fakernet

Use **standard internet protocols** to **read data** from **front-end modules**

Idea/suggestion:
Philipp Klenze (TUM)
(nov 2017)

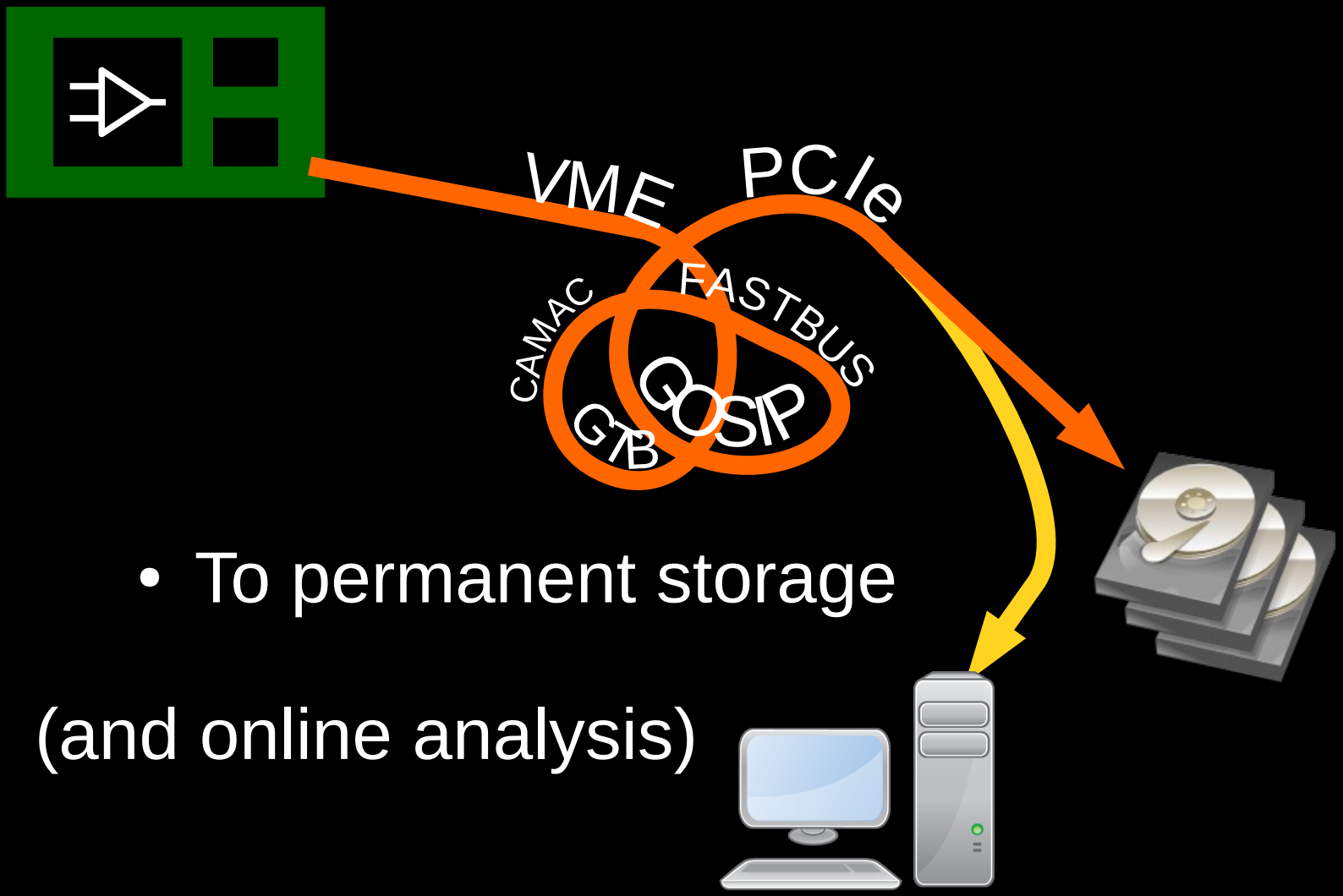
Hardware interface + testing:
Anders Furufors (Chalmers)

