DPDK
DATA PLANE DEVELOPMENT KIT

THE LINUX FOUNDATION

DPDK SUMMIT CHINA 2017

主办方： intel

参与方： 腾讯云 ZTE 美团云 Panabit® 太一星晨 Balance Your Networks UnitedStack有云 云杉网络 Yunshan Networks

协办方： SDNLAB 专注网络创新技术　　视频支持方： IT大咖说

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Accelerate VM IO via SPDK Vhost Solution

Changpeng Liu, Intel

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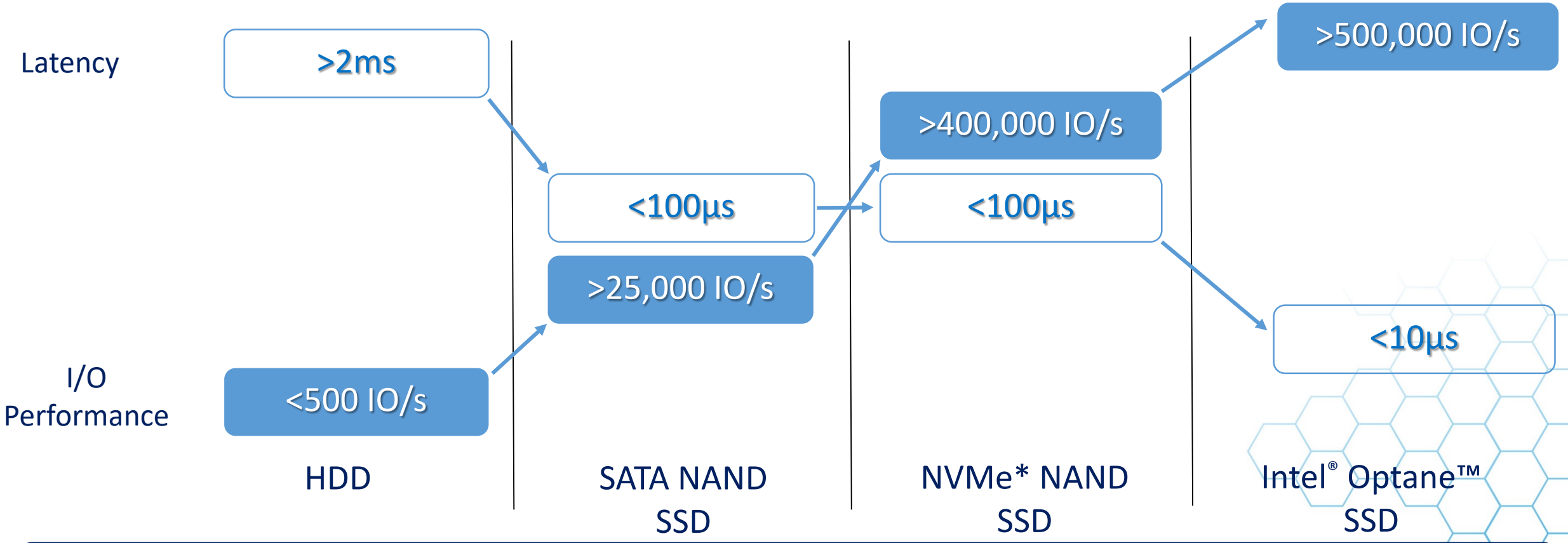
Agenda

