Intel® Network Builders Insights Series

Intel IPUs Fundamental Role In Your Cloud Strategy

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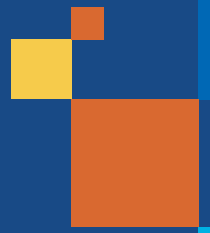

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- Intel technologies may require enabled hardware, software or service activation.
- No product or component can be absolutely secure.
- Your costs and results may vary.
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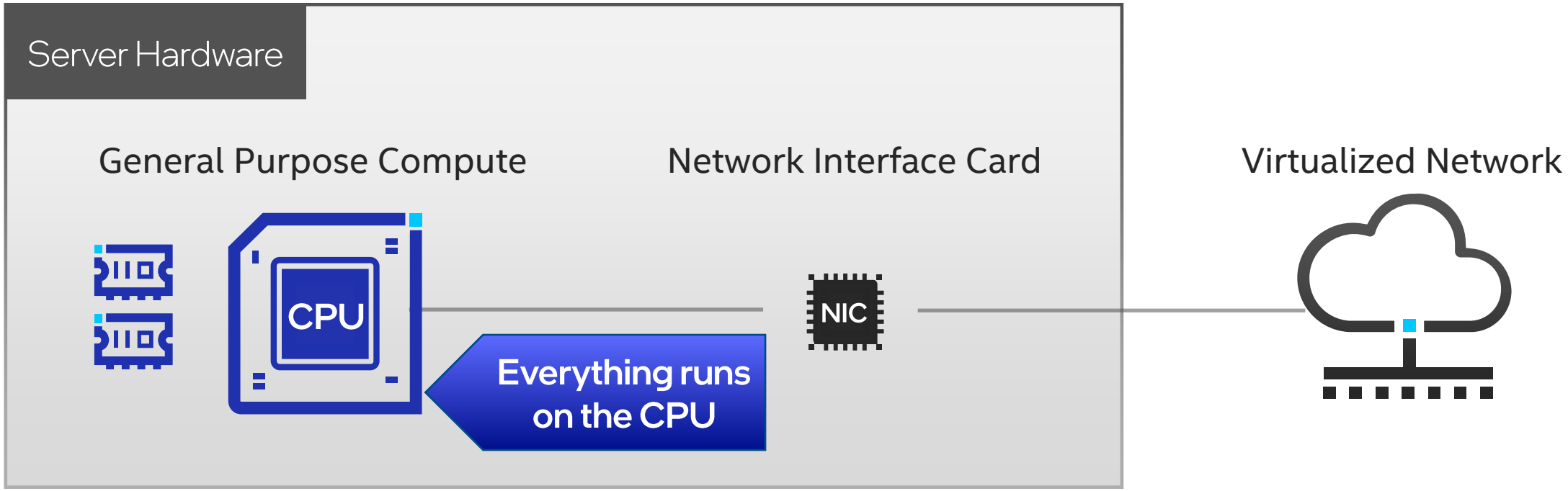
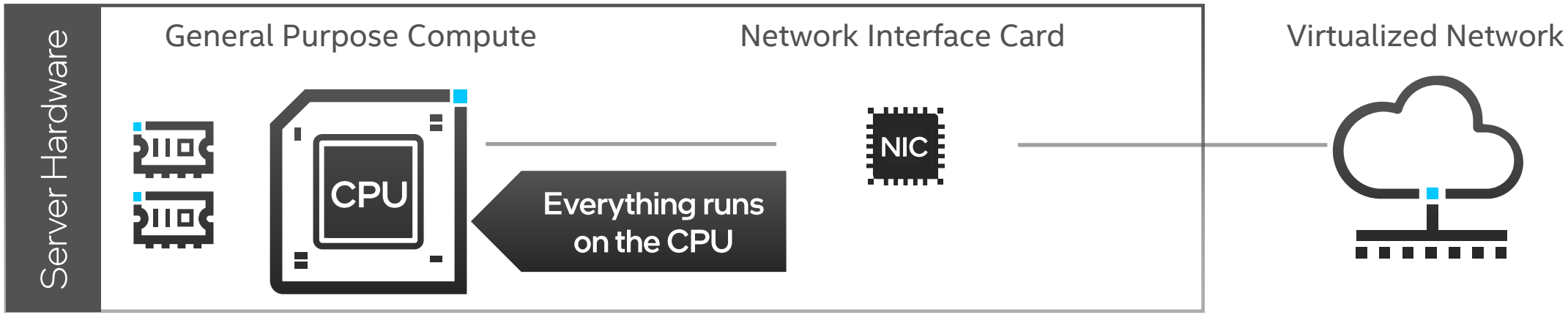
Server Architecture in a classic Data Center

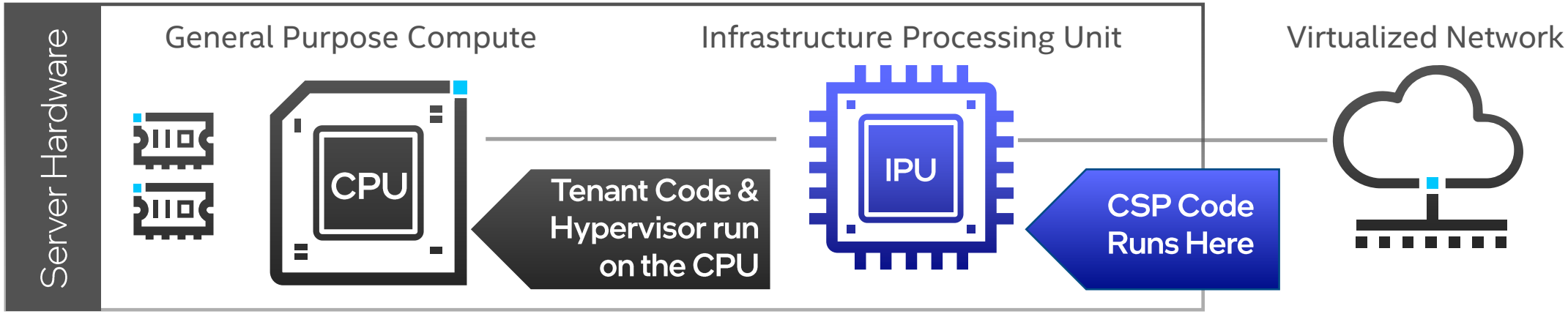
Software and Infrastructure are all controlled by One Entity

