Vulkan CTS Tips & Tricks

Ricardo Garcia

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About Me

- Vulkan CTS contributor since 2019.

- Work funded by Valve.

- Frequent interactions with Mesa and Khronos.

- Vulkan CTS
- Work fund
- Frequent i   Khronos.

What is VK-GL-CTS?

- Vulkan, and OpenGL, Conformance Test Suite

- Open Source Project: https://github.com/KhronosGroup/VK-GL-CTS

- Apache 2.0 License

- Lots of commits from different people, but not much community

- ~2.8 million Vulkan test cases

- ~5 million lines of specific Vulkan source code

Vulkan Tests (1)

- General **README.md**, for Vulkan tests it points you to...

- **external/vulkancts/README.md**, with specific instructions

- Follow those instructions to end up with

  - **build/external/vulkancts/modules/vulkan/deqp-vk**

  - That is the Vulkan CTS binary: deqp-vk -n TEST_GLOB

  - Result summary in the terminal, details in **TestResults.qpa**.

- Tests organized in a tree with leaves of the tree being test cases to run, and parents are test groups.

Vulkan Tests (2)

- Example: dEQP-VK.api.copy_and_blit.core.image_to_image.all_formats.color.1d_to_2d.a2b10g10r10_unorm_pack32.a2b10g10r10_unorm_pack32.general_general

Build Tips (1)

- cmake -DSELECTED_BUILD_TARGETS="list of binaries" (e.g. deqp-vk)

  - Does not build anything else by default.

- If not, at least cmake --build build_dir --target deqp-vk can be useful.

Build Tips (2)

- cmake -DDEQP_LOG_NODE_SOURCE=1

- Logs where the test case is being added in **TestResults.qpa**.

- E.g. <TestCaseResult CasePath="dEQP-VK.api.smoke.triangle" **CaseSource="/home/rgarcia/devel/vk-gl-cts/external/vulkancts/modules/vulkan/api/vktApiSmokeTests.cpp:862"** Version="0.3.4" CaseType="SelfValidate">

Build Tips (3)

- The default BFD or Gold linkers are really slow for deqp-vk in Debug builds.

- Please use LLD or Mold.

  - Check your distribution to make them the default linkers, or...

  - export LDFLAGS="-fuse-ld=mold" before cmake

How Changes Are Reviewed

- Needs internal approval in Khronos.

- Khronos has an internal Gitlab instance.

- New test proposals and issue reports go there.

- People without Khronos access can use the Github repo.

  - Someone will review them and move them to the internal tracker.

How To Interact With VK-GL-CTS

- Khronos account? Gitlab

- No Khronos account? Open issue or PR in Github

- Maybe mention us in Github: rg3igalia, madeeha

How To Report Issues

- Mention hardware, driver and at least one specific test case

- Maybe mention a larger set of affected tests

- Interesting things that can be reported:

  - Test mistakes, specially if reported by the layers.

  - Lack of coverage.

    - Implemented something new and all tests are passing? Try breaking something on purpose in the driver and see if the tests still pass.

    - Real world app triggered simple bug in your driver, not caught by CTS.

How To Report Issues (2)

- Configuration step takes too long

- Test takes too long to run (memory types?)

- Test takes too long to skip (late support checks?)

- Test fails without giving a hint about where

- Test fails but does not explain why

- Test fails and does not log affected color buffers

- Test fails and does not log affected SSBO values

- Build time or link time worsens significantly

- Other pain points

Dealing With Test Failures

- If the test logs an image: **scripts/qpa_image_viewer.html**
  - Works locally, basic functionality, PNG images
- RenderDoc: deqp-vk **--deqp-renderdoc=enable**
- Failure should point to line and file
- If not, **please report** and...
- Find test addition using -DDEQP_LOG_NODE_SOURCE=1 with cmake

Navigating CTS Source Code

- **addFunctionCase***: go to the function being run.

- Test Cases and Instances.

- Test Case are leaves of the tree:

  - checkSupport()

  - initPrograms()

  - createInstance()

- Test Instance contains the meat of the test

  - Manages resources

  - Runs the test "proper" in iterate()

How To Find Tests That...

- Those are the hardest questions.

- Things can get really complicated.

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- Things can get really complicated.

- Feature X, format Y, API call Z, device-local memory, source offset is not aligned, called in a conditional rendering block, test is run only on Tuesdays, the goat has not yet been sacrificed, the Moon is in the waxing gibbous phase.

How To Find Tests That... (2)

- Possible answer:

    - dEQP-
      VK.api.Z_function.with_X.format_Y.conditional_rendering.unaligne
      d.device_local.weekly.tuesday.waxing_gibbous_goat_alive

- Possible answer:

    - Kind of, we have those but we always run them after sacrificing
      the goat and conditional rendering is not being used, and they
      only run on the compute queue for some reason.

How To Find Tests That... (3)

- Real answer: grepping source code.

  - Extensions, feature names, Vulkan enum values.

- We're progressing towards making test feature requirements more explicit and easier to find.

- For the moment: just ask.

RANTS?

Thanks! ~~Questions?~~

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