Håkan Johansson, Chalmers, Göteborg

Lichtenberghaus, Darmstadt, May 2019

Purpose of a DAQ

- Move data from front-end boards (ADC, TDC)



- To permanent storage
- (and online analysis)

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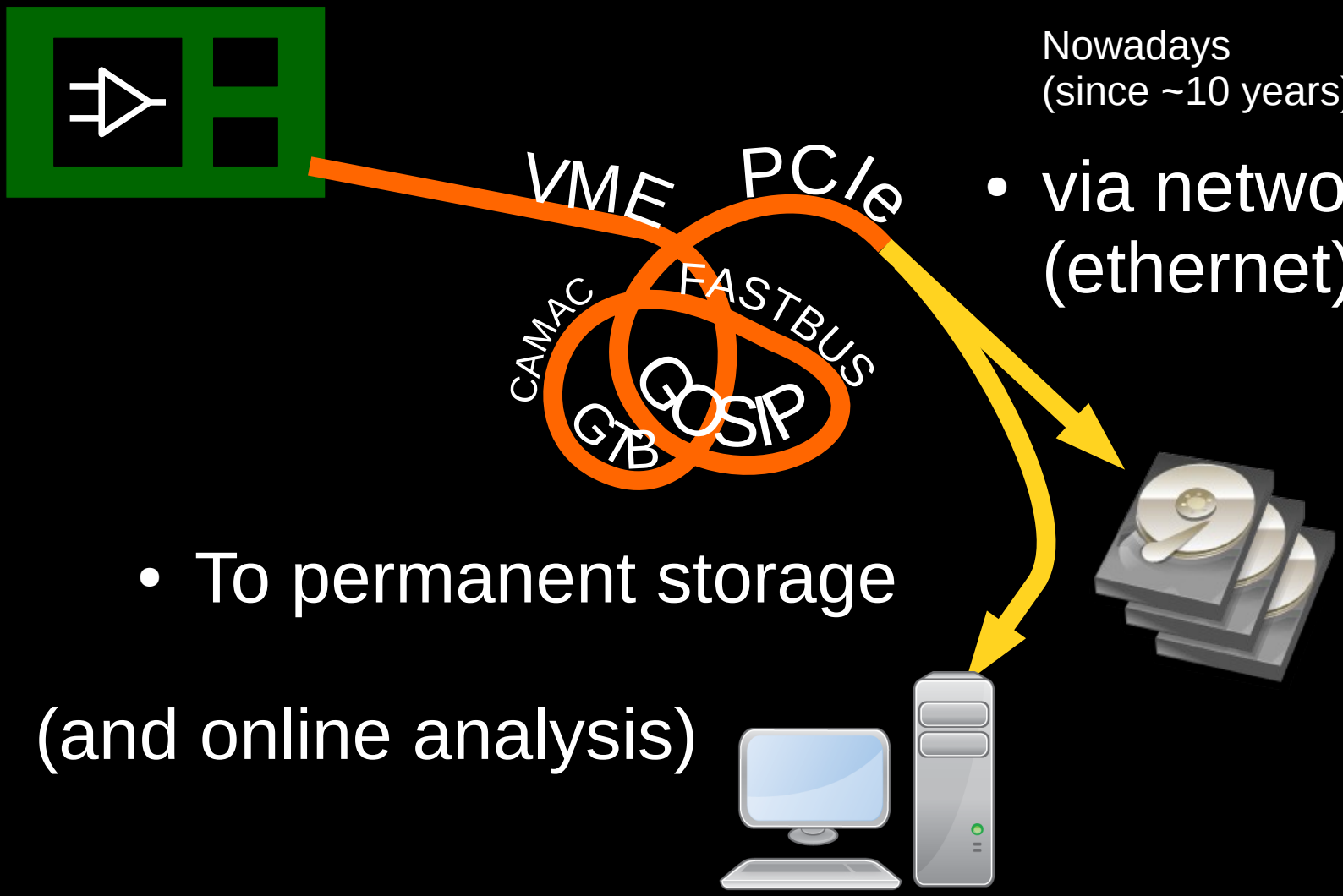
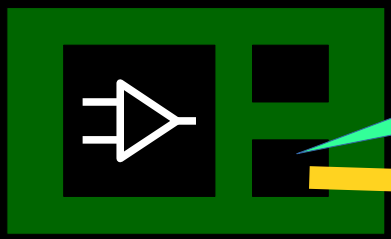