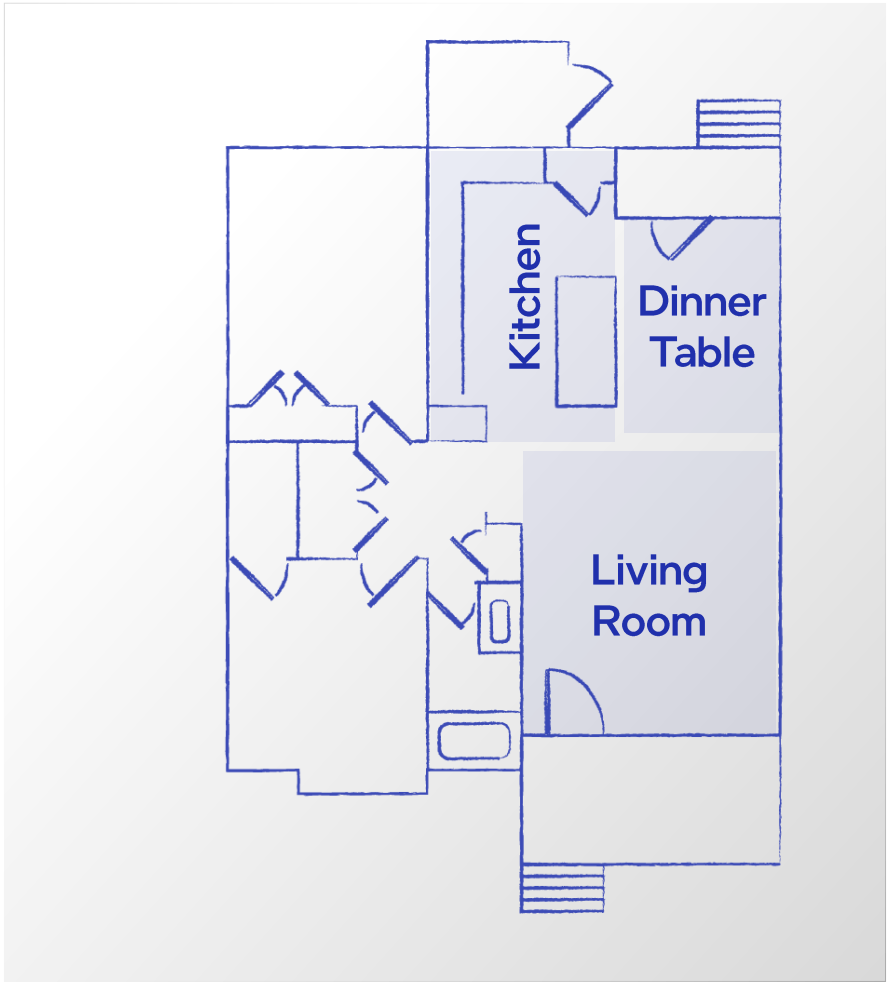


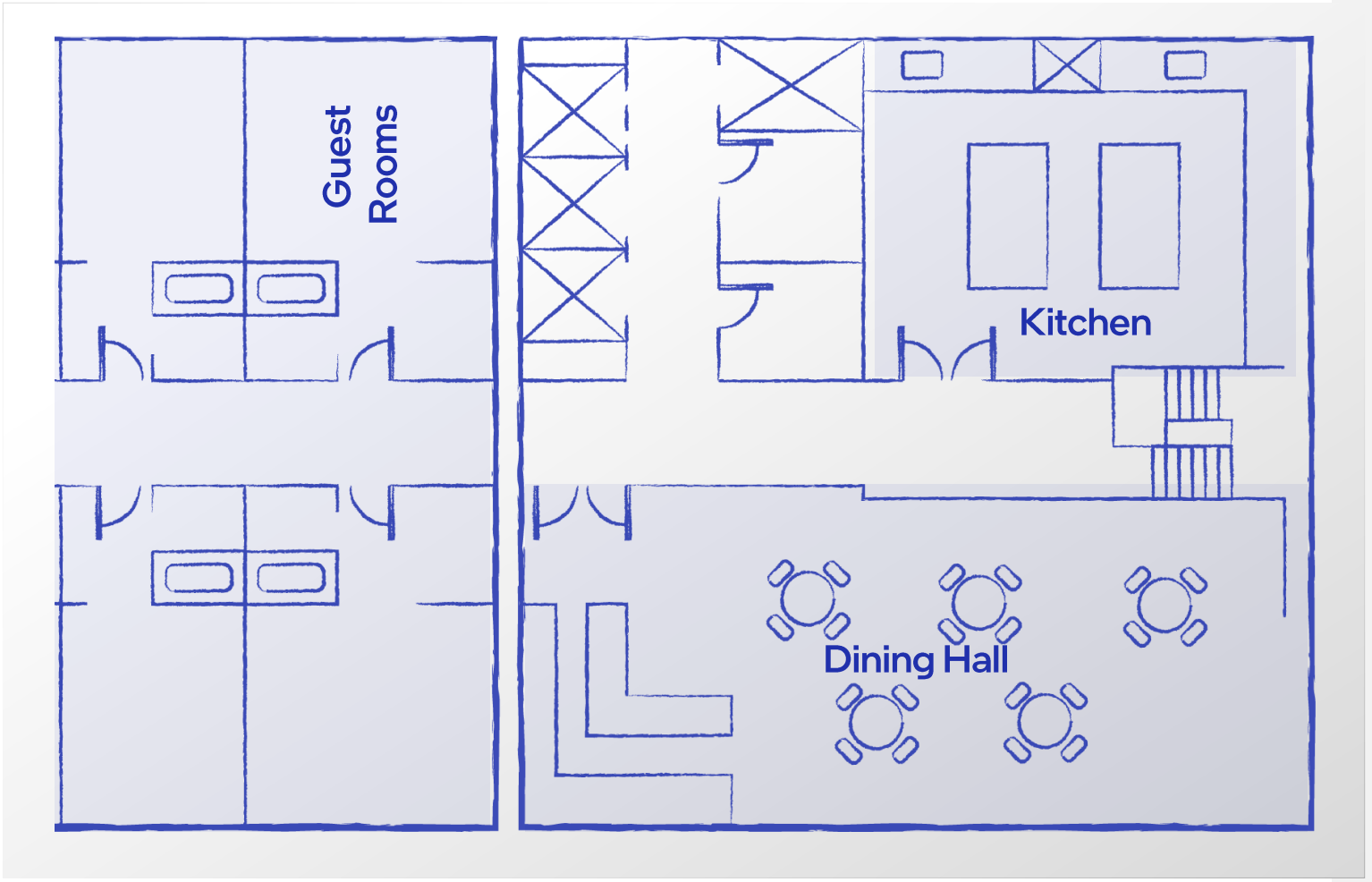
Classic Server Architecture



Cloud Server Architecture

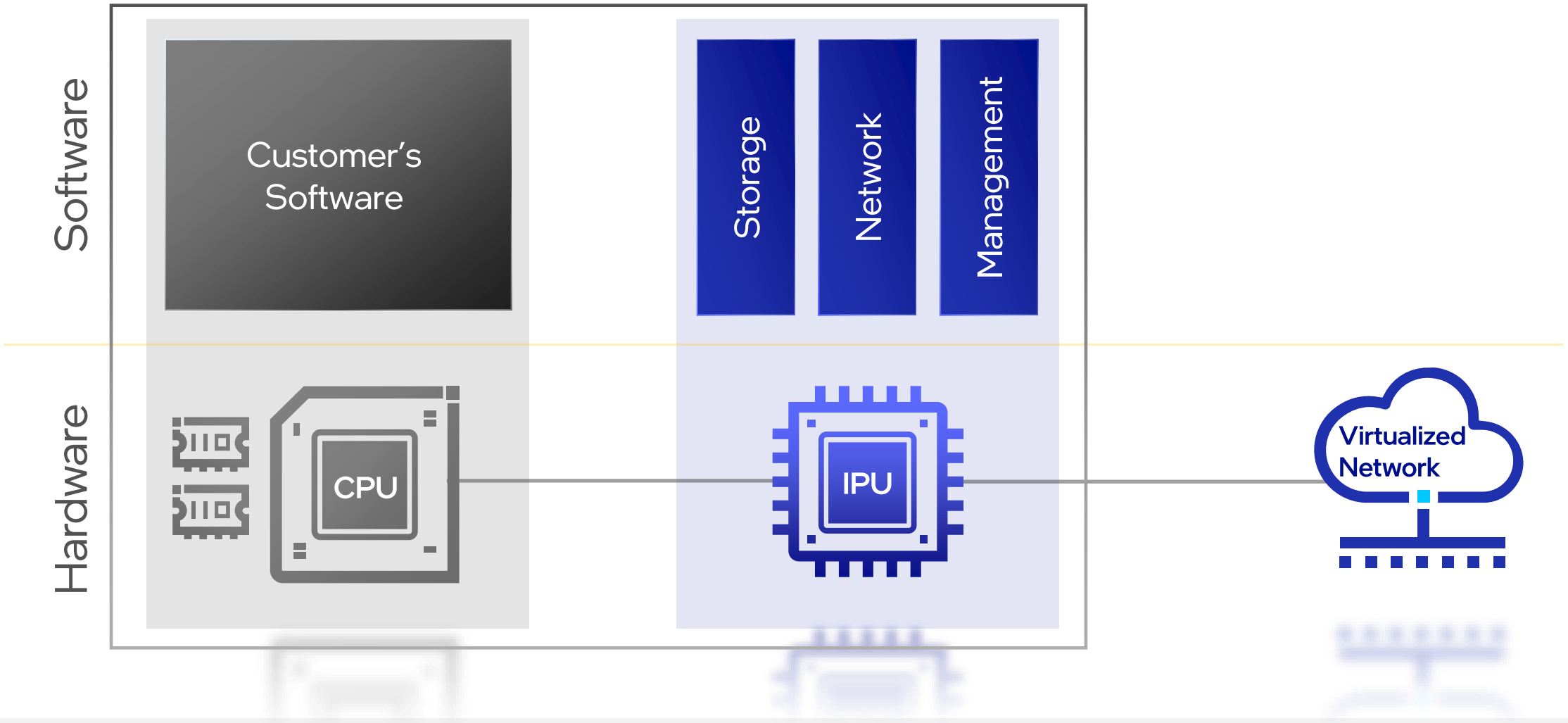



Kitchen
Dinner Table
Living Room


Guest Rooms
Kitchen
Dining Hall

Advantage 1 - Separation of Infrastructure and Tenant

Maximum Control and Isolation for the Tenant



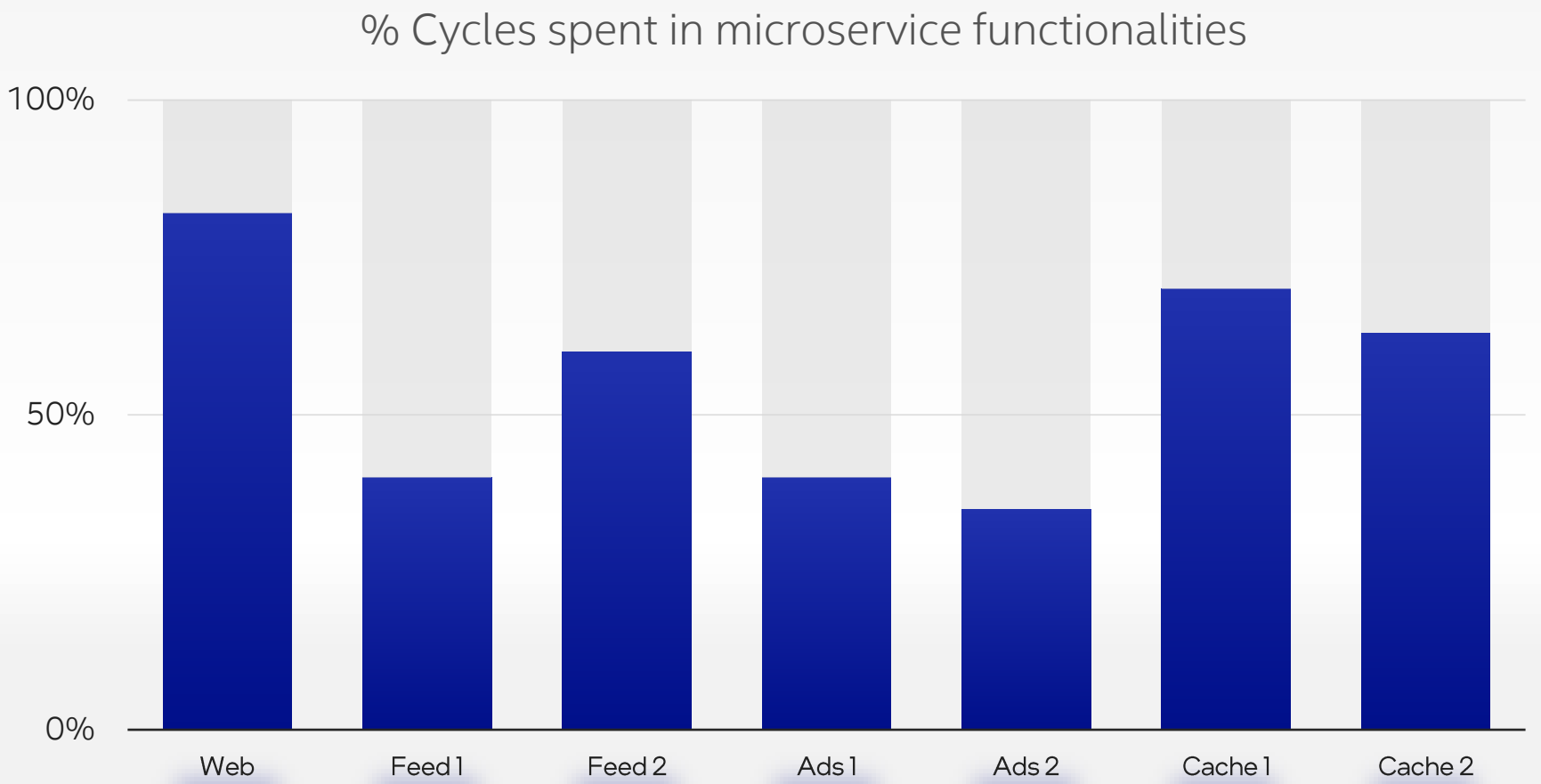
Advantage 2 - Infrastructure Offload

In some cases, the majority of CPU cycles are spent on overhead

