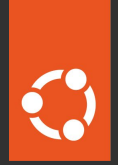

Building the software ecosystem for a RISC-V data center

Jon Taylor
RISC-V Product Manager

Who am I?

25 years in semiconductor industry

Involved with RISC-V since 2019

Member of RISC-V marketing committee since 2023

Now product manager for RISC-V at Canonical

Introduction

RISC-V is evolving from specialized silicon to general-purpose desktop and server architectures.

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Data centers demand more than high performance CPUs. They require integrated security, massive scalability, and high reliability.

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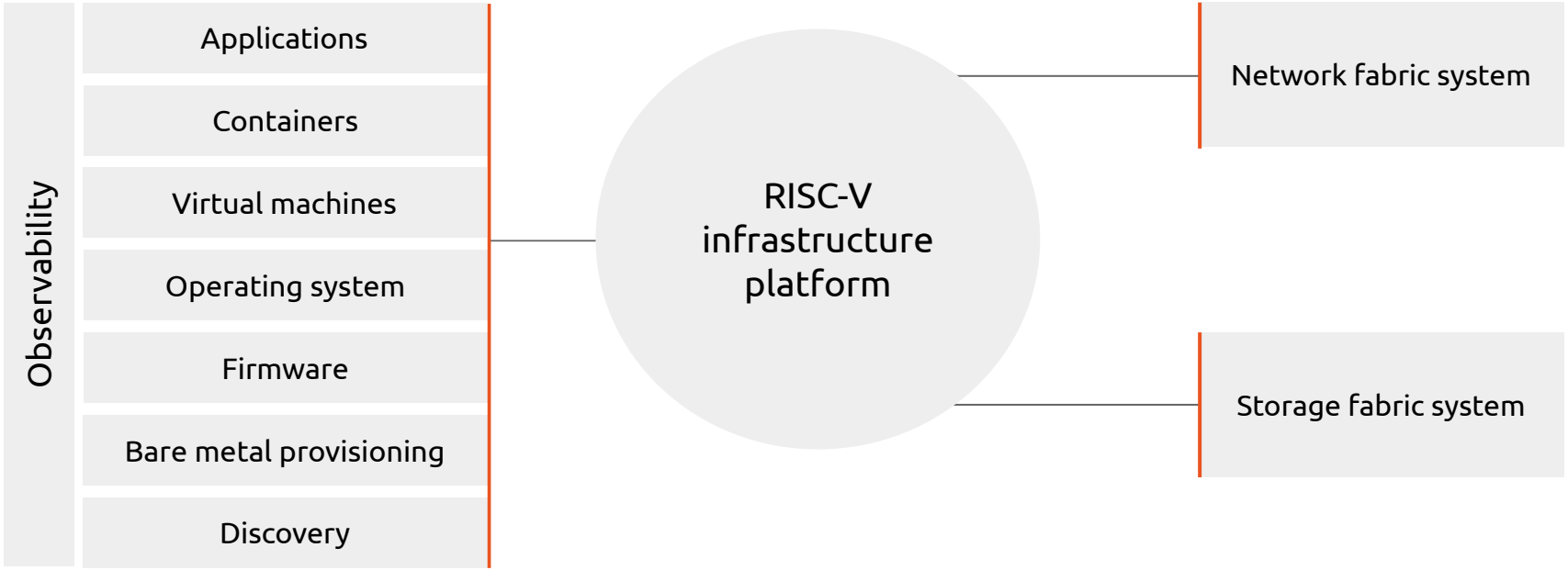
Data centers demand more than single-thread frequency; they require integrated security, massive scalability, and high reliability.

We'll look at the "system of systems" problem and see how it's being addressed

Software systems of systems

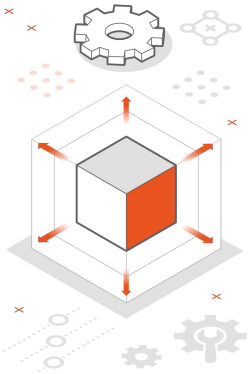


Infrastructure foundations

Modern data centers require autonomous management layers that operate independently of the host silicon and primary OS state.

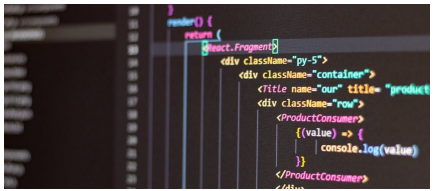
- **Bare metal management:** enabling full lifecycle control of unprovisioned hardware.
- **BMCs and Redfish:** Baseboard Management Controllers and open Redfish APIs enable universal discovery and power management.
- **Secure deployment:** scaling security by removing manual steps from the silicon-to-OS lifecycle.

Virtualization and containerization



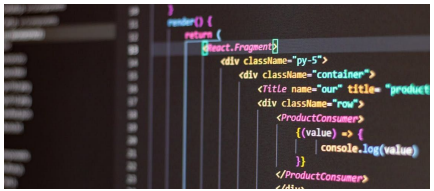
- **Scale** from tiny apps needing only part of a CPU to complex crossing multiple nodes.
- **Strong isolation** for security and privacy.
- **Low overheads** for starting and stopping applications.

