Graphics SIG Meeting
Sept 16, 2021
10:05am PDT

https://github.com/riscv-admin/graphics

@risc_v

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Collaborative & Welcoming Community

RISC-V is a free and open ISA enabling a new era of processor innovation through open standard collaboration. Born in academia and research, RISC-V ISA delivers a new level of free, extensible software and hardware freedom on architecture, paving the way for the next 50 years of computing design and innovation.

We are a transparent, collaborative community where all are welcomed, and all members are encouraged to participate. We are a continuous improvement organization. If you see something that can be improved, please tell us. help@riscv.org

We as members, contributors, and leaders pledge to make participation in our community a **harassment-free experience for everyone**.

https://riscv.org/risc-v-international-community-code-of-conduct/

Conventions

- Unless it is a scheduled agenda topic, we don’t solve problems or detailed topics in most meetings unless specified in the agenda because we don’t often have enough time to do so and it is more efficient to do so offline and/or in email. We identify items and send folks off to do the work and come back with solutions or proposals.
- If some policy, org, extension, etc. can be doing things in a better way, help us make it better. Do not change or not abide by the item unillaterly. Instead let's work together to make it better.
- Please conduct meetings that accommodates the virtual and broad geographical nature of our teams. This includes meeting times, repeating questions before you answer, at appropriate times polling attendees, guide people to interact in a way that has attendees taking turns speaking, …
- Where appropriate and possible, meeting minutes will be added as speaker notes within the slides for the Agenda

Agenda

- Avoiding the “unified” concept (10 min)
- New preliminary charter discussion (15 min)
- Vision (10 min)
- A plan for catching up with the industry (10 min)
- Gap analysis tasks (10 min)
- Is Skia alive and interesting? (5 min)

Avoiding the “unified” concept

Will **not use the word nor the concept**

We can do good progress without that concept

New preliminary charter

Focus on graphics accelerators

Not mentioned on the charter:

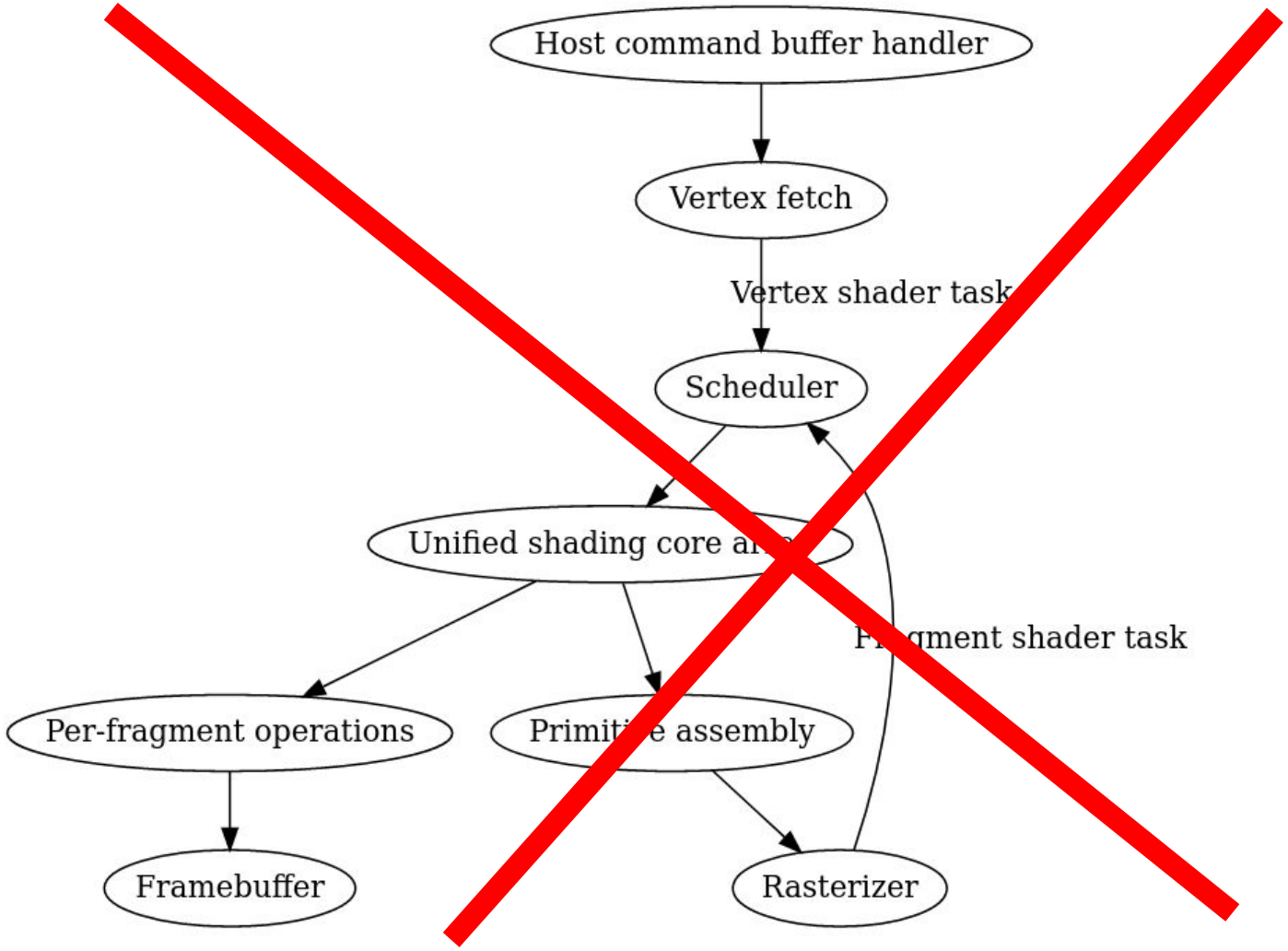
- **Unified**
- **Shading core**
- **Programmable shaders**