31%

to 83%

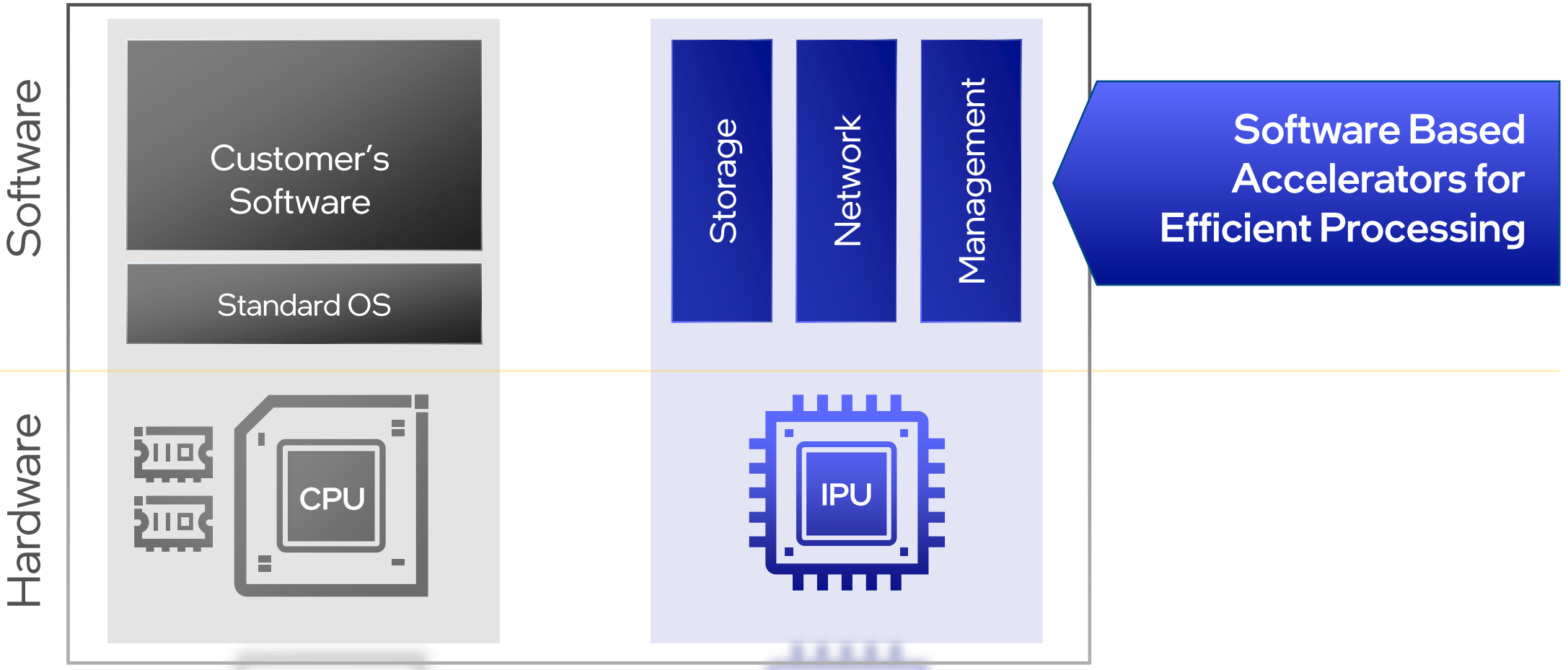
Microservice Overhead at Facebook



https://research.fb.com/publications/accelerometer-understanding-acceleration-opportunities-for-data-center-overheads-at-hyperscale/

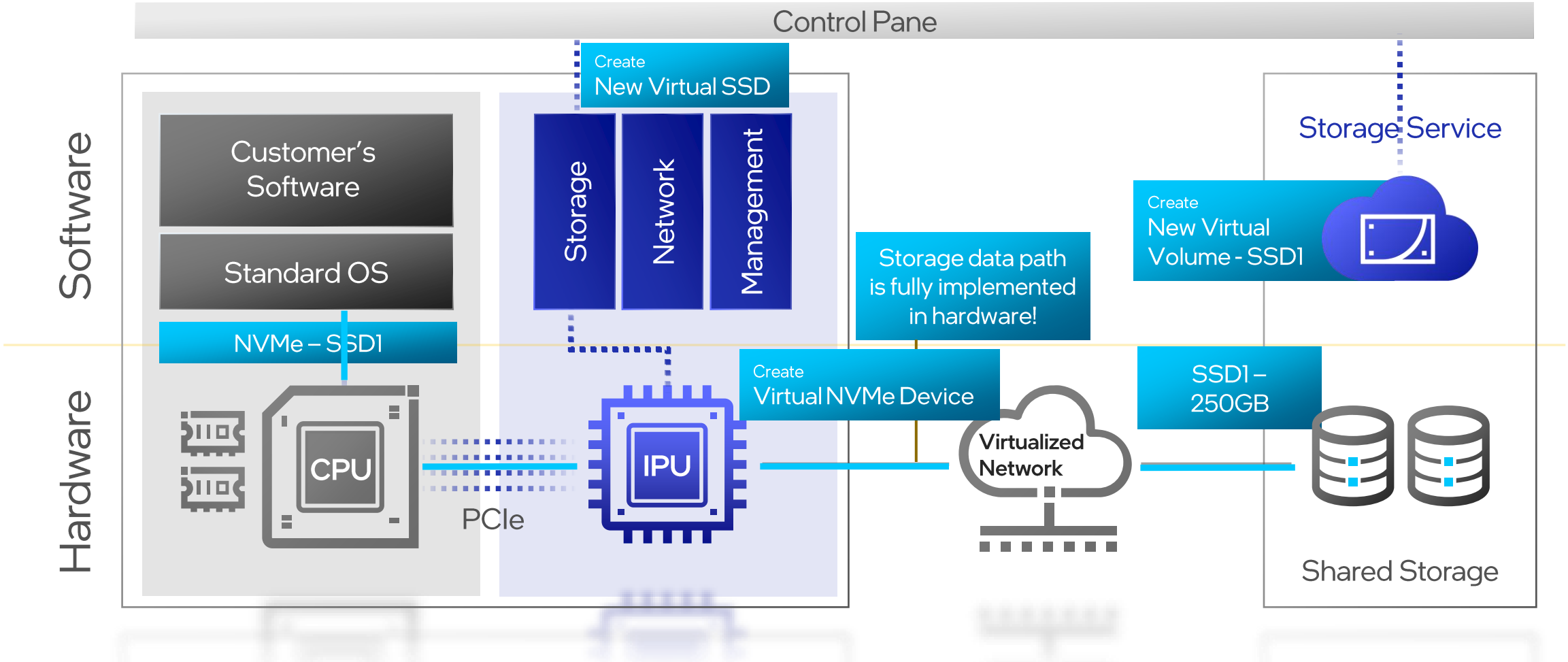
Advantage 2 - Infrastructure Offload

Dedicated Accelerators Free up CPU Capacity



Advantage 3 - Diskless Server Architecture

Scale with Virtual Storage via Network



Broad Infrastructure Acceleration Portfolio

Dedicated ASIC IPU

Performance and power optimized

Optimized secure networking and storage pipeline

FPGA-based Acceleration

IPU Platforms & Adapters	SmartNICs
Faster time to market for evolving standards	
Re-programmable Secure Datapath enables flexible/customizable workload offload (future proof)	Programmable accelerated infrastructure workloads with customizable packet processing
Onboard Xeon processor	Intel Ethernet NIC with DPDK support

