6         "VK_EXT_descriptor_indexing": 2,  
7         "VK_EXT_host_query_reset": 1,  
8         "VK_EXT_image_robustness": 1,  
9         "VK_EXT_inline_uniform_block": 1,  
10        "VK_EXT_memory_budget": 1,  
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12        "VK_EXT_subgroup_size_control": 2,  
13        "VK_EXT_texel_buffer_alignment": 1,  
14        "VK_EXT_vertex_attribute_divisor": 3,  
15        "VK_KHR_16bit_storage": 1,  
16        "VK_KHR_8bit_storage": 1,  
17        "VK_KHR_bind_memory2": 1,  
18        "VK_KHR_create_renderpass2": 1,  
19        "VK_KHR_dedicated_allocation": 3,  
20        "VK_KHR_depth_stencil_resolve": 1,  
21        "VK_KHR_descriptor_update_template": 1,  
22        "VK_KHR_device_group": 4,  
23        "VK_KHR_driver_properties": 1,  
24        "VK_KHR_external_fence": 1,  
25        "VK_KHR_external_memory": 1,  
26        "VK_KHR_external_semaphore": 1,  
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28    }  
29}
```

✓ No errors found. JSON validates against the schema

JSON Schema Validator



newtonsoft.com

An online, interactive JSON Schema validator. Supports JSON Schema Draft 3, Draft 4, Draft 6, Draft 7 and Draft 2019-09.

View source code

Select schema: Custom

```
1 {  
2   "$schema": "http://json-schema.org/draft-07/schema#",  
3   "$id": "https://schema.khronos.org/vulkan/profiles-0.8.0-147.json#",  
4   "title": "Vulkan Profiles Schema for Vulkan 1.2.147",  
5   "additionalProperties": true,  
6   "required": [  
7     "capabilities",  
8     "profiles"  
9   ],  
10  "definitions": {  
11    "status": {  
12      "description": "The development status of the setting. When  
13      missing, this property is inherited from parent nodes. If no  
14      parent node defines it, the default value is 'STABLE'.",  
15      "type": "string",  
16      "enum": [  
17        "ALPHA",  
18        "BETA",  
19        "STABLE",  
20        "DEPRECATED"  
21      ]  
22    },  
23    "contributor": {  
24      "type": "object",  
25      "additionalProperties": false,  
26      "required": [  
27        "company"  
28      ]  
29    }  
30  },  
31  "properties": {  
32    "capabilities": {  
33      "type": "array",  
34      "items": {  
35        "type": "string",  
36        "enum": [  
37          "VK_KHR_16bit_storage",  
38          "VK_KHR_8bit_storage",  
39          "VK_KHR_bind_memory",  
40          "VK_KHR_bind_memory2",  
41          "VK_KHR_create_renderpass",  
42          "VK_KHR_create_renderpass2",  
43          "VK_KHR_dedicated_allocation",  
44          "VK_KHR_depth_stencil_resolve",  
45          "VK_KHR_descriptor_update_template",  
46          "VK_KHR_device_group",  
47          "VK_KHR_driver_properties",  
48          "VK_KHR_external_fence",  
49          "VK_KHR_external_memory",  
50          "VK_KHR_external_semaphore",  
51          "VK_KHR_get_memory_requirements",  
52          "VK_KHR_get_memory_requirements2"  
53        ]  
54      }  
55    }  
56  }  
57}
```

Found 2 error(s)

Message: Property 'VK_EXT_image_robustness' has not been defined and the schema does not allow additional properties.

Schema path: https://schema.khronos.org/vulkan/profiles-0.8.0-

147.json#/properties/capabilities/additionalProperties/properties/extensions/additionalProperties

Input JSON: Found 2 error(s)