Nowadays
(since ~10 years):

- via network (ethernet)
- To permanent storage
- (and online analysis)

Transport data using TCP

- Move data from front-end boards (ADC, TDC)



Already have FPGA here.

Make ”Fake” ethernet

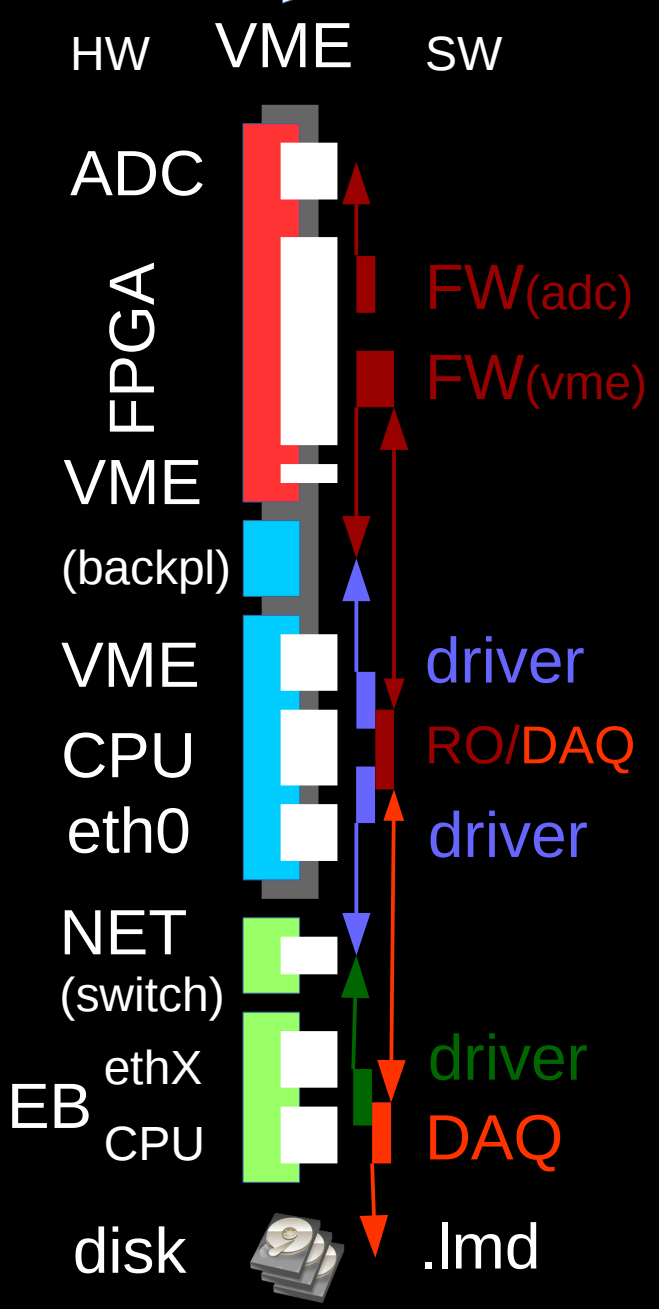
- via network (ethernet)

Commercial, cheap (”local supermarket”)

- To permanent storage
- (and online analysis)

Reaching network

"Classical system"



Custom (board)