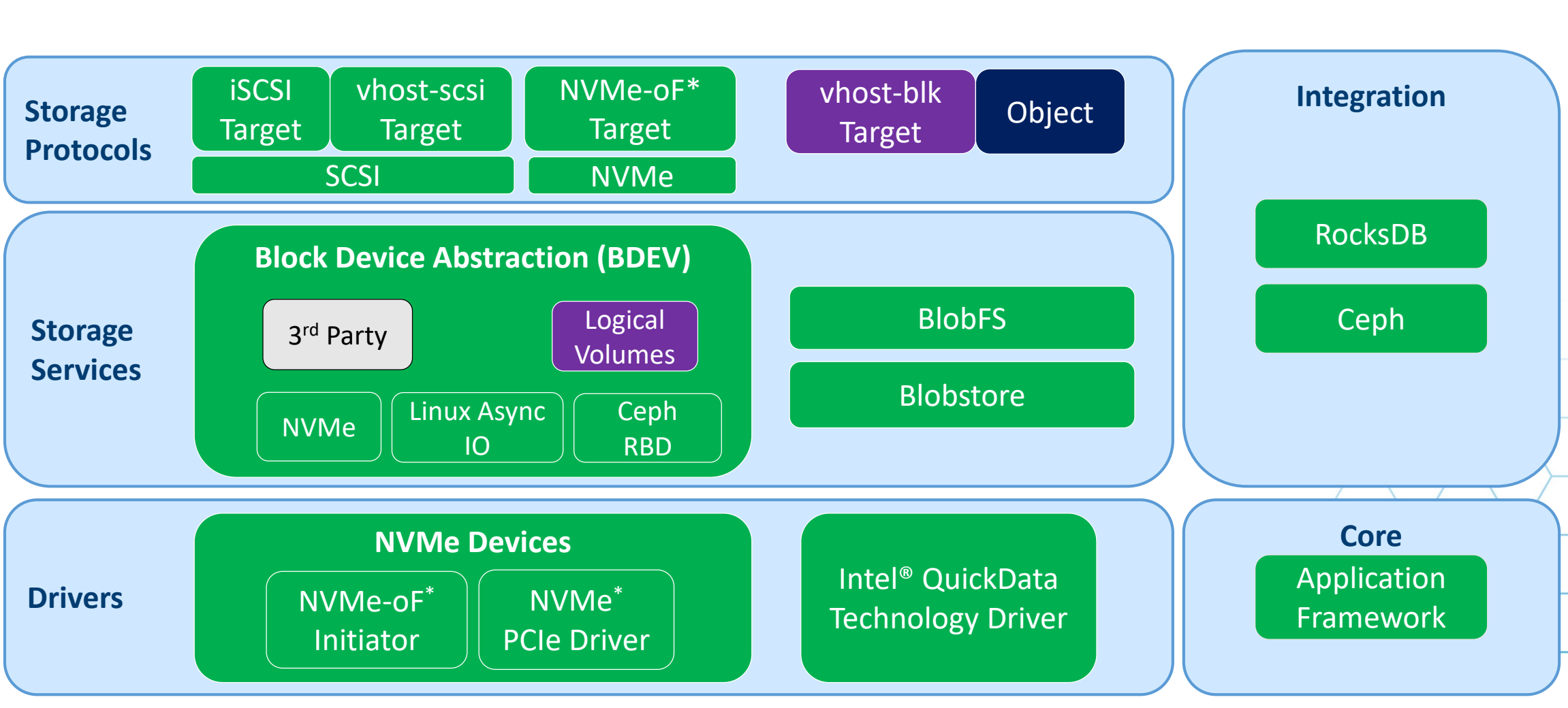
- Introduction
- SPDK Vhost Architecture
- Usage Cases
- Benchmarks
- Plans