```
1 {  
2   "$schema": "https://schema.khronos.org/vulkan/profiles-0.8.0-  
3   170.json#",  
4   "capabilities": [  
5     "baseline": {  
6       "extensions": [  
7         "VK_EXT_descriptor_indexing": 2,  
8         "VK_EXT_host_query_reset": 1,  
9         "VK_EXT_image_robustness": 1,  
10        "VK_EXT_inline_uniform_block": 1,  
11        "VK_EXT_memory_budget": 1,  
12        "VK_EXT_robustness2": 1,  
13        "VK_EXT_subgroup_size_control": 2,  
14        "VK_EXT_texel_buffer_alignment": 1,  
15        "VK_EXT_vertex_attribute_divisor": 3,  
16        "VK_KHR_16bit_storage": 1,  
17        "VK_KHR_8bit_storage": 1,  
18        "VK_KHR_bind_memory2": 1,  
19        "VK_KHR_create_renderpass2": 1,  
20        "VK_KHR_dedicated_allocation": 3,  
21        "VK_KHR_depth_stencil_resolve": 1,  
22        "VK_KHR_descriptor_update_template": 1,  
23        "VK_KHR_device_group": 4,  
24        "VK_KHR_driver_properties": 1,  
25        "VK_KHR_external_fence": 1,  
26        "VK_KHR_external_memory": 1,  
27        "VK_KHR_external_semaphore": 1,  
28        "VK_KHR_get_memory_requirements2": 1.  
29      ]  
30    }  
31  },  
32  "properties": {  
33    "capabilities": {  
34      "type": "array",  
35      "items": {  
36        "type": "string",  
37        "enum": [  
38          "VK_KHR_16bit_storage",  
39          "VK_KHR_8bit_storage",  
40          "VK_KHR_bind_memory",  
41          "VK_KHR_bind_memory2",  
42          "VK_KHR_create_renderpass",  
43          "VK_KHR_create_renderpass2",  
44          "VK_KHR_dedicated_allocation",  
45          "VK_KHR_depth_stencil_resolve",  
46          "VK_KHR_descriptor_update_template",  
47          "VK_KHR_device_group",  
48          "VK_KHR_driver_properties",  
49          "VK_KHR_external_fence",  
50          "VK_KHR_external_memory",  
51          "VK_KHR_external_semaphore",  
52          "VK_KHR_get_memory_requirements",  
53          "VK_KHR_get_memory_requirements2"  
54        ]  
55      }  
56    }  
57  }  
58}
```

JSON Schema Validator - Newton ⚡ <https://schema.khronos.org/vulkan/profiles-0.8.0-148.json#>

jsonschemasvalidator.net

JSON Schema Validator

Save

newtonsoft.com

An online, interactive JSON Schema validator. Supports JSON Schema Draft 3, Draft 4, Draft 6, Draft 7 and Draft 2019-09.

View source code

Select schema: Custom

```
1 {  
2   "$schema": "http://json-schema.org/draft-07/schema#",  
3   "$id": "https://schema.khronos.org/vulkan/profiles-0.8.0-148.json#",  
4   "title": "Vulkan Profiles Schema for Vulkan 1.2.148",  
5   "additionalProperties": true,  
6   "required": [  
7     "capabilities",  
8     "profiles"  
9   ],  
10  "definitions": {  
11    "status": {  
12      "description": "The development status of the setting. When missing, this property is inherited from parent nodes. If no parent node defines it, the default value is 'STABLE'.",  
13      "type": "string",  
14      "enum": [  
15        "ALPHA",  
16        "BETA",  
17        "STABLE",  
18        "DEPRECATED"  
19      ]  
20    },  
21    "contributor": {  
22      "type": "object",  
23      "additionalProperties": false,  
24      "required": [  
25        "company"  
26      ]  
27    }  
28  },  
29  "properties": {  
30    "capabilities": {  
31      "type": "array",  
32      "items": {  
33        "type": "string",  
34        "enum": [  
35          "VK_KHR_16bit_storage",  
36          "VK_KHR_8bit_storage",  
37          "VK_KHR_bind_memory2",  
38          "VK_KHR_create_renderpass2",  
39          "VK_KHR_dedicated_allocation",  
40          "VK_KHR_depth_stencil_resolve",  
41          "VK_KHR_descriptor_update_template",  
42          "VK_KHR_device_group",  
43          "VK_KHR_driver_properties",  
44          "VK_KHR_external_fence",  
45          "VK_KHR_external_memory",  
46          "VK_KHR_external_semaphore",  
47          "VK_KHR_get_memory_requirements2"  
48        ]  
49      }  
50    },  
51    "profiles": {  
52      "type": "array",  
53      "items": {  
54        "type": "string",  
55        "enum": [  
56          "VK_EXT_descriptor_indexing",  
57          "VK_EXT_host_query_reset",  
58          "VK_EXT_image_robustness",  
59          "VK_EXT_inline_uniform_block",  
60          "VK_EXT_memory_budget",  
61          "VK_EXT_robustness2",  
62          "VK_EXT_subgroup_size_control",  
63          "VK_EXT_texel_buffer_alignment",  
64          "VK_EXT_vertex_attribute_divisor",  
65          "VK_KHR_16bit_storage",  
66          "VK_KHR_8bit_storage",  
67          "VK_KHR_bind_memory2",  
68          "VK_KHR_create_renderpass2",  
69          "VK_KHR_dedicated_allocation",  
70          "VK_KHR_depth_stencil_resolve",  
71          "VK_KHR_descriptor_update_template",  
72          "VK_KHR_device_group",  
73          "VK_KHR_driver_properties",  
74          "VK_KHR_external_fence",  
75          "VK_KHR_external_memory",  
76          "VK_KHR_external_semaphore",  
77          "VK_KHR_get_memory_requirements2"  
78        ]  
79      }  
80    }  
81  }  
82}
```

Input JSON:

```
1 {  
2   "$schema": "https://schema.khronos.org/vulkan/profiles-0.8.0-170.json#",  
3   "capabilities": [  
4     "baseline": {  
5       "extensions": {  
6         "VK_EXT_descriptor_indexing": 2,  
7         "VK_EXT_host_query_reset": 1,  
8         "VK_EXT_image_robustness": 1,  
9         "VK_EXT_inline_uniform_block": 1,  
10        "VK_EXT_memory_budget": 1,  
11        "VK_EXT_robustness2": 1,  
12        "VK_EXT_subgroup_size_control": 2,  
13        "VK_EXT_texel_buffer_alignment": 1,  
14        "VK_EXT_vertex_attribute_divisor": 3,  
15        "VK_KHR_16bit_storage": 1,  
16        "VK_KHR_8bit_storage": 1,  
17        "VK_KHR_bind_memory2": 1,  
18        "VK_KHR_create_renderpass2": 1,  
19        "VK_KHR_dedicated_allocation": 3,  
20        "VK_KHR_depth_stencil_resolve": 1,  
21        "VK_KHR_descriptor_update_template": 1,  
22        "VK_KHR_device_group": 4,  
23        "VK_KHR_driver_properties": 1,  
24        "VK_KHR_external_fence": 1,  
25        "VK_KHR_external_memory": 1,  
26        "VK_KHR_external_semaphore": 1,  
27        "VK_KHR_get_memory_requirements2": 1,  
28      }  
29    }  
30  }  
31}
```

✓ No errors found. JSON validates against the schema

The LunarG Desktop Baseline 2023 effectively requires Vulkan Header 148

JSON Schema Validator - Newton ⚡ <https://schema.khronos.org/vulkan/profiles-0.8.0-148.json#> | +

jsonschemasvalidator.net

JSON Schema Validator Save newtonsoft.com

An online, interactive JSON Schema validator. Supports JSON Schema Draft 3, Draft 4, Draft 6, Draft 7 and Draft 2019-09. View source code

Select schema: Custom

```
1 {  
2   "$schema": "http://json-schema.org/draft-07/schema#",  
3   "$id": "https://schema.khronos.org/vulkan/profiles-0.8.0-148.json#",  
4   "title": "Vulkan Profiles Schema for Vulkan 1.2.148",  
5   "additionalProperties": true,  
6   "required": [  
7     "capabilities",  
8     "profiles"  
9   ],  
10  "definitions": {  
11    "status": {  
12      "description": "The development status of the setting. When missing, this property is inherited from parent nodes. If no parent node defines it, the default value is 'STABLE'.",  
13      "type": "string",  
14      "enum": [  
15        "ALPHA",  
16        "BETA",  
17        "STABLE",  
18        "DEPRECATED"  
19      ]  
20    },  
21    "contributor": {  
22      "type": "object",  
23      "additionalProperties": false,  
24      "required": [  
25        "company"  
26      ]  
27    }  
28  },  
29  "properties": {  
30    "capabilities": {  
31      "type": "array",  
32      "items": {  
33        "type": "string",  
34        "enum": [  
35          "VK_EXT_descriptor_indexing",  
36          "VK_EXT_host_query_reset",  
37          "VK_EXT_image_robustness",  
38          "VK_EXT_inline_uniform_block",  
39          "VK_EXT_memory_budget",  
40          "VK_EXT_robustness2",  
41          "VK_EXT_subgroup_size_control",  
42          "VK_EXT_texel_buffer_alignment",  
43          "VK_EXT_vertex_attribute_divisor",  
44          "VK_KHR_16bit_storage",  
45          "VK_KHR_8bit_storage",  
46          "VK_KHR_bind_memory2",  
47          "VK_KHR_create_renderpass2",  
48          "VK_KHR_dedicated_allocation",  
49          "VK_KHR_depth_stencil_resolve",  
50          "VK_KHR_descriptor_update_template",  
51          "VK_KHR_device_group",  
52          "VK_KHR_driver_properties",  
53          "VK_KHR_external_fence",  
54          "VK_KHR_external_memory",  
55          "VK_KHR_external_semaphore",  
56          "VK_KHR_get_memory_requirements2"  
57        ]  
58      }  
59    }  
60  }  
61}
```

Input JSON:

```
1 {  
2   "$schema": "https://schema.khronos.org/vulkan/profiles-0.8.0-148.json#",  
3   "capabilities": [  
4     "baseline": {  
5       "extensions": {  
6         "VK_EXT_descriptor_indexing": 2,  
7         "VK_EXT_host_query_reset": 1,  
8         "VK_EXT_image_robustness": 1,  
9         "VK_EXT_inline_uniform_block": 1,  
10        "VK_EXT_memory_budget": 1,  
11        "VK_EXT_robustness2": 1,  
12        "VK_EXT_subgroup_size_control": 2,  
13        "VK_EXT_texel_buffer_alignment": 1,  
14        "VK_EXT_vertex_attribute_divisor": 3,  
15        "VK_KHR_16bit_storage": 1,  
16        "VK_KHR_8bit_storage": 1,  
17        "VK_KHR_bind_memory2": 1,  
18        "VK_KHR_create_renderpass2": 1,  
19        "VK_KHR_dedicated_allocation": 3,  
20        "VK_KHR_depth_stencil_resolve": 1,  
21        "VK_KHR_descriptor_update_template": 1,  
22        "VK_KHR_device_group": 4,  
23        "VK_KHR_driver_properties": 1,  
24        "VK_KHR_external_fence": 1,  
25        "VK_KHR_external_memory": 1,  
26        "VK_KHR_external_semaphore": 1,  
27        "VK_KHR_get_memory_requirements2": 1.  
28      }  
29    }  
30  }  
31}
```

✓ No errors found. JSON validates against the schema

We can replace the required Profile Schema from VP_LUNARG_desktop_baseline_2023

Vulkan Layers Management

Layers Fully Controlled by the Vulkan Applications

Overriding Layers by the Vulkan Configurator

Apply only to the Vulkan Applications List

Continue Overriding Layers on Exit

Edit Applications...

Vulkan Layers Configurations

API dump

Frame Capture

Portability

Synchronization

Validation

New...

Edit...

Duplicate

Remove

Vulkan Application Launcher

> Application

Clear log at launch Vulkan Loader Messages:

Vulkan Development Status:

- Layers override: "Portability" configuration
- VULKAN_SDK environment variable: E:\VulkanSDK\1.3.236.0
- Vulkan Loader version: 1.3.224
- User-Defined Layers locations:
 - VK_LAYER_PATH variable: None
 - Per-configuration paths: None
 - VK_ADD_LAYER_PATH variable: None
- `vk_layer_settings.txt` uses the default platform path:
C:\Users\Piranha\AppData\Local\LunarG\vkconfig\override
- Available Layers:

Portability Settings

Vulkan Applications

VK_LAYER_KHRONOS_validation

