GPU acceleration on the CVA6 through VirtIO

- Supervisor: Nicolas Derumigny
- Prerequisite: a Linux x86 computer with $>$ 100 GB free disk space.

The CVA6 is an open-source RISC-V CPU core written in SystemVerilog able to boot Linux. At Benagil, we have ported a dual-core version on the AMD ZCU104 board, an MPSoC that containing an FPGA (where the softcore is deployed), but also a quad-core Arm Cortex A53 CPU and a Mali 400 GPU, that run a standalone (Arm) Linux. The goal of this internship is to let the CVA6 access the Mali GPU using a VirtIO interface through a shared AXI bus. On the CVA6 side, the student will ensure proper implementation of the required hardware primitives and software components. On the Arm side, the student will run a virglrenderer-based daemon executing the requests on the physical GPU.communication between the two components. Finally, the student will design and perform a performance evaluation of the final system using either off-the-shelf benchmark and/or manually written microbenchmarks.