Introduction

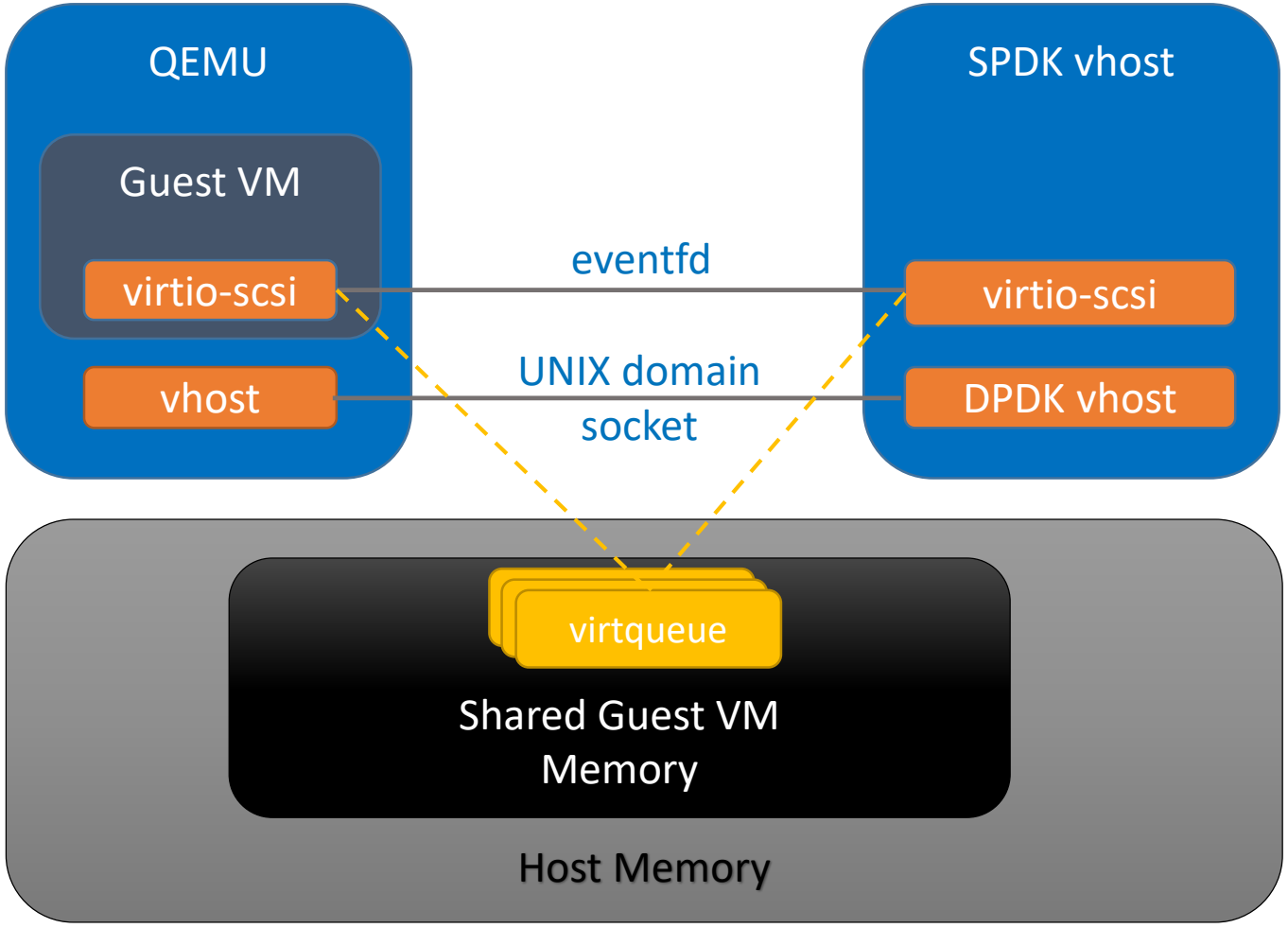


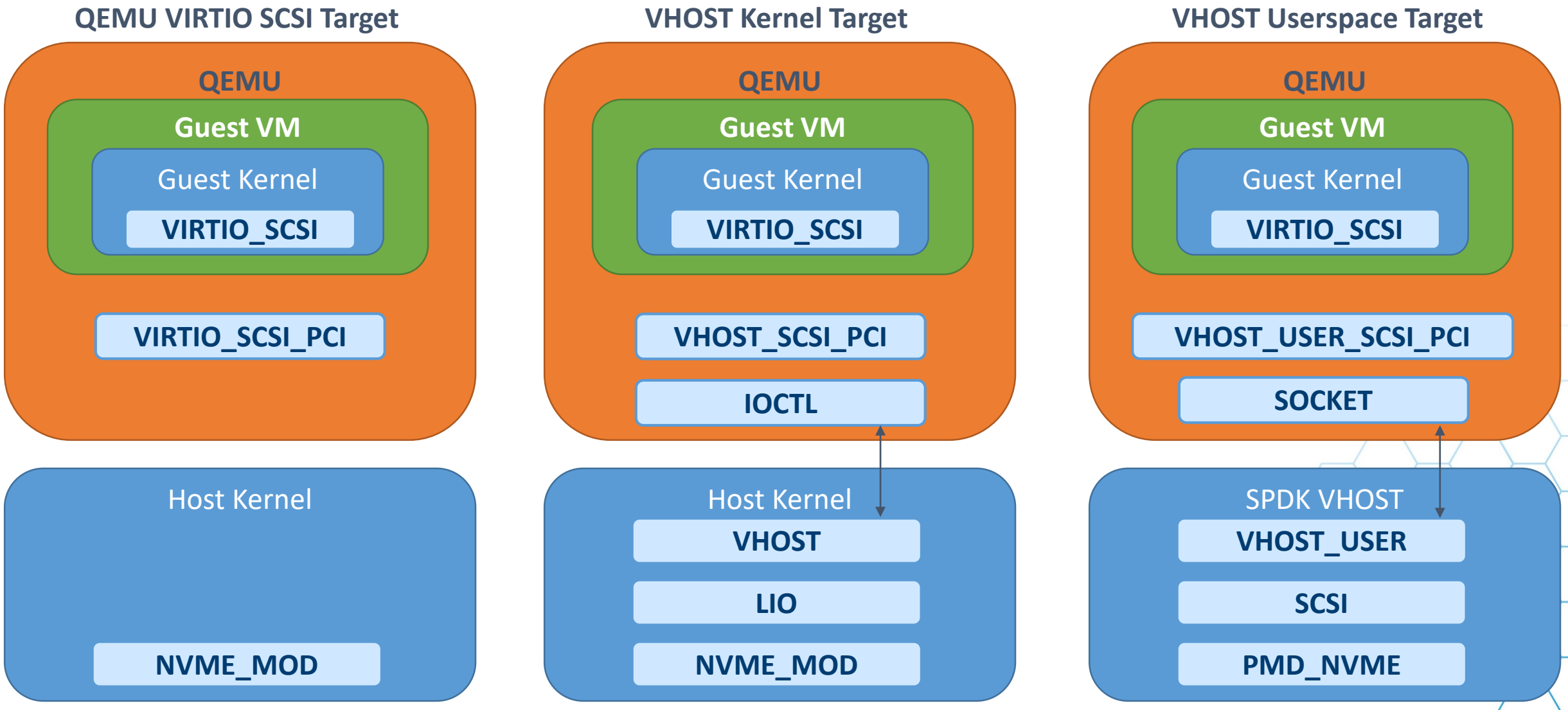
The Opportunity: Use Intel software ingredients to unlock the potential of new media

