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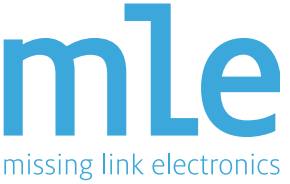
CORUNDUM

An open source FPGA based 100G NIC

Overview



1) Introduction

2) RTL/ Drivers

3) Outlook / Roadmap

About Us

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Alex

- Ph.D. EE UC San Diego
- M.Sc. & B.Sc. EE UC San Diego
- Post Doctoral Researcher at UC San Diego
- Main developer of corundum
- Aims at supporting research driven features

Ulrich

- Dipl.-Ing. Computer Engineering TU Berlin
- Dir. Eng. at Missing Link Electronics
- Team lead of a design team integrating and extending corundum
- Aims at providing a reliable source for a data center ready NIC

Background

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- Academic project to enable network architecture research experiments at full speed
- Work was part of the Dissertation Thesis of Dr. John Alexander Forencich (Alex) at UC San Diego and released to open source
- Presented at various academic conferences, including FCCM 2020

Goals

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- Line-rate capable NIC
- Portable RTL and Linux Driver code
- Support for various variants of interconnects, e.g. PCIe and AXI-MM
- Fully open source
- Adaptable for academic and commercial projects

Features

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- PCIe attached NIC
- 1-8x (1/)10/25/100 GbE physical Ports
- Driver for Linux
- > 16k rings supported for RX and TX
- Custom scheduling, processing logic addition in RTL and driver
- Full Xilinx UltraScale+ device support
- Initial Intel Stratix 10 (H-Tile) device support
- Various Supported Boards
  Xilinx: ADM_PCIE_9V3, AU250, AU50, ExaNIC_X25, NetFPGA_SUME,
  VCU108, VCU1525, AU200, AU280, ExaNIC_X10, fb2CG, VCU118, ZCU106
  Intel: S10MX_DK

Overview

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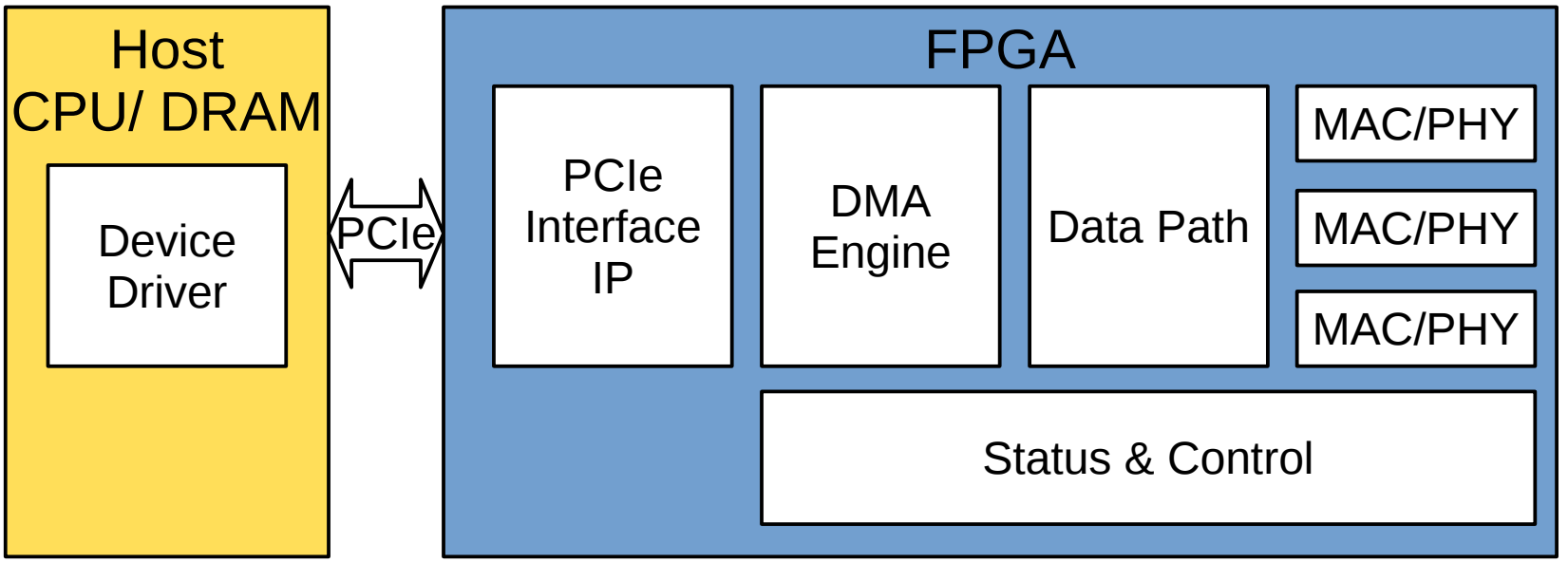