User-Defined Settings

Validation Areas

Debug Action

Log Message

Log Filename

stdout

Debug Output

Break

Message Severity

Info

Warning

Performance

Error

Limit Duplicated Messages

Max Duplicated Messages

10

Mute Message VUIDs

VK_LAYER_KHRONOS_profiles

User-Defined Settings

Profile Selection

_LUNARG_desktop_portability_2022.json

Schema Validation

Emulate VK_KHR_portability_subset

constantAlphaColorBlendFactors

events

Tools Help

Vulkan Layers Management

Layers Fully Controlled by the Vulkan Applications

Overriding Layers by the Vulkan Configurator

Apply only to the Vulkan Applications List

Continue Overriding Layers on Exit

Edit Applications...

Vulkan Layers Configurations

API dump

Frame Capture

Portability

Synchronization

Validation

New...

Edit...

Duplicate

Remove

Vulkan Application Launcher

> Application

Clear log at launch Vulkan Loader Messages:

Vulkan Development Status:

- Layers override: "Portability" configuration
- VULKAN_SDK environment variable: E:\VulkanSDK\1.3.236.0
- Vulkan Loader version: 1.3.224
- User-Defined Layers locations:
 - VK_LAYER_PATH variable: None
 - Per-configuration paths: None
 - VK_ADD_LAYER_PATH variable: None
- `vk_layer_settings.txt` uses the default platform path:
C:\Users\Piranha\AppData\Local\LunarG\vkconfig\override
- Available Layers:

Portability Settings

Vulkan Applications

VK_LAYER_KHRONOS_validation

User-Defined Settings

Validation Areas

Debug Action

Log Message

Log Filename

stdout

Debug Output

Break

Message Severity

Info

Warning

Performance

Error

Limit Duplicated Messages

Max Duplicated Messages Mute Message VUIDs

VK_LAYER_KHRONOS_profiles

User-Defined Settings

Profile Selection

_LUNARG_desktop_portability_2022.json

Schema Validation

Emulate VK_KHR_portability_subset

 constantAlphaColorBlendFactors events

Tools Help

Vulkan Layer Management

Portability Settings

Select file

« VulkanSDK > 1.3.236.0 > share > vulkan > registry >

...

...

Search registry

X

Organize ▾ New folder

	Name	Date modified	Type	Size
1.3.211.0	__pycache__	25/01/2023 11:34	File folder	
1.3.216.0	VK_LUNARG_desktop_baseline_2023	25/01/2023 11:32	File folder	
1.3.224.0	profiles-0.8-latest.json	13/12/2022 18:20	JSON File	358 KB
