Local NVMe Storage Acceleration Solution with Intel FPGA

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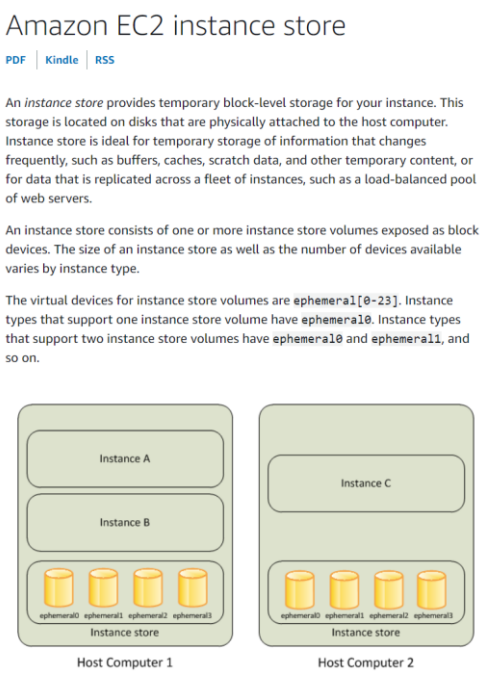
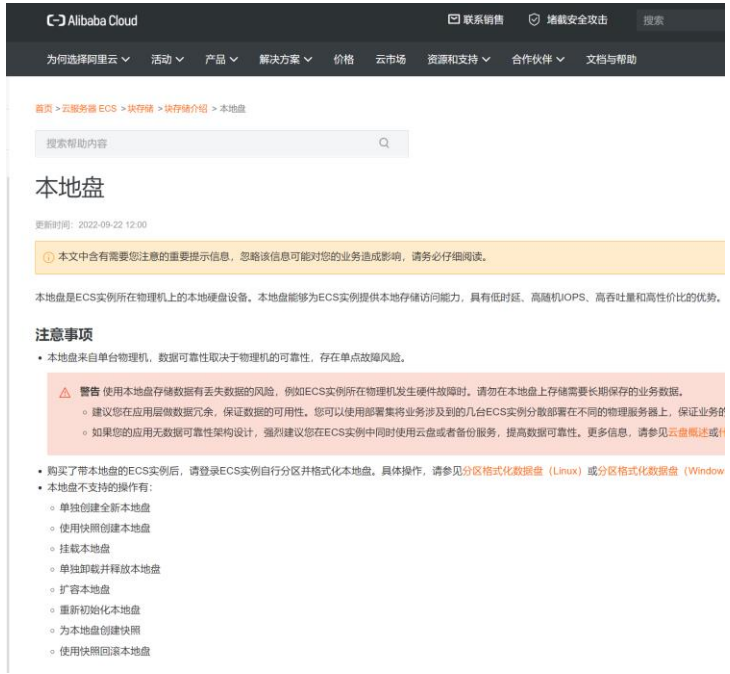
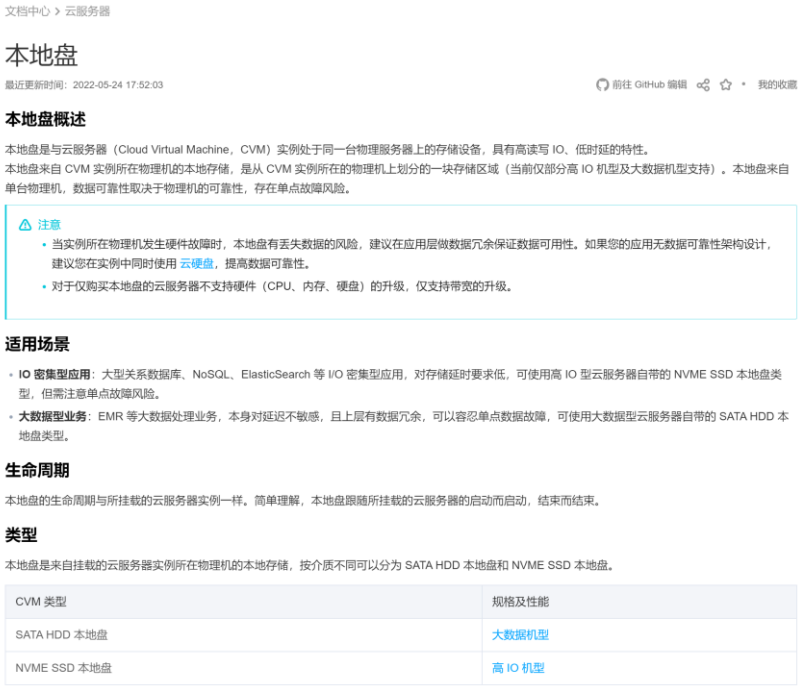
Local NVMe Storage in Cloud

