
Early HPC Use Cases for RISC V

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Overview

HPC accelerators based on RISC V

- Vector/Matrix processors
- Custom Floating point calculations
- Network processor elements

RISC V as a scalable multi core processor

- Probably further away in the future
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Classic HPC - State of RISC V Infrastructure

HPC

- Large Scale and an established legacy
- Full Scalable Operating System
- Established support for high speed networking, GPUs etc etc.

RISC V

- Customizable minimal, easily modifiable
 - Infrastructure is maturing
 - No support for general high speed I/O and specialized offloaders.
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RISC V HPC Potential form factors

PCIe Card

- Command and control like a regular network device under Linux
- PCIe limits for data throughput (PCIe3 problems)
- Local memory.

Network Element

- Node on the ethernet fabric
 - 1G command and control
 - 10G Data
 - Needs 100G/200G support to be competitive.
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Software Support

Operating System

- Minimal operating system or network stack. Maybe no operating system.
- Removal of major components of the OS (such as MMU)
- Complex tasks are offloaded to other units in the HPC fabric.

Applications

- Custom applications in support of custom hardware.
 - Software is minimal and experimental and exploring new approaches
 - Will mature as ecosystem and RISC V systems mature
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RISC V use cases

Standardized floating point accelerators

Replace GPUs, Numeric Calculations, Vector calculation, Vector engines. A rich playground for new approaches.

Custom accelerators

Special math operations customized for a workload (f.e. Biology, Genome, vector path analysis, deep learning)

Network processors

In line network compute elements. Wire speed modifications. On the wire calculations and operations.

Questions and Discussion

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