A Research Computer for Systems Software Research

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Abstract

Companies are building their own hardware solutions – how can academic systems software research stay relevant when the hardware isn't off-the-shelf any more?

Feasible hardware design space

Scope of most systems software research

Available COTS hardware

Specialized product hardware designs

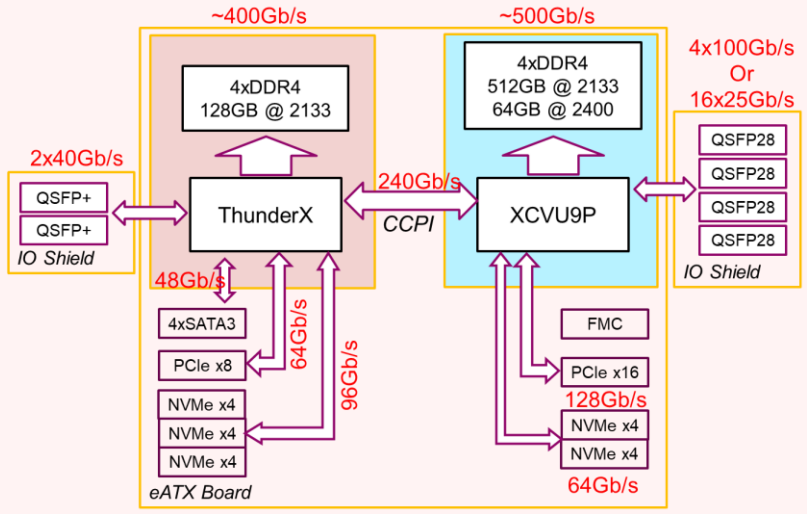
Challenges

- It's hard for universities to get custom hardware
- It's even harder for them to get documentation
- When they do, the **key decisions have already been made**: research is constrained to follow hardware designs, not lead them.

Core Idea

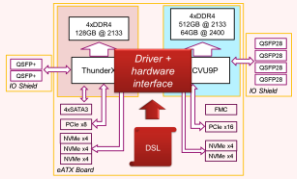
- A **flexible** and configurable computer for **research**

Enzian Block Diagram

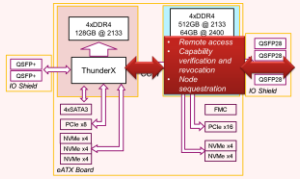


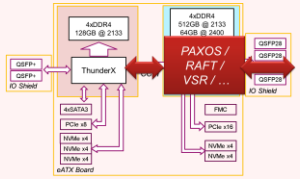
Applications / Research Directions

Hardware/Software Co-design

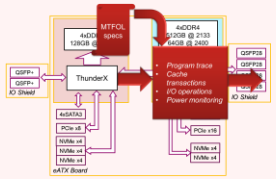


RDMA





Consensus



Verification

Prototype

3x Coherency Link

Key features: final design

- 80+400Gb/s network
- 640GB RAM
- 48 ARM Cores
- NVMe / PCI Express
- **Native processor coherence protocol** on the FPGA

Acknowledgements/References

http://www.enzian.systems/