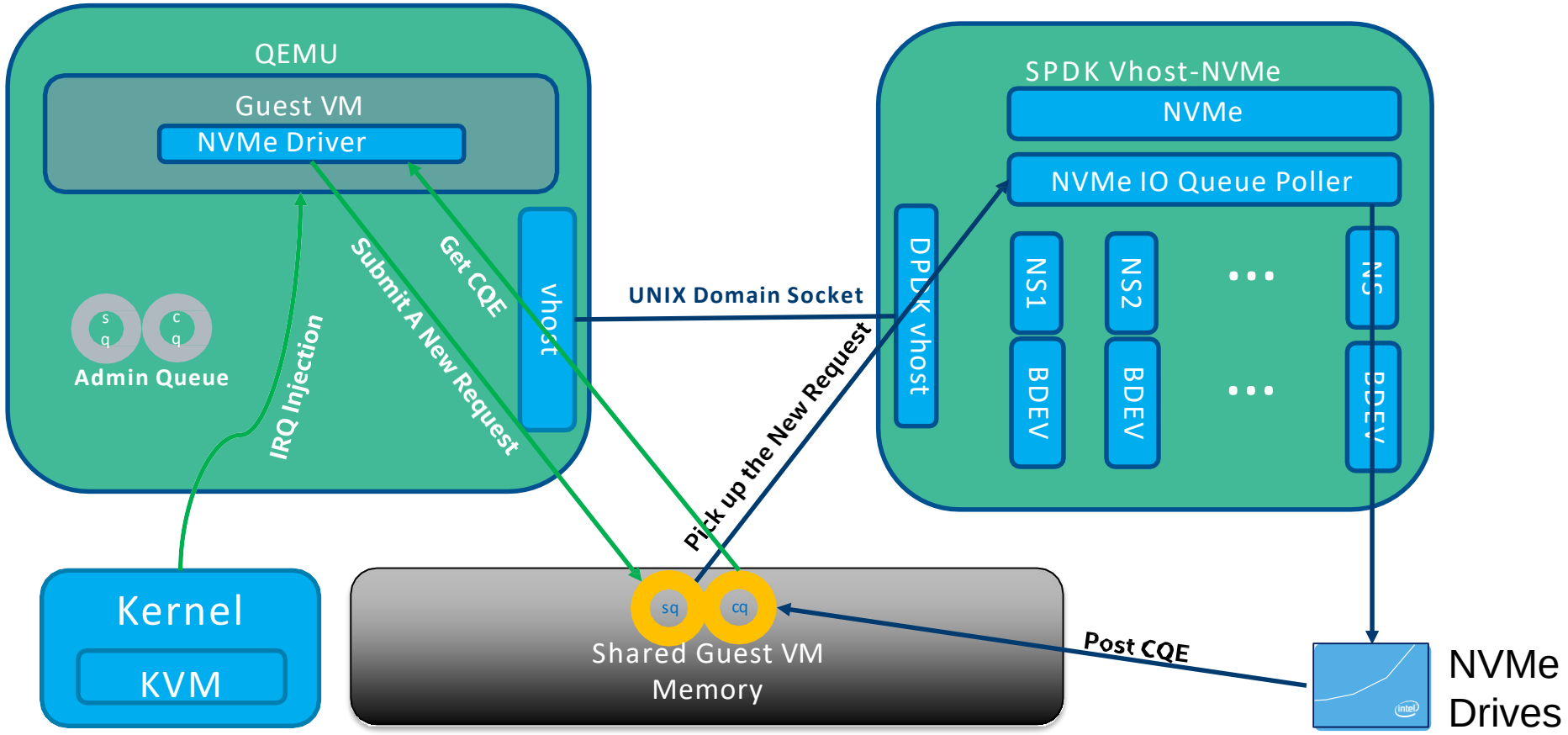
- Compared with EBS/CBS, local storage are physically attached to the host CPU and provide temporary block-level storage.
- Ideal for temporary storage of information that changes frequently.