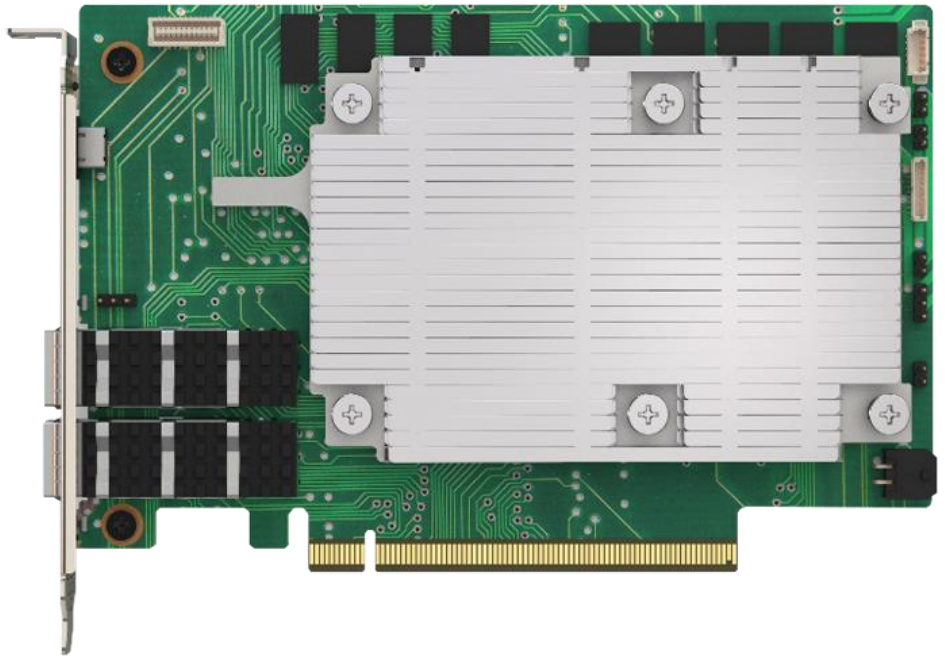
Partnering on the IPU

Introducing

Oak Springs Canyon

High perf networking and storage acceleration for Cloud Service Providers

- OVS, NVMe over Fabric, and RoCE solutions
- Programmable through Intel OFS, DPDK, and SPDK
- Customizable solutions with FPGA

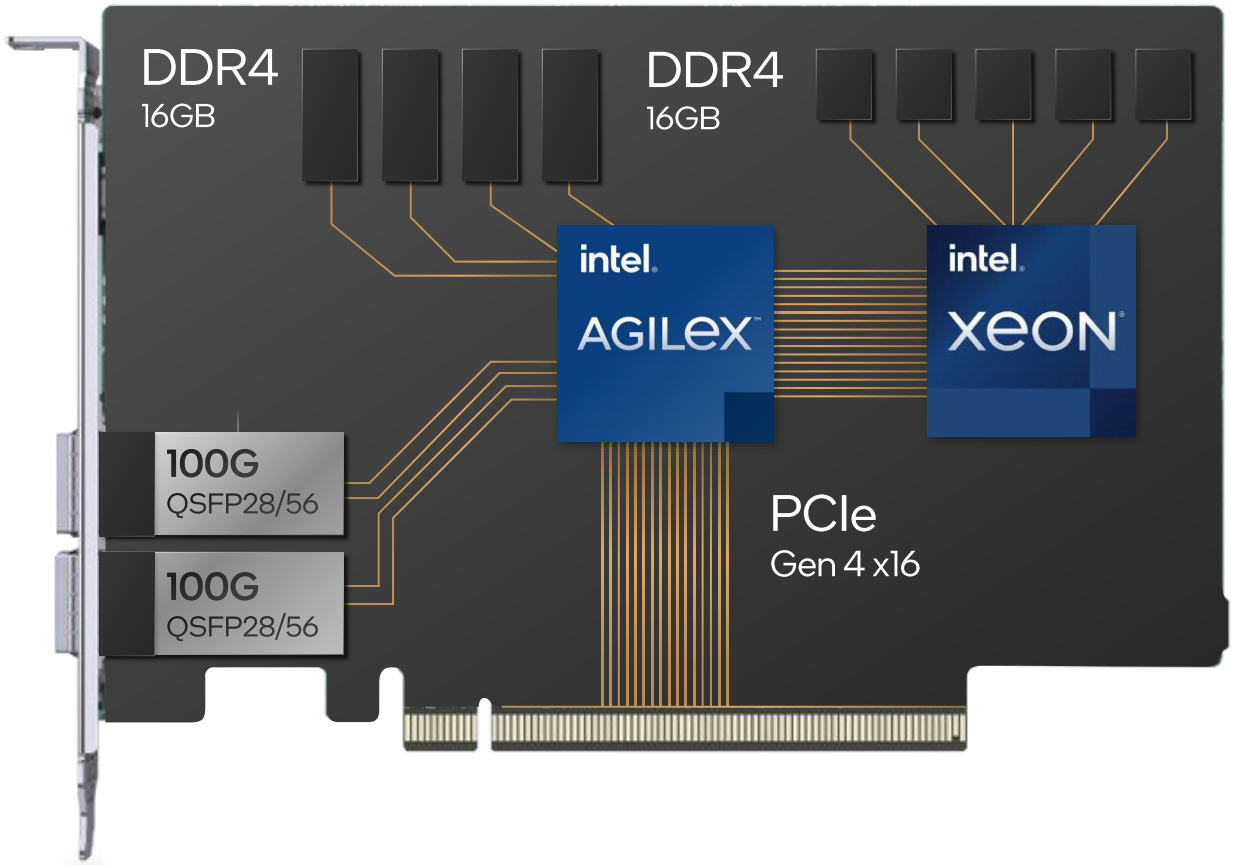


Intel OFS: Intel Open FPGA Stack

Oak Springs Canyon

Built with Intel® Agilex™ FPGA and Intel® Xeon® D SoC

- High speed Ethernet support - 2x100G
- PCIe Gen 4 x16
- Hardware crypto block enables security at line rate