1.3.224.1	validusage.json	13/12/2022 18:20	JSON File	5 978 KB
1.3.224.1 - dev	VK_LUNARG_desktop_baseline_2023.json	25/01/2023 11:43	JSON File	102 KB
1.3.231.1				
1.3.235.0 - tmp				
1.3.236.0				
Bin				
Config				
VK_LAYER_KHRONOS				
Demos				

File name: VK_LUNARG_desktop_baseline_2023.json

*.json

Open

Cancel

- VK_ADD_LAYER_PATH variable: None

- `vk_layer_settings.txt` uses the default platform path:

C:\Users\Piranha\AppData\Local\LunarG\vkconfig\override

- Available Layers:

 Emulate VK_KHR_portability_subset
 constantAlphaColorBlendFactors
 events

Vulkan Configurator 2.5.2 <ACTIVE>

Tools Help

Vulkan Layers Management

Layers Fully Controlled by the Vulkan Applications

Overriding Layers by the Vulkan Configurator

Apply only to the Vulkan Applications List

Continue Overriding Layers on Exit

[Edit Applications...](#)

Vulkan Layers Configurations

API dump

Frame Capture

Portability

Synchronization

Validation

[New...](#)

[Edit...](#)

[Duplicate](#)

[Remove](#)

Vulkan Application Launcher

> Application [...](#)

Clear log at launch [Clear](#)

Vulkan Loader Messages: [Launch](#)

Vulkan Development Status:

- Layers override: "Portability" configuration
- VULKAN_SDK environment variable: E:\VulkanSDK\1.3.236.0
- Vulkan Loader version: 1.3.224
- User-Defined Layers locations:
 - VK_LAYER_PATH variable: None
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 - VK_ADD_LAYER_PATH variable: None
- `vk_layer_settings.txt` uses the default platform path:
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- Available Layers:

Portability Settings

Vulkan Applications

VK_LAYER_KHRONOS_validation

User-Defined Settings

Validation Areas

Debug Action

Log Message

Log Filename [...](#)

Debug Output

Break

Message Severity

Info

Warning

Performance

Error

Limit Duplicated Messages

Max Duplicated Messages

Mute Message VUIDs [+](#)

VK_LAYER_KHRONOS_profiles

User-Defined Settings

Profile Selection

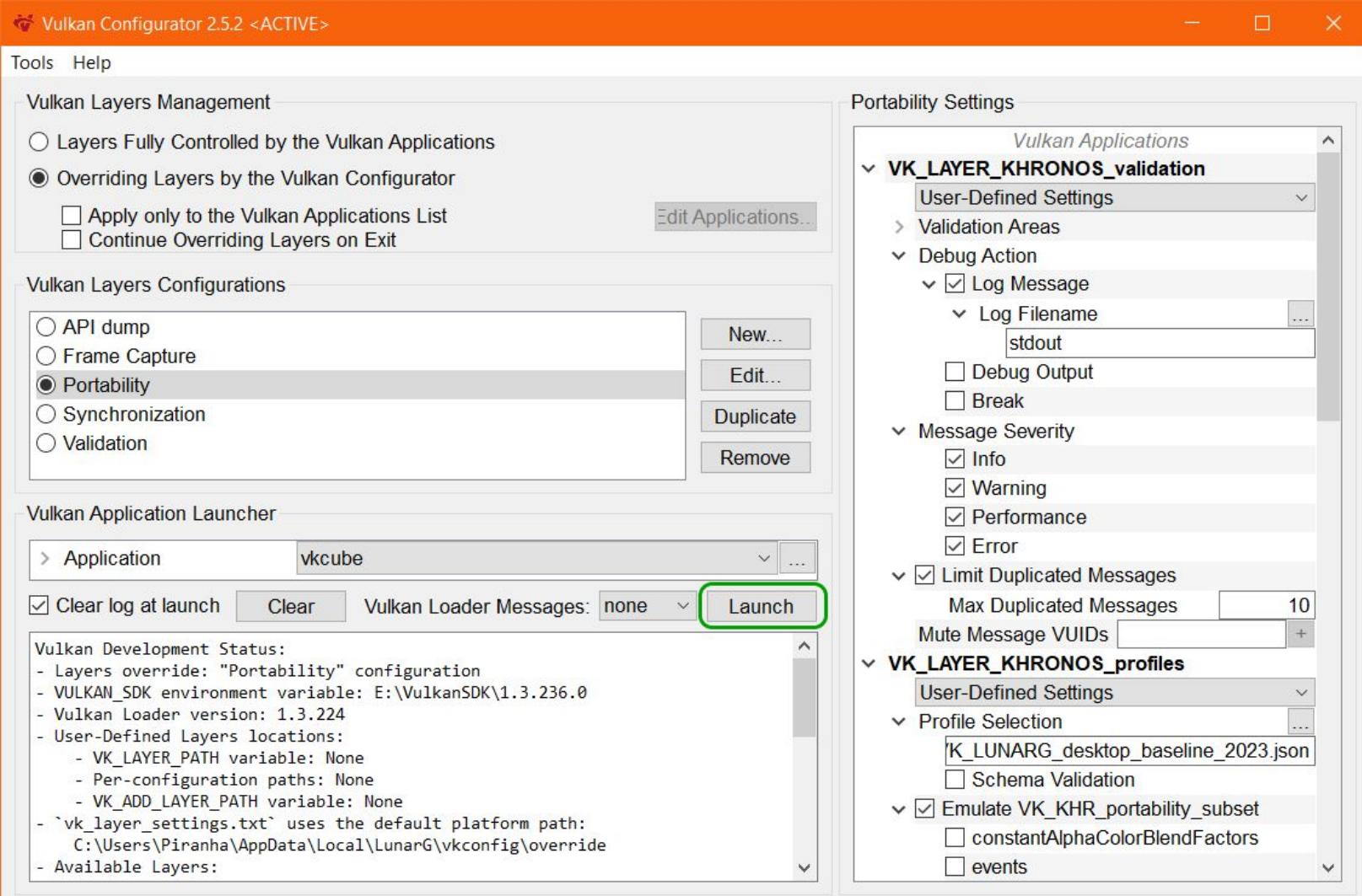
[...](#)

Schema Validation

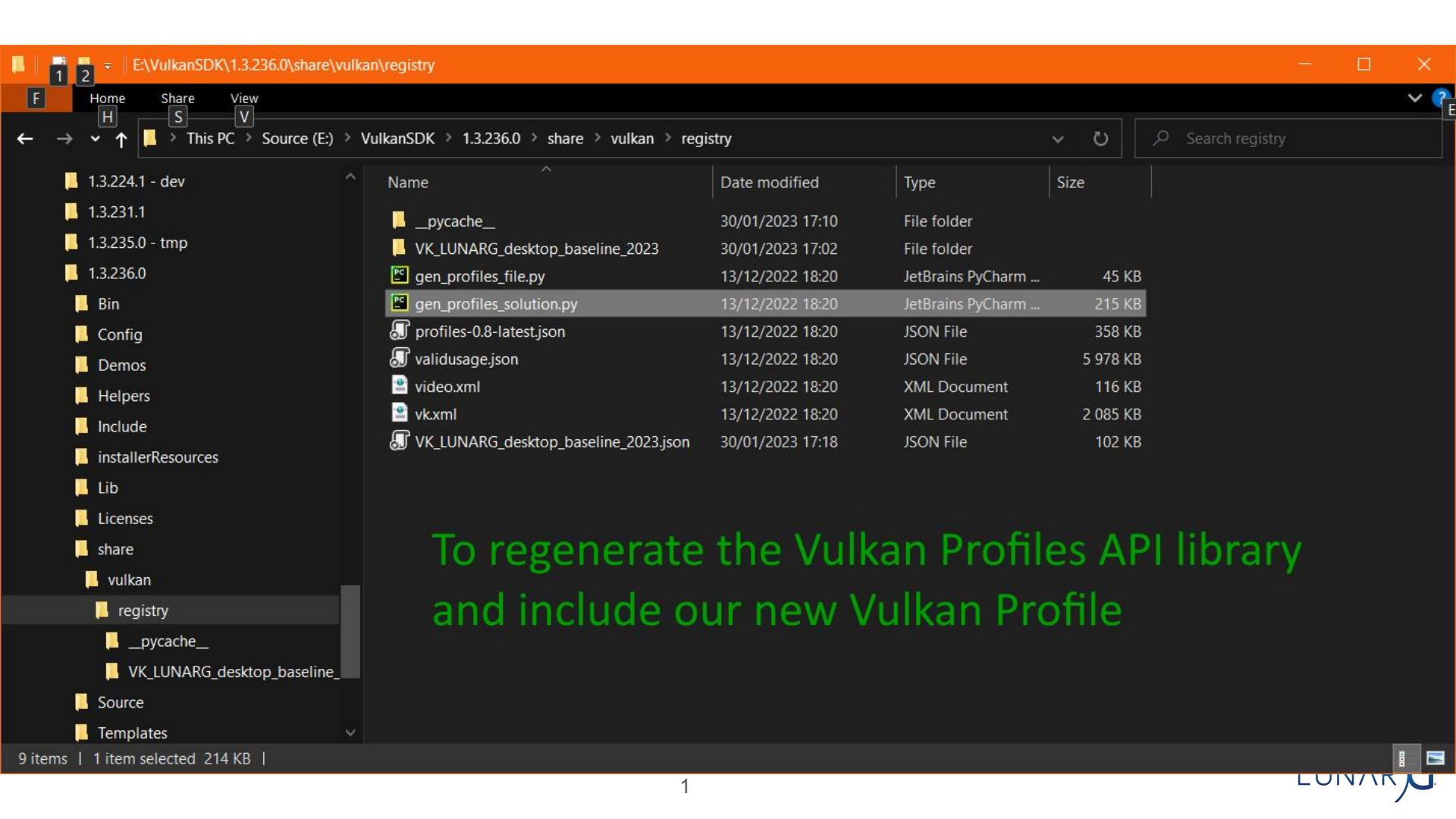
Emulate VK_KHR_portability_subset

constantAlphaColorBlendFactors

events

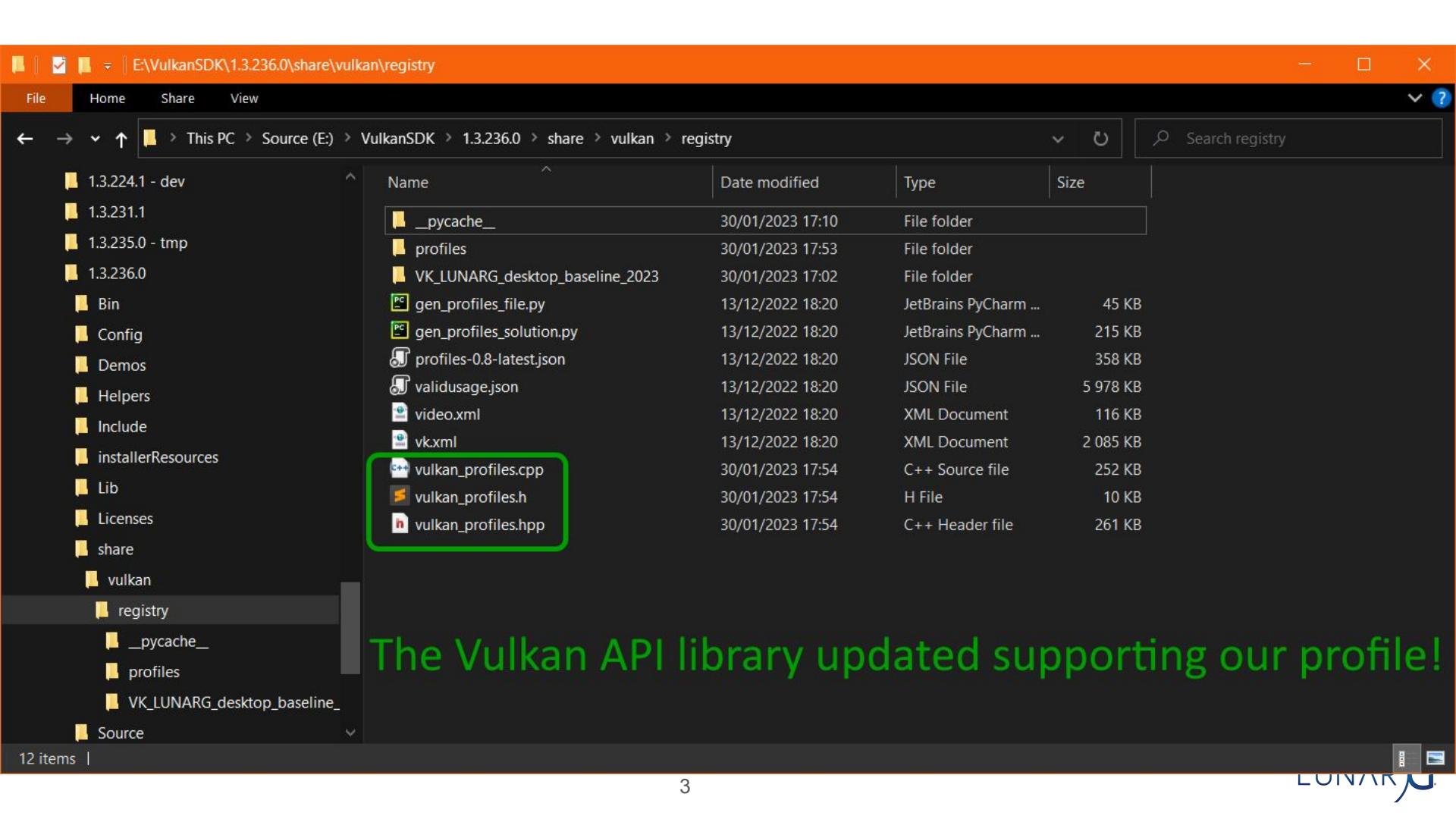


NAR



To regenerate the Vulkan Profiles API library and include our new Vulkan Profile