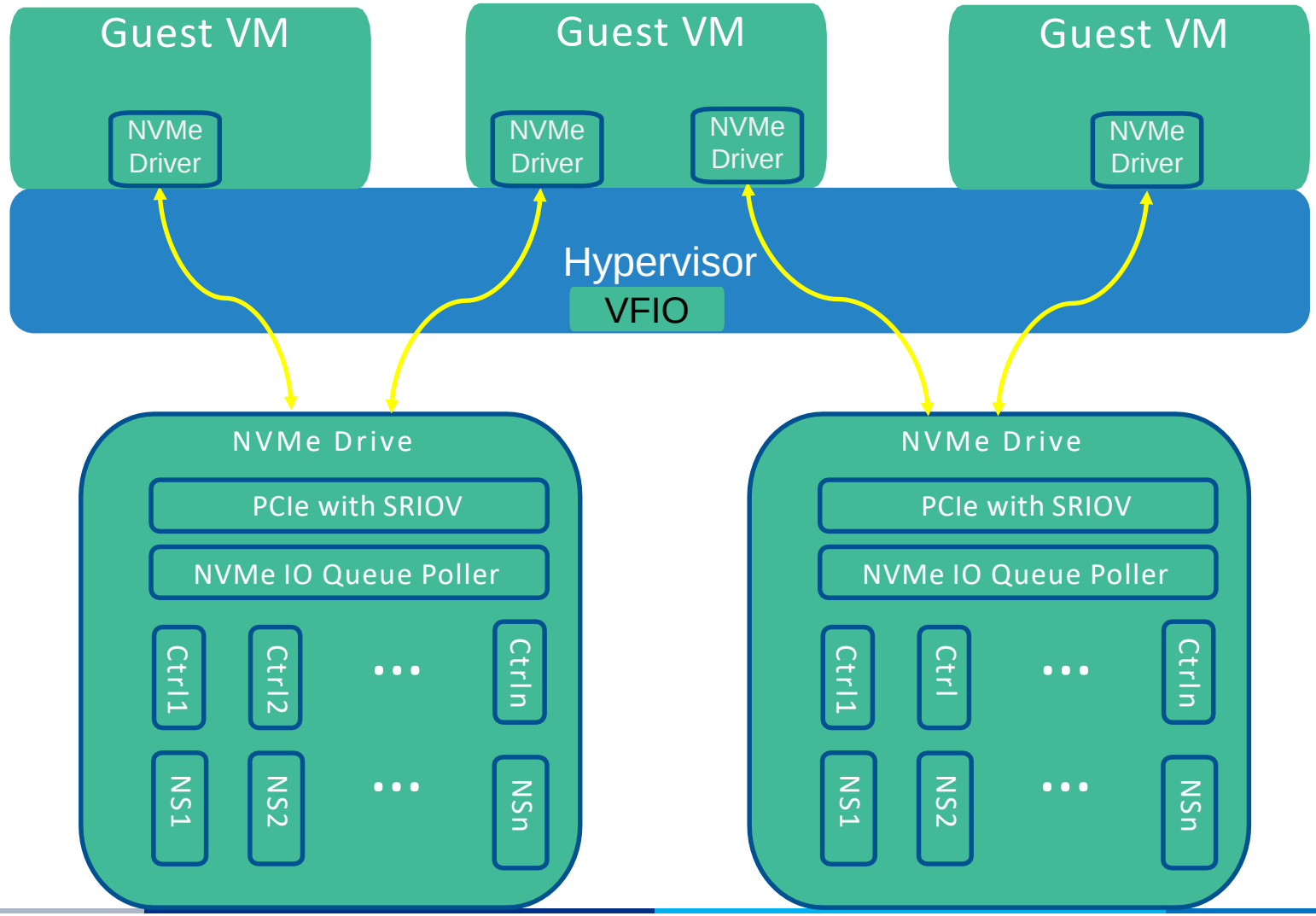




SPDK vhost NVMe



SRIOV


Guest VM
NVMe Driver
Guest VM
NVMe Driver
NVMe Driver
Guest VM
NVMe Driver
Hypervisor
VFIO
NVMe Drive
PCIe with SRIOV
NVMe IO Queue Poller
Ctrl1
Ctrl2
Ctrln
NS1
NS2
NSn
NVMe Drive
PCIe with SRIOV
NVMe IO Queue Poller
Ctrl1
Ctrl
Ctrln
NS1
NS2
NSn