Low-volume commercial
(e.g. VME CPU board)

Commercial
(e.g. PC / switch)

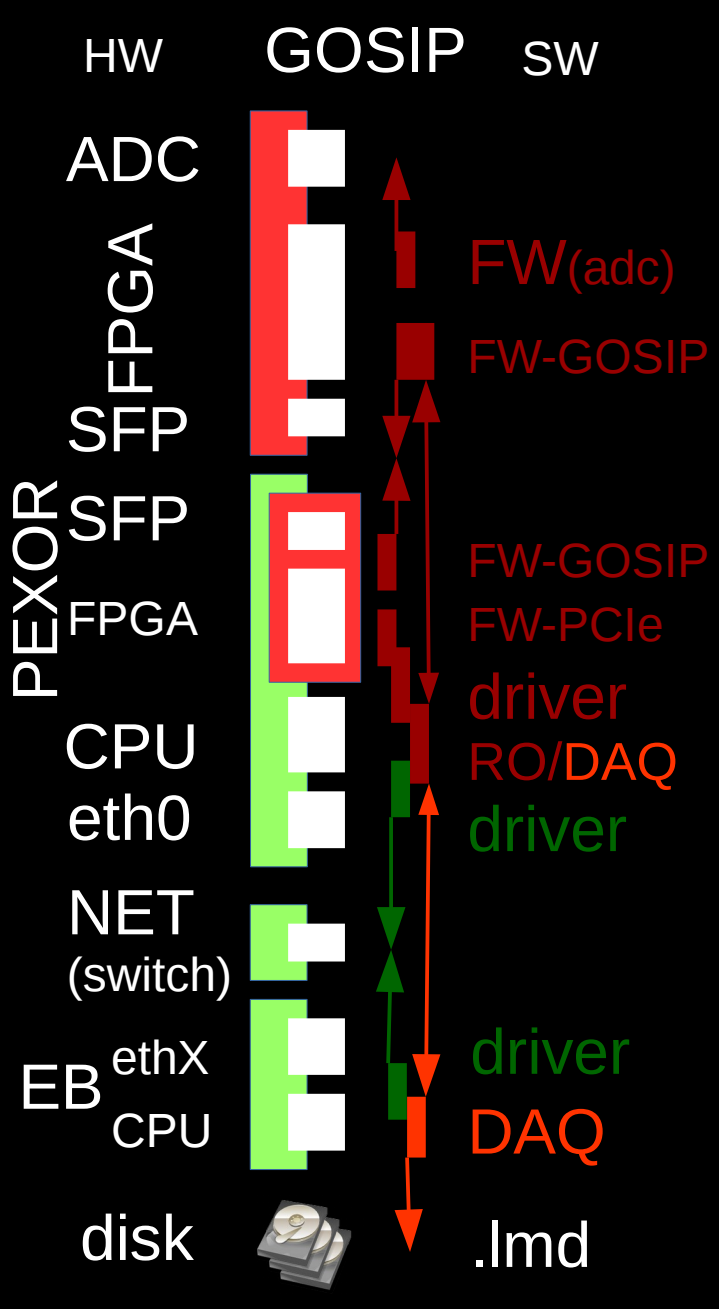
Custom firmware/
software