```
Piranha@Piranha MINGW64 /e/VulkanSDK/1.3.236.0/share/vulkan/registry
$ python gen_profiles_solution.py --registry vk.xml --input ./profiles --output-library-inc ./ --output-library-src ./
Loading registry file: 'vk.xml'
Loading profile file: 'VP_LUNARG_desktop_baseline_2023.json'
Registering profile 'VP_LUNARG_merged_2023_01_30_17_18'
Generating 'E:\VulkanSDK\1.3.236.0\share\vulkan\registry\vulkan_profiles.h'...
Generating 'E:\VulkanSDK\1.3.236.0\share\vulkan\registry\vulkan_profiles.cpp'...
Generating 'E:\VulkanSDK\1.3.236.0\share\vulkan\registry\vulkan_profiles.hpp'...
Piranha@Piranha MINGW64 /e/VulkanSDK/1.3.236.0/share/vulkan/registry
$ |
```



Checking the support of our new profile with the Profile API library

```
const VpProfileProperties profile{  
    VP_LUNARG_DESKTOP_BASELINE_2023_NAME,  
    VP_LUNARG_DESKTOP_BASELINE_2023_SPEC_VERSION};  
  
VkBool32 supported = VK_FALSE;  
vpGetPhysicalDeviceProfileSupport(  
    instance, physicalDevice, &profile, &supported);
```

Creating a VkDevice using our new profile with the Profile API library

```
const VpProfileProperties profile = {  
    VP_LUNARG_DESKTOP_BASELINE_2023_NAME,  
    VP_LUNARG_DESKTOP_BASELINE_2023_SPEC_VERSION};  
  
VkDeviceCreateInfo info = {};  
...  
  