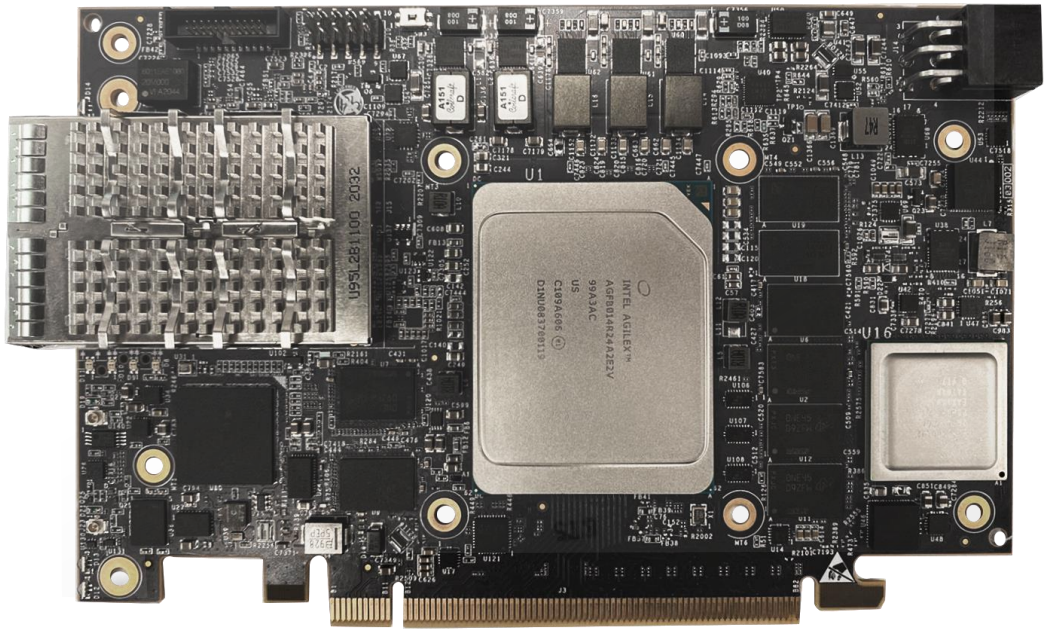


Introducing

Arrow Creek

Acceleration Development Platform (ADP) for
High Performance 100G networking acceleration

- Customizable packet processing including bridging and networking services
- Programmable through Intel OFS and DPDK
- Accelerated infrastructure workloads Juniper Contrail , OVS, SRv6, vFW
- Secure Remote Update of FPGA and Firmware over PCIe
- On-board root of trust