Comparison

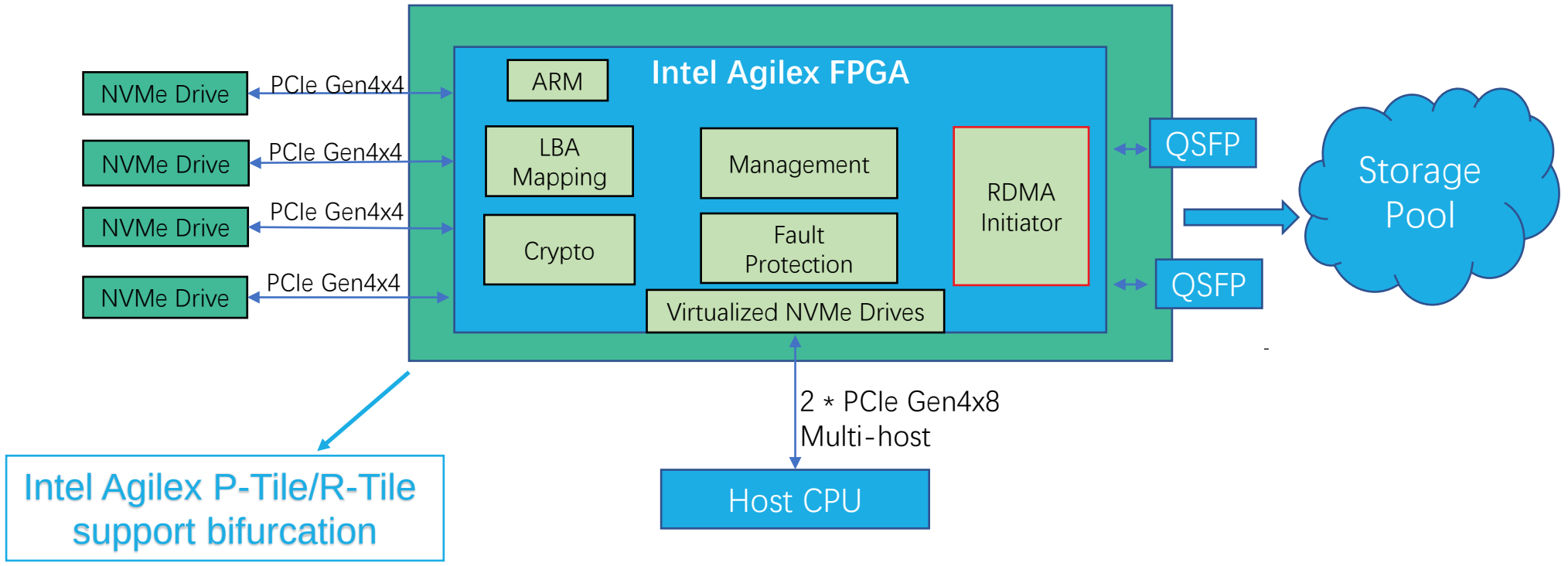
SPDK vhost

- High CPU utilization
- High latency
- No encryption
- No hardware failure isolation

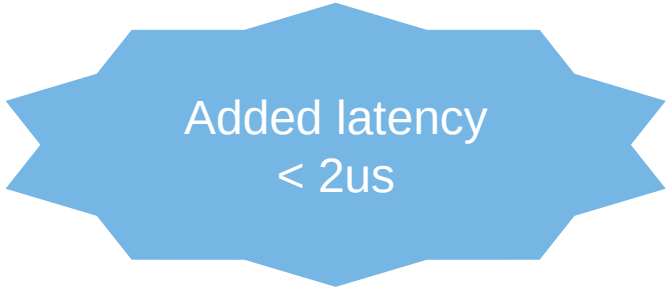
SRIOV

- NVMe drives must support SRIOV, high cost
- Weak SLA ensurance
- No encryption support
- No hardware failure isolation

What Wisewave Solution Is



Features Enhanced



- Up to 64 virtualized NVMe endpoint devices
  - Better compatibility for legacy NVMe driver
  - Manageable quota allocation for each virtualized NVMe devices
  - Could be many more if needed
- Support line rate AES-256 encryption/decryption
  - Each virtualized NVMe drive has its own key
- Failure Isolation
  - Avoid server hang-up caused by NVMe drives' failure
- 4K SQ/CQ pairs and 4K interrupts
  - 64 Queue Pairs for each devices.
  - Each CQ has its own interrupt.

