Reconfigurable System-on-Chip Framework
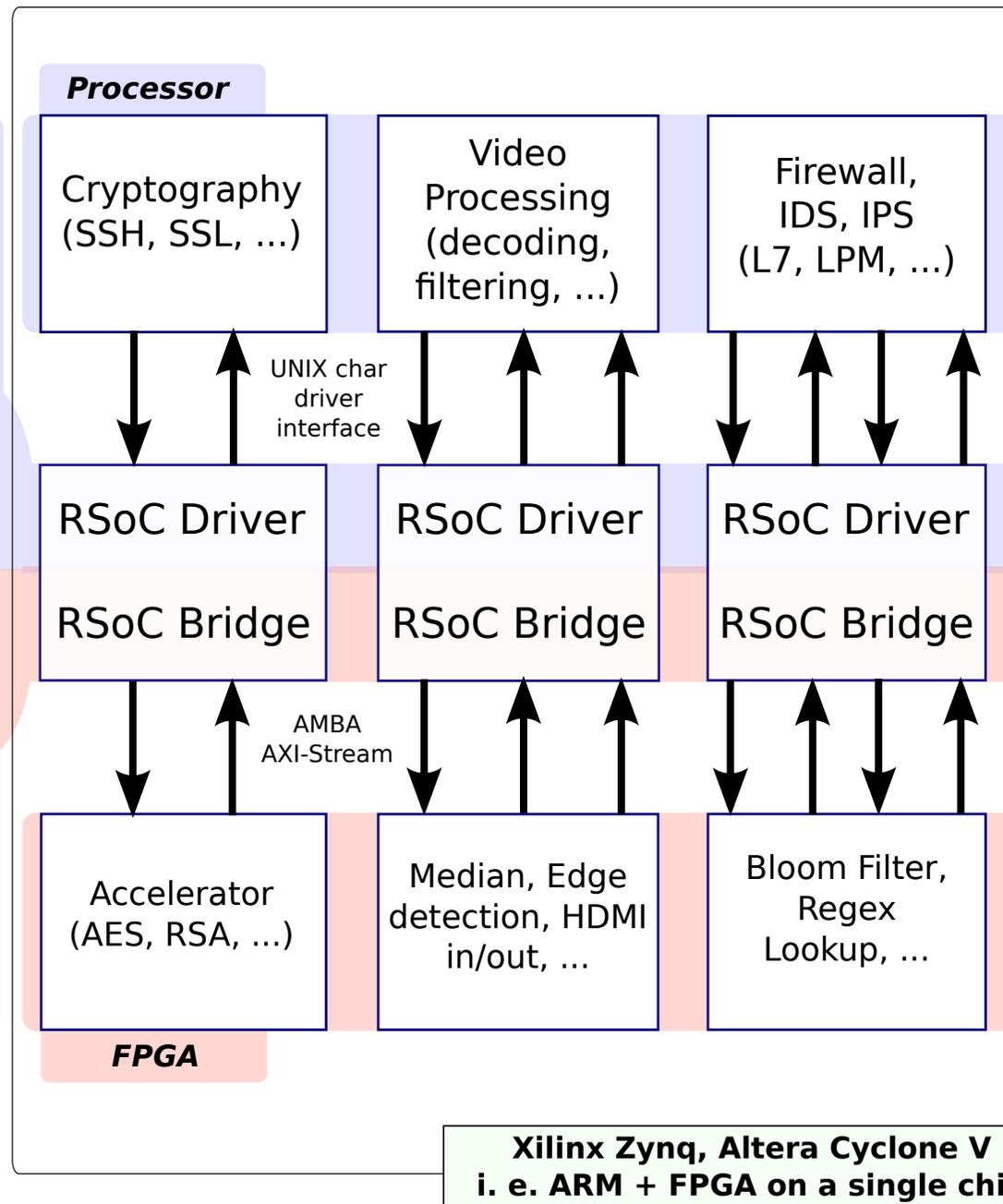
RSoC Framework: integrates the hardware (FPGA) and software (processor) together. It provides interfaces both to the software userspace and the hardware part. It hides the specifics of the target platform.

The framework consists of two main components:

RSoC Driver - driver for a Linux operating system.
RSoC Bridge - generic soft core for FPGA providing DMA controllers and bus systems.

The driver adapts itself when loaded depending on the configuration of the bridge.

Processor

| Cryptography (SSH, SSL, ...) | Video Processing (decoding, filtering, ...) | Firewall, IDS, IPS (L7, LPM, ...) |

UNIX char driver interface

| RSoC Driver | RSoC Driver | RSoC Driver |

| RSoC Bridge | RSoC Bridge | RSoC Bridge |

AMBA AXI-Stream

| Accelerator (AES, RSA, ...) | Median, Edge detection, HDMI in/out, ... | Bloom Filter, Regex Lookup, ... |

FPGA

Applications to be accelerated on the target platform with an integrated FPGA (Xilinx Zynq). The framework can support various applications with different goals (performance, resource consumption, low power).

FPGA layer with hardware accelerators or physical interface adapters (VHDL, Verilog, C, or third party IP cores). Each accelerator is connected through a pair of simplex AXI-Stream links and optionally a configuration bus (AXI-Lite or AXI-Full).

**Xilinx Zynq, Altera Cyclone V
i. e. ARM + FPGA on a single chip**