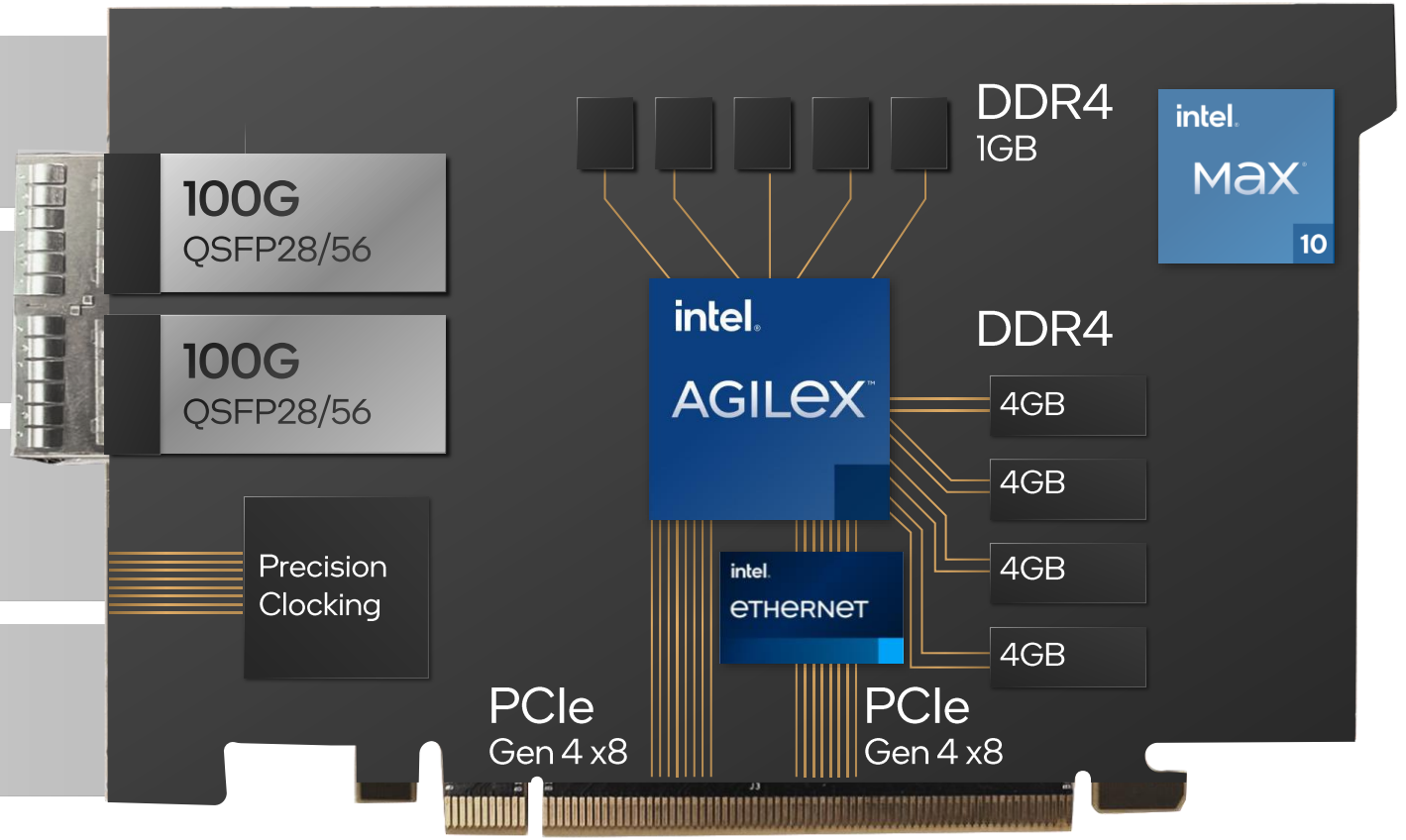


Intel OFS: Intel Open FPGA Stack

Arrow Creek

Built with Intel® Agilex™ FPGA and Intel® Ethernet E810 Controller

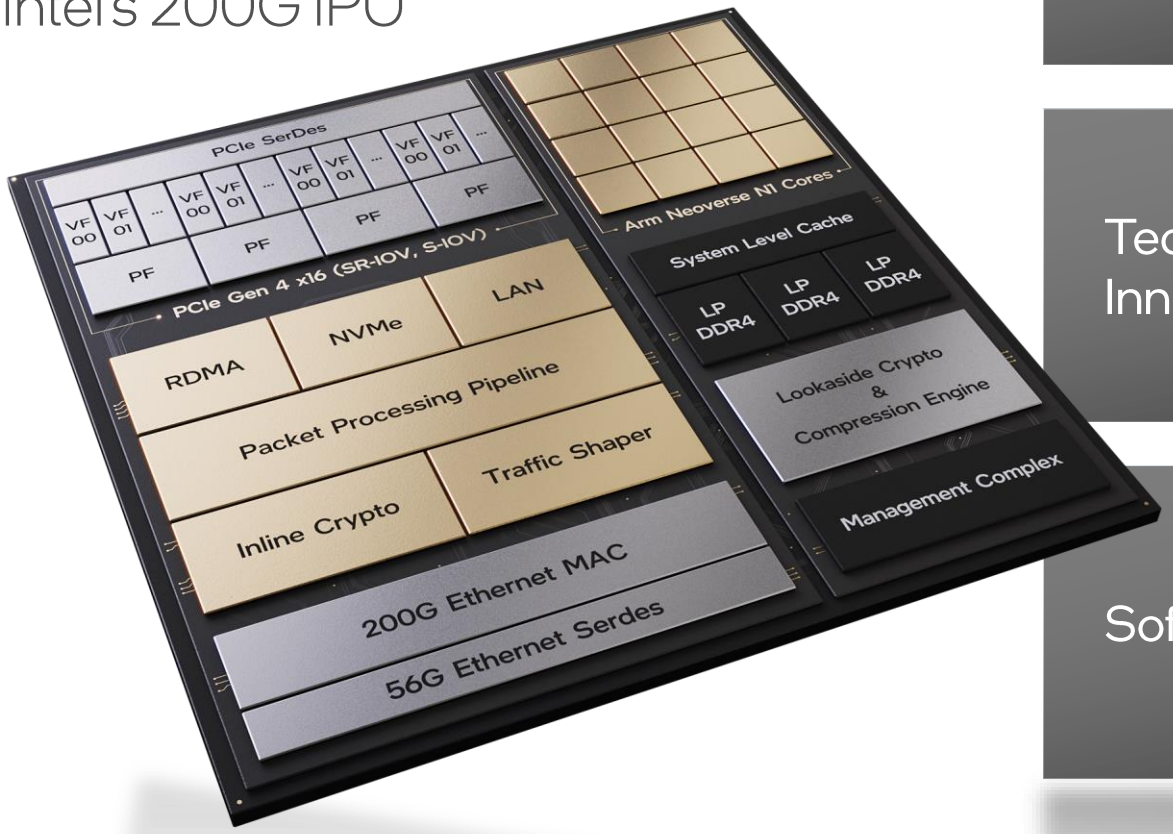
- 2x QSFP56 supporting up to 2x100GbE networking
- PCIe Gen4 x16
- 16GB DDR4 memory
  1GB DDR4 to integrated CPU
- Full height, half length PCIe form factor; passively cooled



Introducing

Mount Evans

Intel's 200G IPU



Hyperscale Ready

- Co-designed with a top cloud provider
- Integrated learnings from multiple gen. of FPGA sNICs
- High performance under real world load
- Security and isolation from the ground up

Technology Innovation

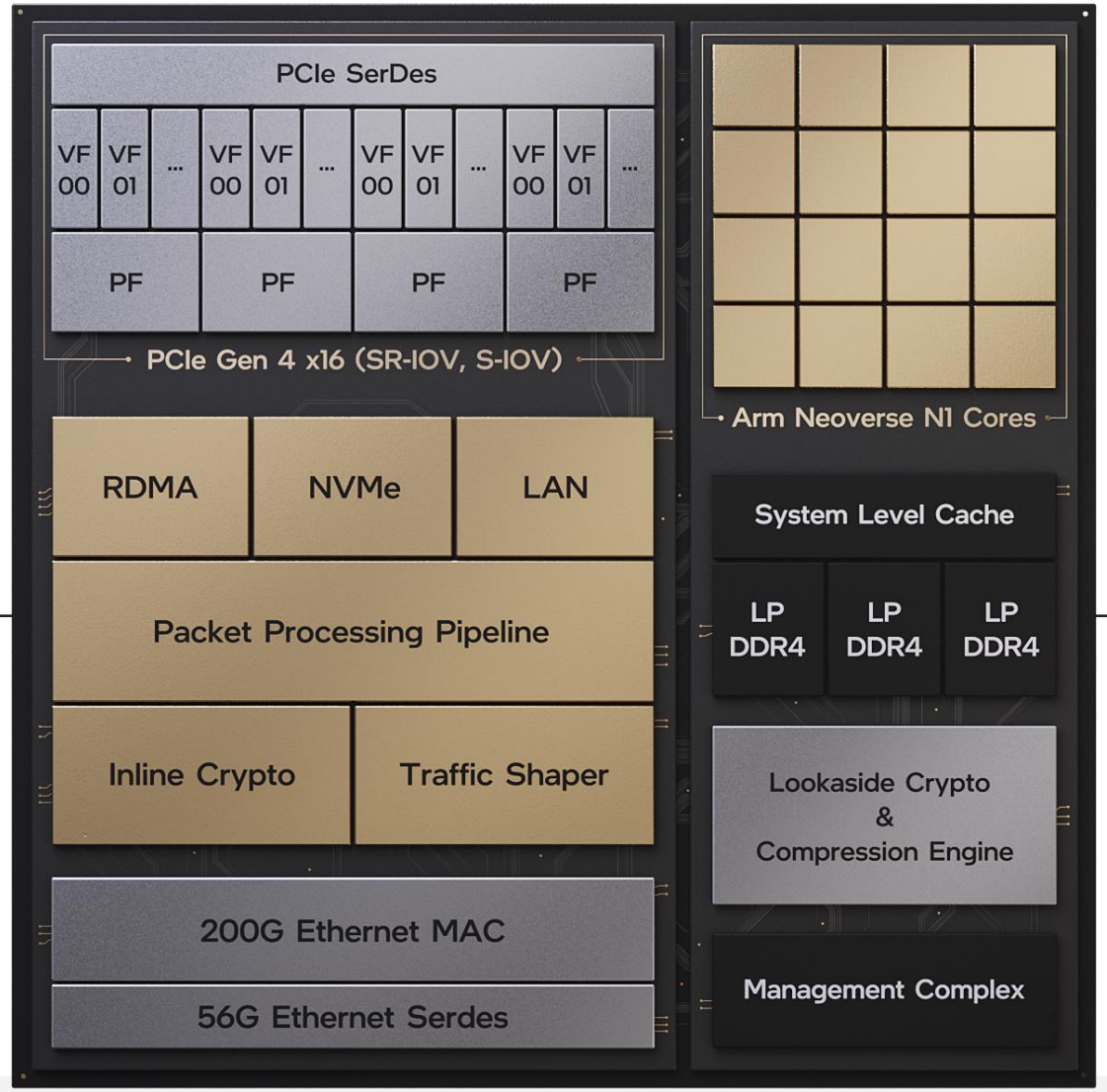
- Best-in-Class Programmable Packet Processing Engine
- NVMe storage interface scaled up from Intel Optane Tech
- Next Generation Reliable Transport
- Advanced crypto and compression accel.