Common software

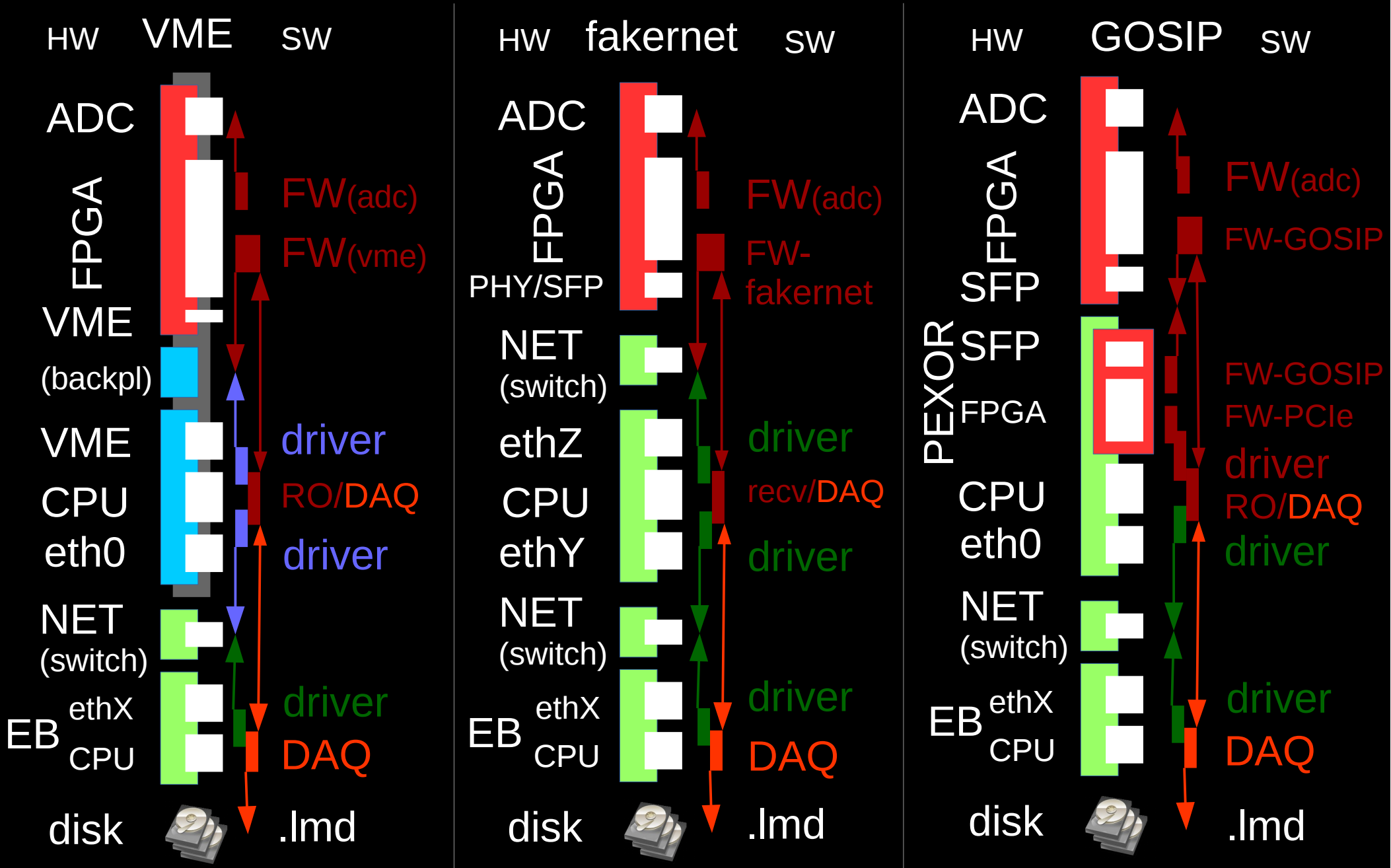
Customized open-source
(BSP packages)

Generic open-source
(e.g. GNU/Linux)