VpDeviceCreateInfo profileInfo = {};  
profileInfo.pCreateInfo = &info;  
profileInfo.pProfile = &profile;  
  
VkDevice device = VK_NULL_HANDLE;  
VkResult res = vpCreateDevice(physicalDevice, &profileInfo, nullptr, &device);
```

Questions?

christophe@lunarg.com

<https://github.com/KhronosGroup/Vulkan-Profiles/issues>





Help Us Improve the
Vulkan SDK and Ecosystem

Share Your Feedback

Take the LunarG annual developer's survey

- Survey results are tabulated
- Shared with the Vulkan Working Group
- Actions are assigned
- Results are reported

Survey closes February 27, 2023



<https://www.surveymonkey.com/r/PVM92RH>

LUNARG®

JSON Schema Validator



newtonsoft.com

An online, interactive JSON Schema validator. Supports JSON Schema Draft 3, Draft 4, Draft 6, Draft 7 and Draft 2019-09.

View source code

Select schema: Custom

```
1 {  
2   "$schema": "http://json-schema.org/draft-07/schema#",  
3   "$id": "https://schema.khronos.org/vulkan/profiles-0.8.0-148.json#",  
4   "title": "Vulkan Profiles Schema for Vulkan 1.2.148",  
5   "additionalProperties": true,  
6   "required": [  
7     "capabilities",  
8     "profiles"  
9   ],  
10  "definitions": {  
11    "status": {  
12      "description": "The development status of the setting. When  
13      missing, this property is inherited from parent nodes. If no  
14      parent node defines it, the default value is 'STABLE'.",  
15      "type": "string",  
16      "enum": [  
17        "ALPHA",  
18        "BETA",  
19        "STABLE",  
20        "DEPRECATED"  
21      ]  
22    },  
23    "contributor": {  
24      "type": "object",  
25      "additionalProperties": false,  
26      "required": [  
1.        "company"  
2.      ]  
3.    }  
4.  }  
5. }  
6. }  
7. }  
8. }  
9. }  
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```

JSON Schema Validator - Newton ⚡ <https://schema.khronos.org/vulkan/profiles-0.8.0-148.json#> | +

jsonschemasvalidator.net

JSON Schema Validator Save newtonsoft.com

An online, interactive JSON Schema validator. Supports JSON Schema Draft 3, Draft 4, Draft 6, Draft 7 and Draft 2019-09. View source code

Select schema: Custom

```
1 {  
2   "$schema": "http://json-schema.org/draft-07/schema#",  
3   "$id": "https://schema.khronos.org/vulkan/profiles-0.8.0-148.json#",  
4   "title": "Vulkan Profiles Schema for Vulkan 1.2.148",  
5   "additionalProperties": true,  
6   "required": [  
7     "capabilities",  
8     "profiles"  
9   ],  
10  "definitions": {  
11    "status": {  
12      "description": "The development status of the setting. When missing, this property is inherited from parent nodes. If no parent node defines it, the default value is 'STABLE'.",  
13      "type": "string",  
14      "enum": [  
15        "ALPHA",  
16        "BETA",  
17        "STABLE",  
18        "DEPRECATED"  
19      ]  
20    },  
21    "contributor": {  
22      "type": "object",  
23      "additionalProperties": false,  
24      "required": [  
25        "company"  
26      ]  
1.  }
```

Input JSON:

```
1909 ] "VK_FORMAT_FEATURE_VERTEX_BUFFER_BIT"  
1910 }  
1911 }  
1912 }  
1913 }  
1914 }  
1915 }  
1916 },  
1917 "profiles": {  
1918   "VP_LUNARG_merged_2023_01_30_17_18": {  
1919     "version": 1,  
1920     "api-version": "1.2.148",  
1921     "label": "Lunarg Desktop Baseline 2023",  
1922     "description": "Portable profile for desktop devices",  
1923     "contributors": {},  
1924     "history": [  
1925       {  
1926         "revision": 1,  
1927         "date": "2023-01-30",  
1928         "author": "Lunarg Profiles Generation",  
1929         "comment": "Generated profile"  
1930       }  
1931     ],  
1932     "capabilities": [  
1933       "baseline"  
1934     ]  
1935   }  
1936 }
```

✓ No errors found. JSON validates against the schema **We can also change the required Vulkan API version**
But we can use a required Vulkan API version newer than the Vulkan Header version