Software

- SW/HW/Accel co-design
- P4 Studio based on Barefoot
- Leverage and extend DPDK and SPDK

Mount Evans

Architectural Breakdown



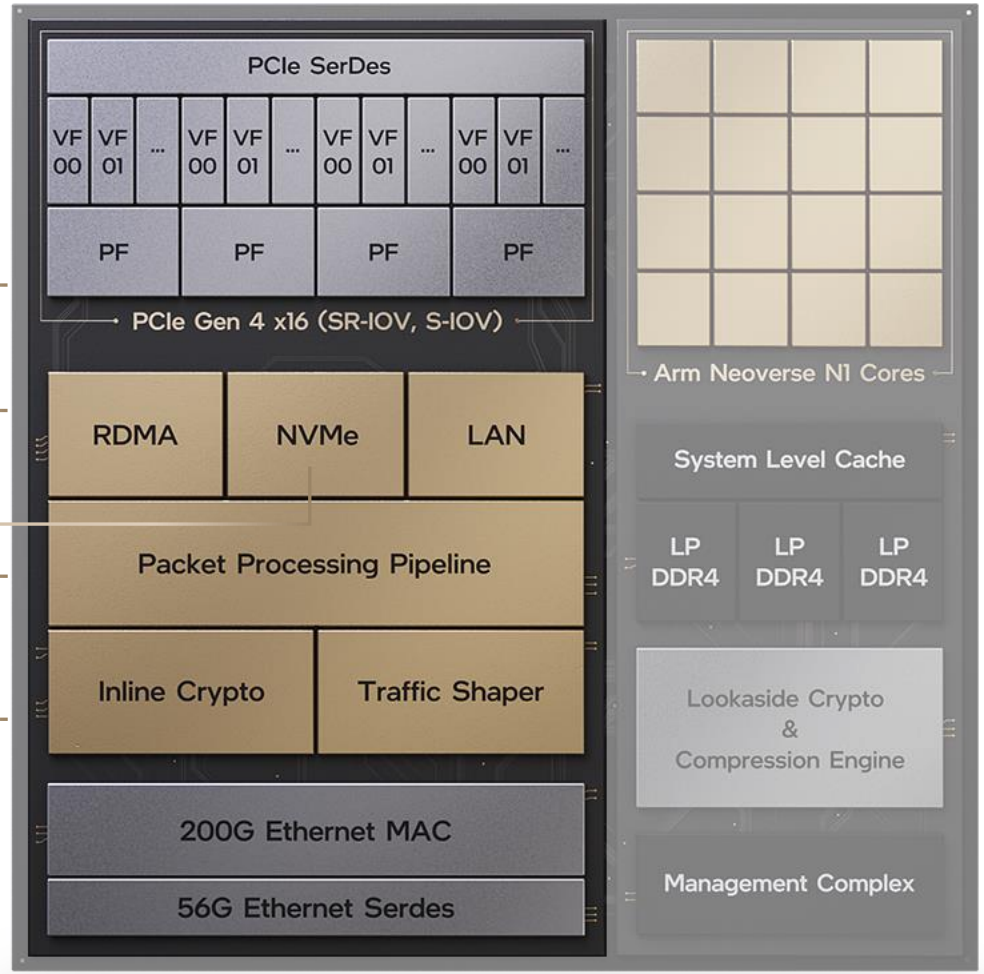
Network Subsystem

Compute Complex

Mount Evans

Architectural Breakdown

- Support for up to 4 host Xeons with 200Gb/s full duplex
- High-performance ROCEv2
- NVMe offload engine
- Programmable packet pipeline with QoS and telemetry capabilities
- Inline IPSec



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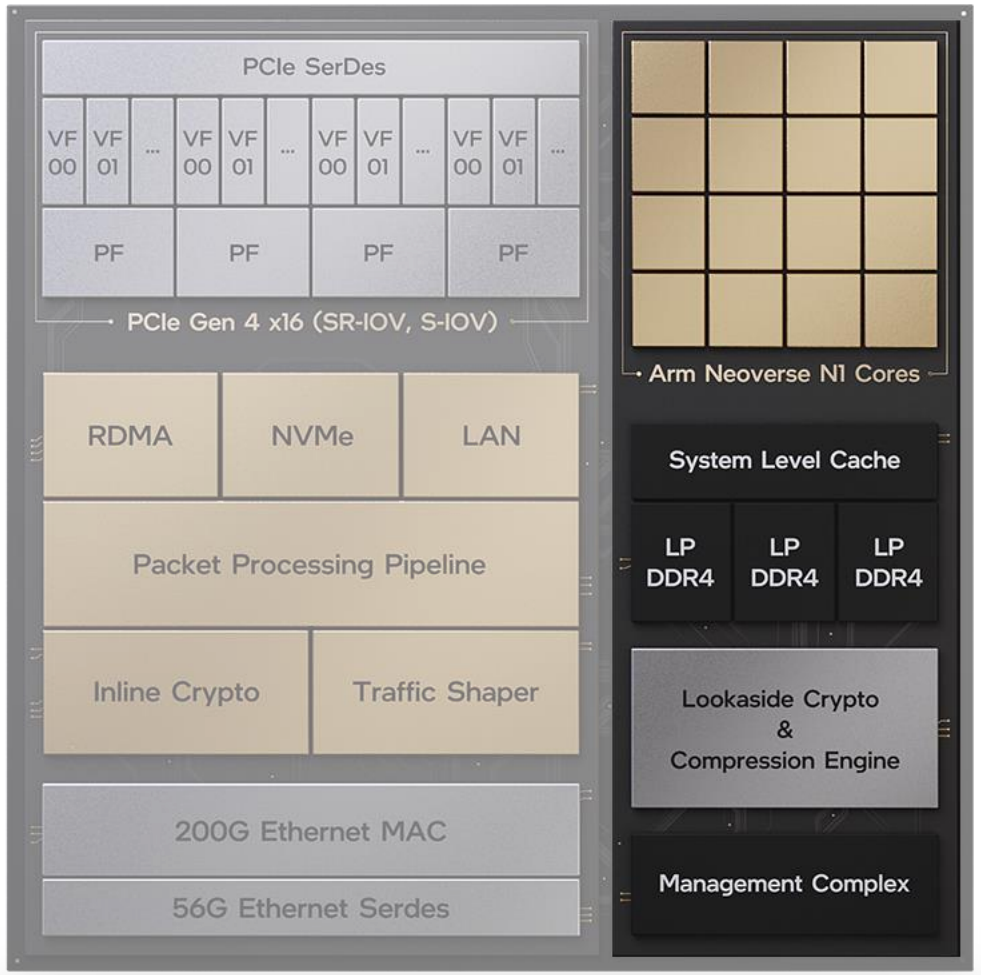
Compute Complex



- Up to 16 Arm Neoverse N1 Cores
- Dedicated compute and cache with up to 3 memory channels
- Lookaside crypto and compression
- Dedicated management processor

Summary

- Cloud service providers maximize data center revenue by offloading infrastructure tasks including storage, networking and management functions from CPUs to IPUs
- Intel is the volume leader in IPU deployments at major CSP's
- SmartNICs and IPU platforms for cloud and comms service providers are available today

Intel.com/IPU

Questions?

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