Background

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Corundum is based on various (sub-) projects and components (partially also maintained by Alex)

- verilog-axi
- verilog-axis
- verilog-pcie
- verilog-ethernet
- cocotb
- MyHDL
- Device Specific Vendor IP

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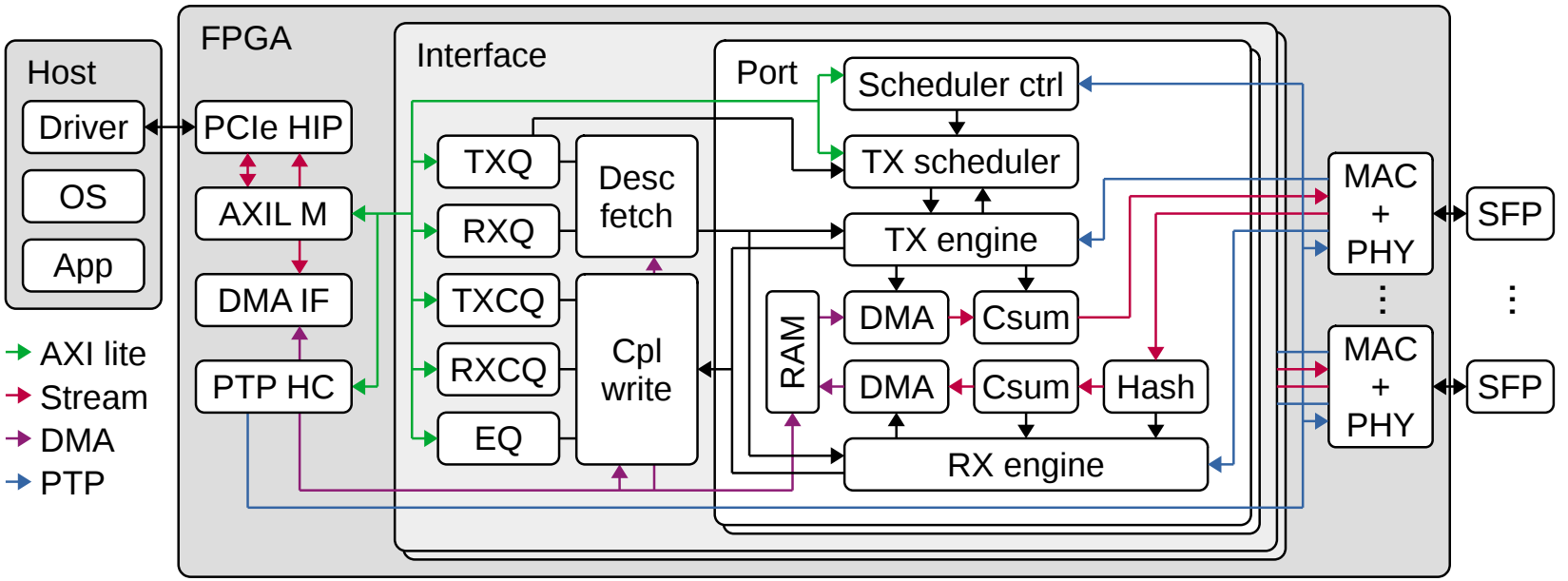
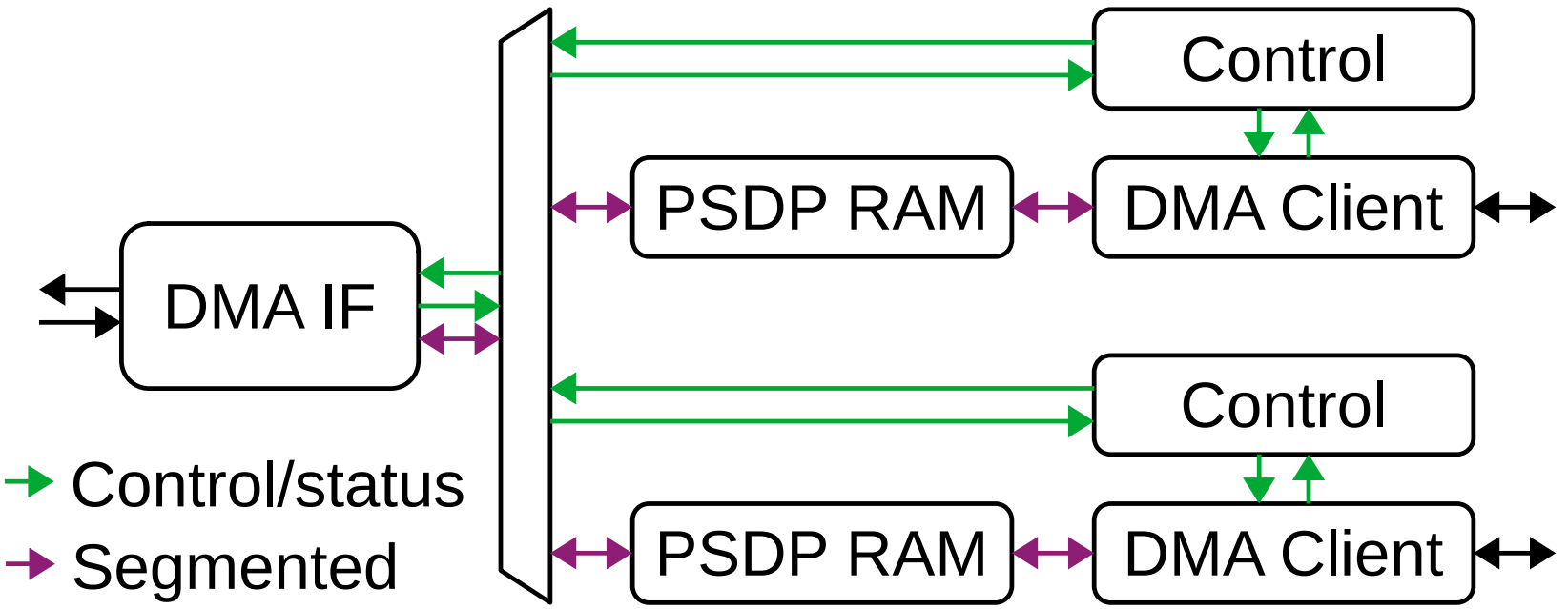
RTL Structure



DMA RTL Structure



Overview

Roadmap

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- Restructure RTL (shared datapath)
- SW/HW Interface Optimisation
  (Variable Length Descriptors)
- Unified DMA Address Space (Host + on-board DRAM)
- RDMA Support
  - RoCEv2
  - On-board DRAM Cache
- DPDK Support
- Large Send Offload (LSO)/ Large Receive Offload (LRO)

Meet Us

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- Mailing list:
  https://groups.google.com/d/forum/corundum-nic
- Slack:
  https://join.slack.com/t/corundumworkspace/shared_invite/zt-tj5azsbm-V9LV8L7ugSRDBpe2JiPKMA
- Developer Meeting bi-weekly (Mon 6 pm MEZ):
  https://github.com/corundum/corundum/wiki/Corundum-Developer-Meeting
- Github Repo:
  https://github.com/corundum/corundum
- Github WIKI:
  https://github.com/corundum/corundum/wiki