More Important

- Remote storage Could be presented as local NVMe drives
  - Leverage RDMA technology and infinite remote storage pool
  - Tiered storage
- Hybrid Acceleration Platform for Storage
  - Could present a Endpoint for a specific storage acceleration service.
- Wisewave's in-house IPs with competitive Fmax/resource utilization
  - **WDMA**
  - **PCIe RC Bridge**

  Could run 500MHz on Intel's Agilex -3 device even ECC is enabled
  - Encryption/Decryption(Soft)
  - Erasure Coding with any K/P set
  - RDMA(in developing)

About Wisewave

芯潮流（珠海）科技有限公司 (wisewavetech.com)

高速互联无处不在

数据中心光电网络互联

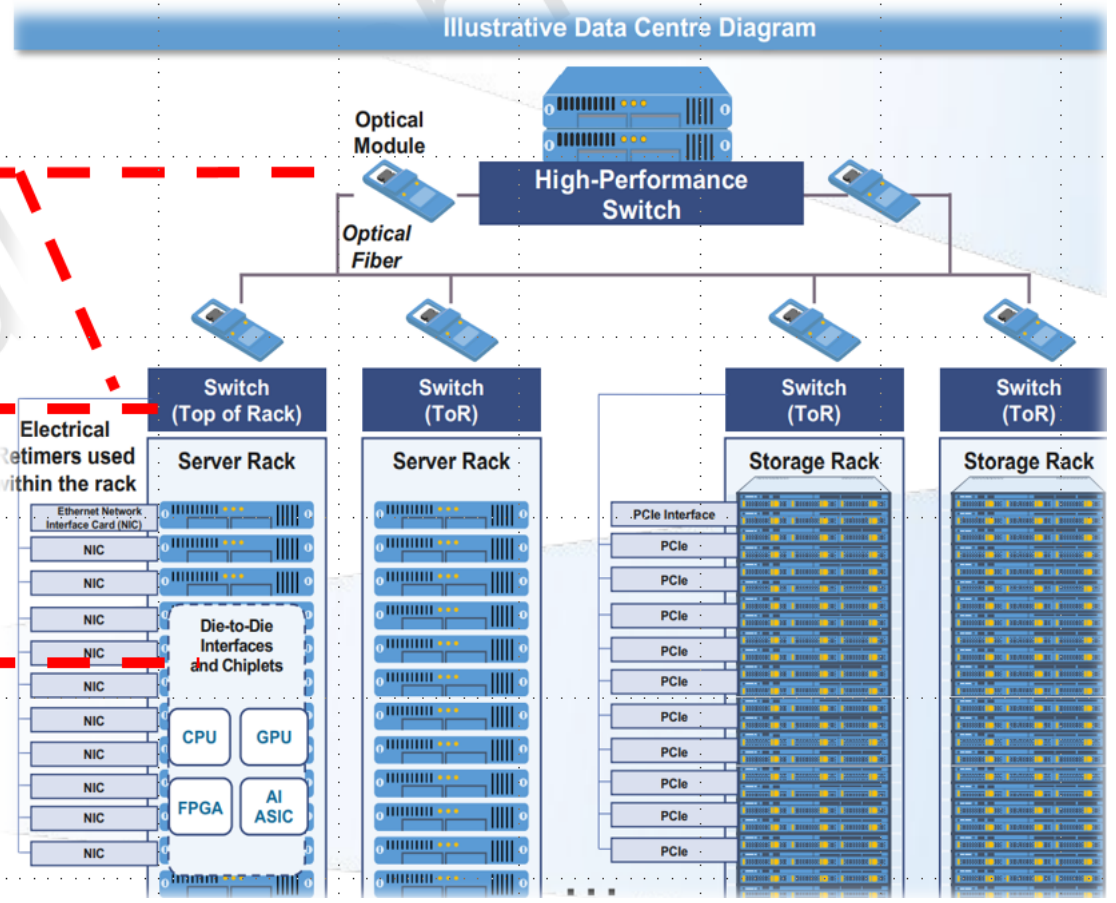
- 4*112G PAM4
- 8*112G PAM4

服务器内部芯片间互联

- Network
- Storage
- Security

芯片内部芯粒互联

- Serdes
- D2D
- PCIe
- CXL
- ETH
- AD/DA



Confidential

Thank You