Example custom system
Others e.g.: CAEN CONET



Reaching network



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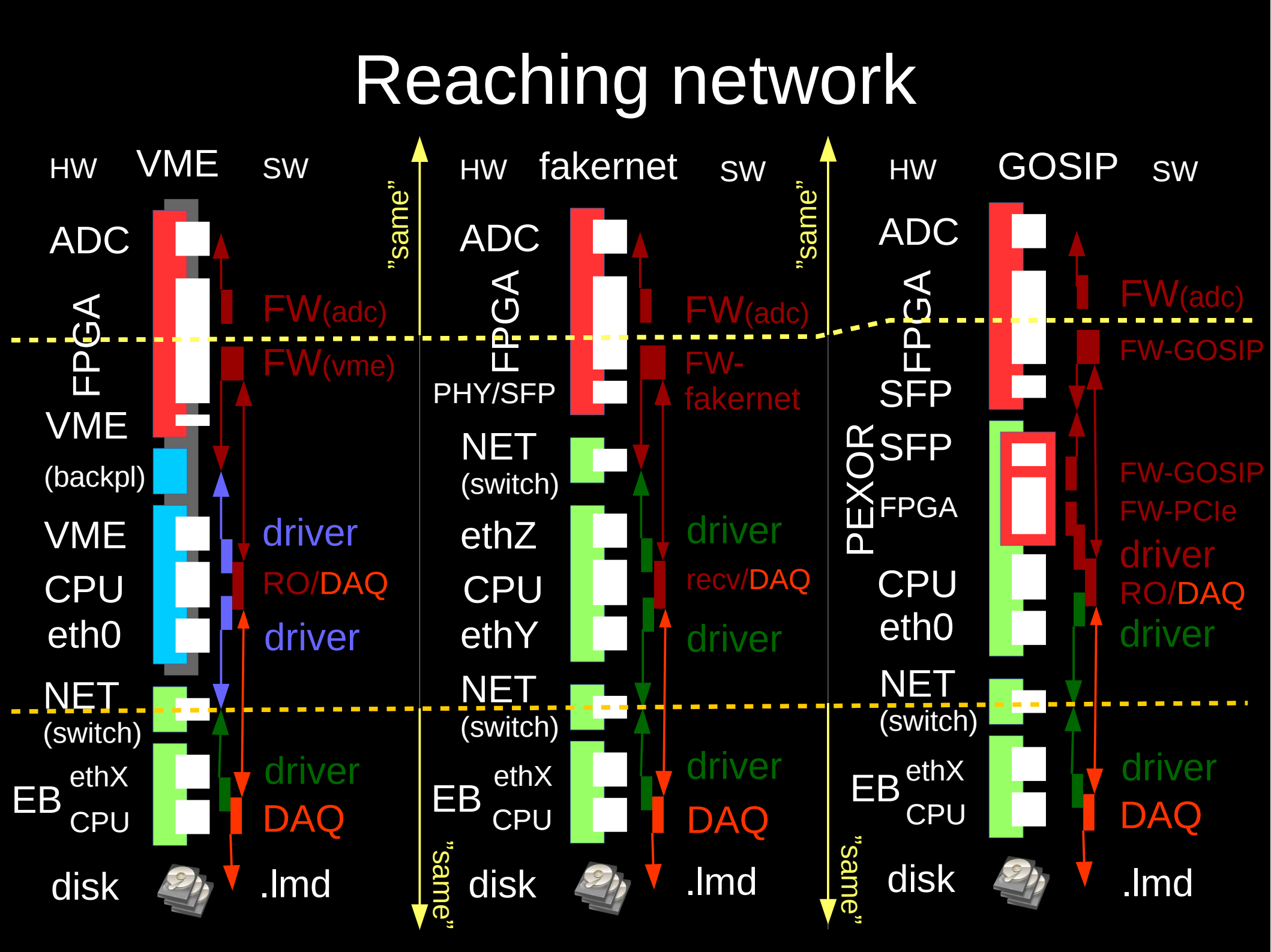