Orchestration and dynamic management



Managing complex workloads through provisioning, monitoring, scaling and lifecycle management.

Orchestration and dynamic management



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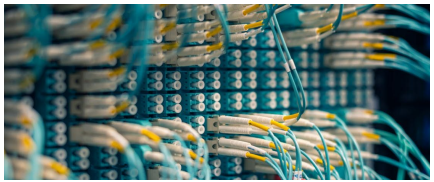
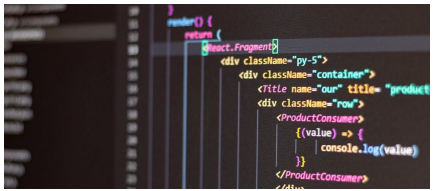


Storage and **networking** including backup and redundancy.

Orchestration and dynamic management



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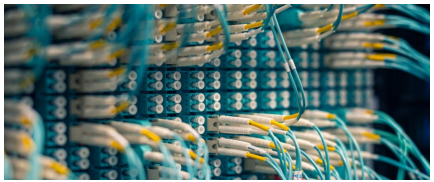

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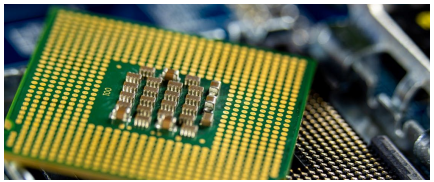
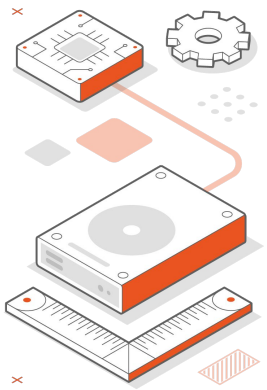


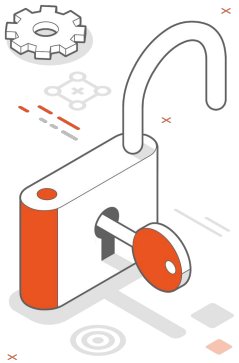
Custom silicon for workload-specific acceleration.

Microclouds and distributed compute



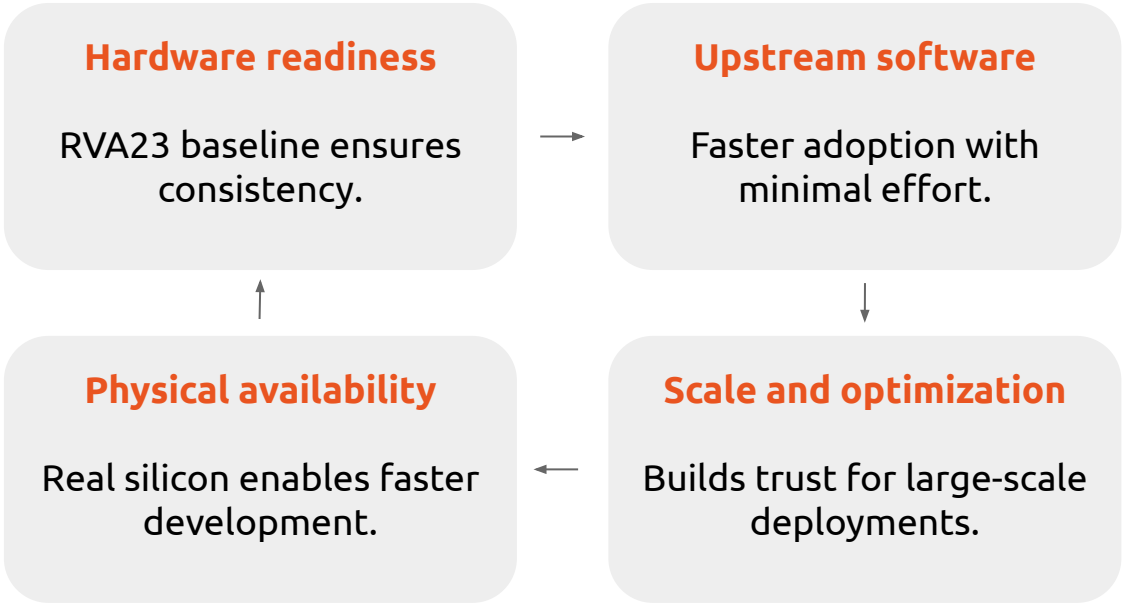
- Smaller scale compute still benefits from data center technology.
- Benefits include security, low latency, and minimal overhead.
- Requirements for management and updatability still apply at a smaller scale.

Long tail of maintenance



- System must be maintained and secured as long as it’s running
- Security updates must be readily available
- Control over what, where and when they are deployed
- Management of dependencies across thousands of packages

Building a virtuous circle



Conclusion

- The RISC-V data center is a work in progress.
- Software is as complex as CPU design.
- Working upstream makes the software much faster and easier to scale.
- RVA23 silicon availability will massively accelerate the pace of development.

Final takeaway

- Next year, Canonical plans to have RVA23 silicon in our in-house data center, powering launchpad.net and customer clouds.
- Contact me at jon.taylor@canonical.com