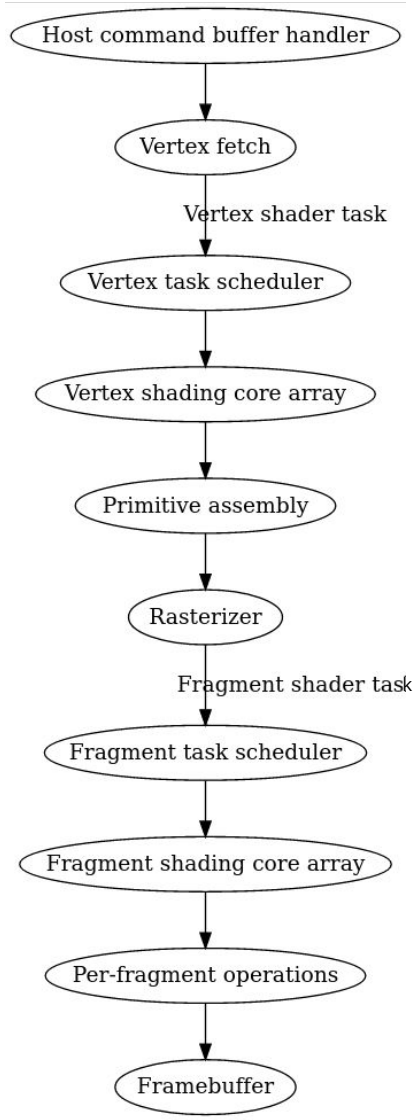
https://github.com/riscv-admin/graphics/blob/main/CHARTER.md

Survey:

- Should explicitly mention GPGPU?
- Can we just live with it? Then say so!

Vision: RISC-V on ~~unified~~ shading cores





~~Unified~~ shading core properties

- Input attributes and uniforms stored on a read-only registers
- Outputs stored on an write-only registers
- Temporary storage on an SRAM.
- Texture sampling support, but **no other access to external memory**

What if we succeed?

Open question, please raise your hands

My two cents

- Will ever happen that there is a market for “white brand” RISC-V based GPUs with software-compatible drivers?

- Could a GPU following open standards be supported out-of-the-box with every major operative system as a VGA card is?

A plan for catching up with the industry

- Stage 1: microcontroller
- Stage 2: basic multicore
- Stage 3: complete multicore

Stage 1: microcontroller

OpenGL ES 2.0 compatible

Texturing unit

Pixel backend

Transcendentals and matrix products

Producing silicon with ISA extensions for approving specs

Focus on enabling embedded graphics products

Stage 2: basic multicore

Still OpenGL ES 2.0

Fully featuring the unified shading concept

Scheduler2

Hardware rasterizer

Focus on task communication

Stage 3: complete multicore

Compute capable.

Completed with missing shading stages.

Aim at compliance with Vulkan 1.0.

Open questions about the plan

- Should we skip the microcontroller step?
- Is OpenGL ES 2.0 still appealing for our constituency?

Gap analysis tasks

Help the chairs to complete the SPIR-V to RVV mapping

https://drive.google.com/drive/u/1/folders/1Z_ZlEmzL7a7mgUwaGiUnhGxbV0t3sriE

Provide us market research figures:

What is the number of OpenGL ES 2.0 capable GPUs shipped every year?
What is the number of GPUs shipped per power range every year?

Backup Slides