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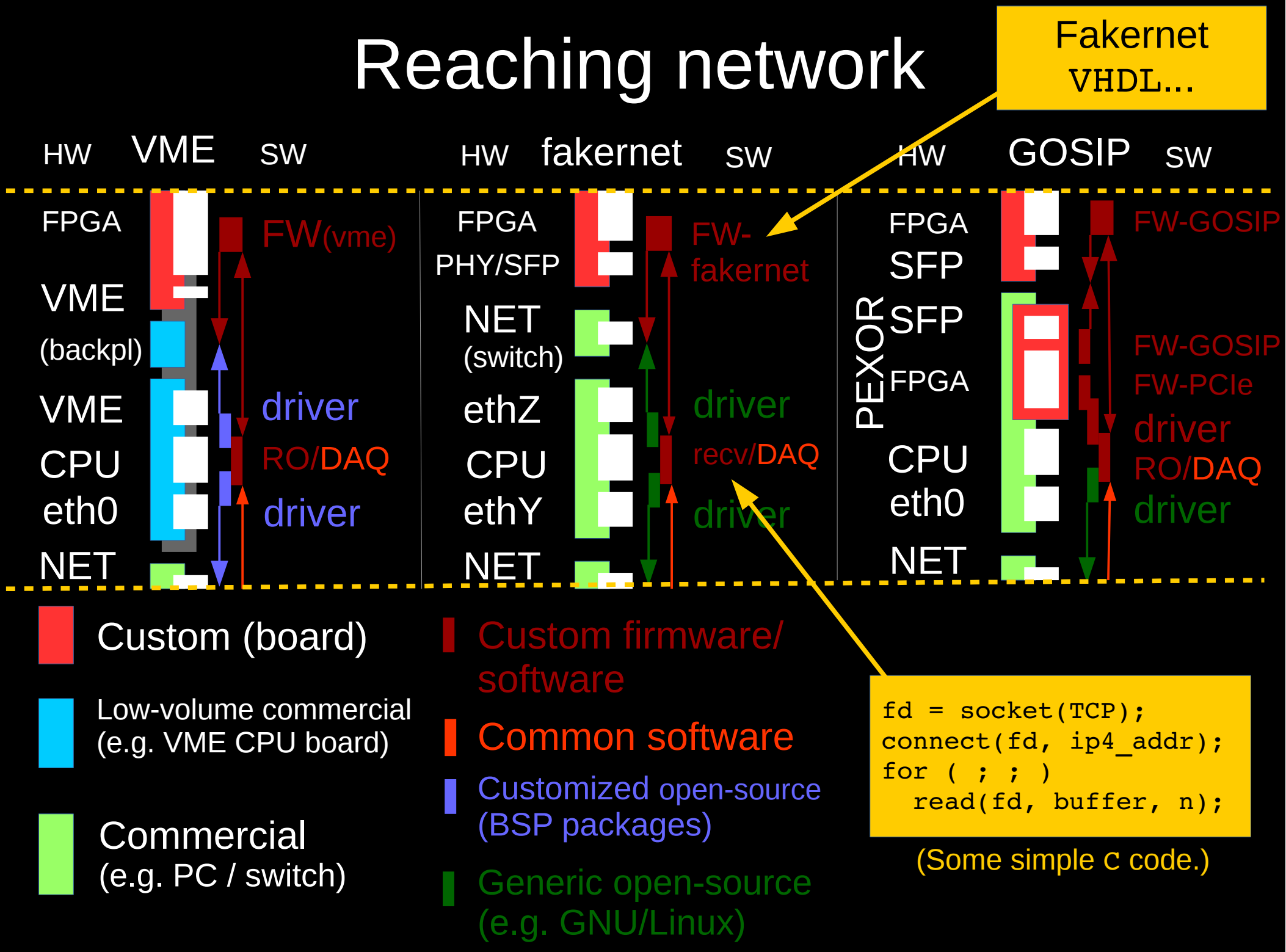
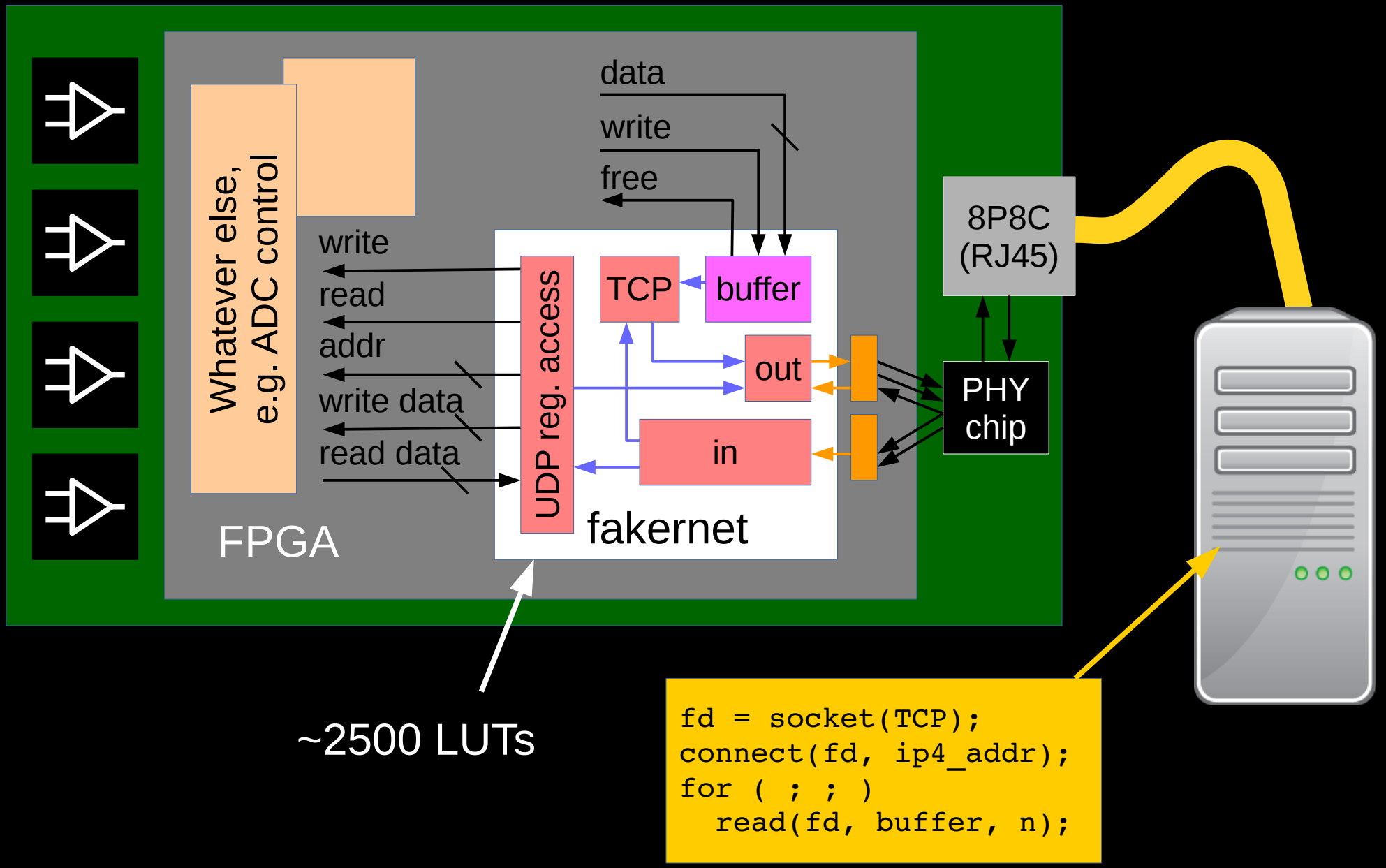


Fakernet overview



fakernet - Summary

- Data stream to TCP
  - @ line speed. (the VHDL code is > 1 Gbps-capable)
- Control access via UDP
  - ’Reliable’ (by sequence counter)
- Directly to commercial network hardware
  - Private subnet—(not for generic network)
- Std. Ethernet & IP checksums from FPGA to CPU
- No special drivers
- ~ 2500 LUTs, needs PHY + 8P8C (RJ45) or SFP

100 Mbps tested with hardware

Comparison:
VULOM4 has 20 kLUT

fakernet - RST

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Thank you!

and Philipp
& Anders