SPDK Architecture

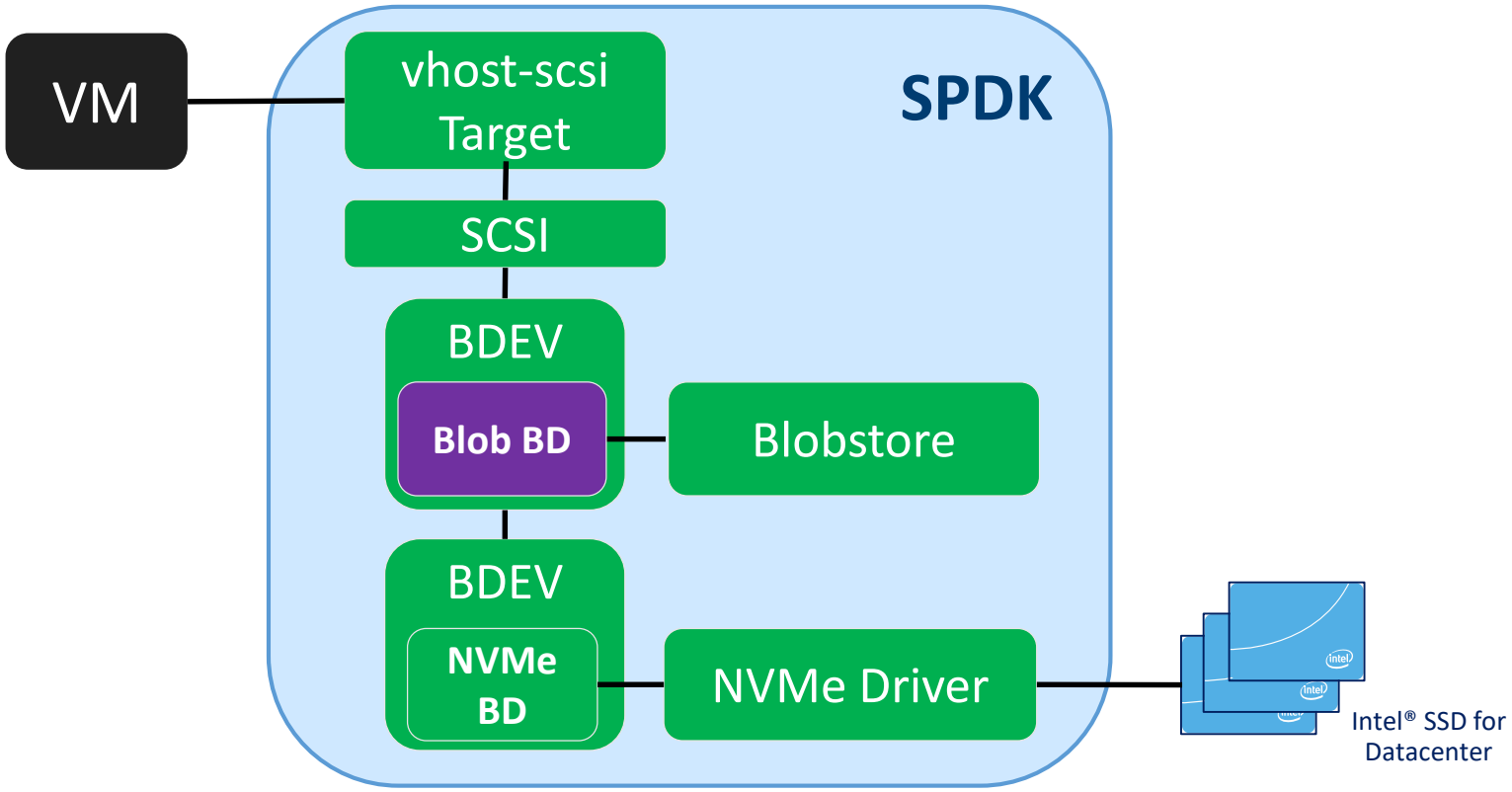


SPDK VHOST Architecture




QEMU VIRTIO SCSI Target
QEMU
Guest VM
Guest Kernel
VIRTIO_SCSI
VIRTIO_SCSI_PCI
Host Kernel
NVME_MOD
VHOST Kernel Target
QEMU
Guest VM
Guest Kernel
VIRTIO_SCSI
VHOST_SCSI_PCI
IOCTL
Host Kernel
VHOST
LIO
NVME_MOD
VHOST Userspace Target
QEMU
Guest VM
Guest Kernel
VIRTIO_SCSI
VHOST_USER_SCSI_PCI
SOCKET
SPDK VHOST
VHOST_USER
SCSI
PMD_NVME

VM Ephemeral Storage



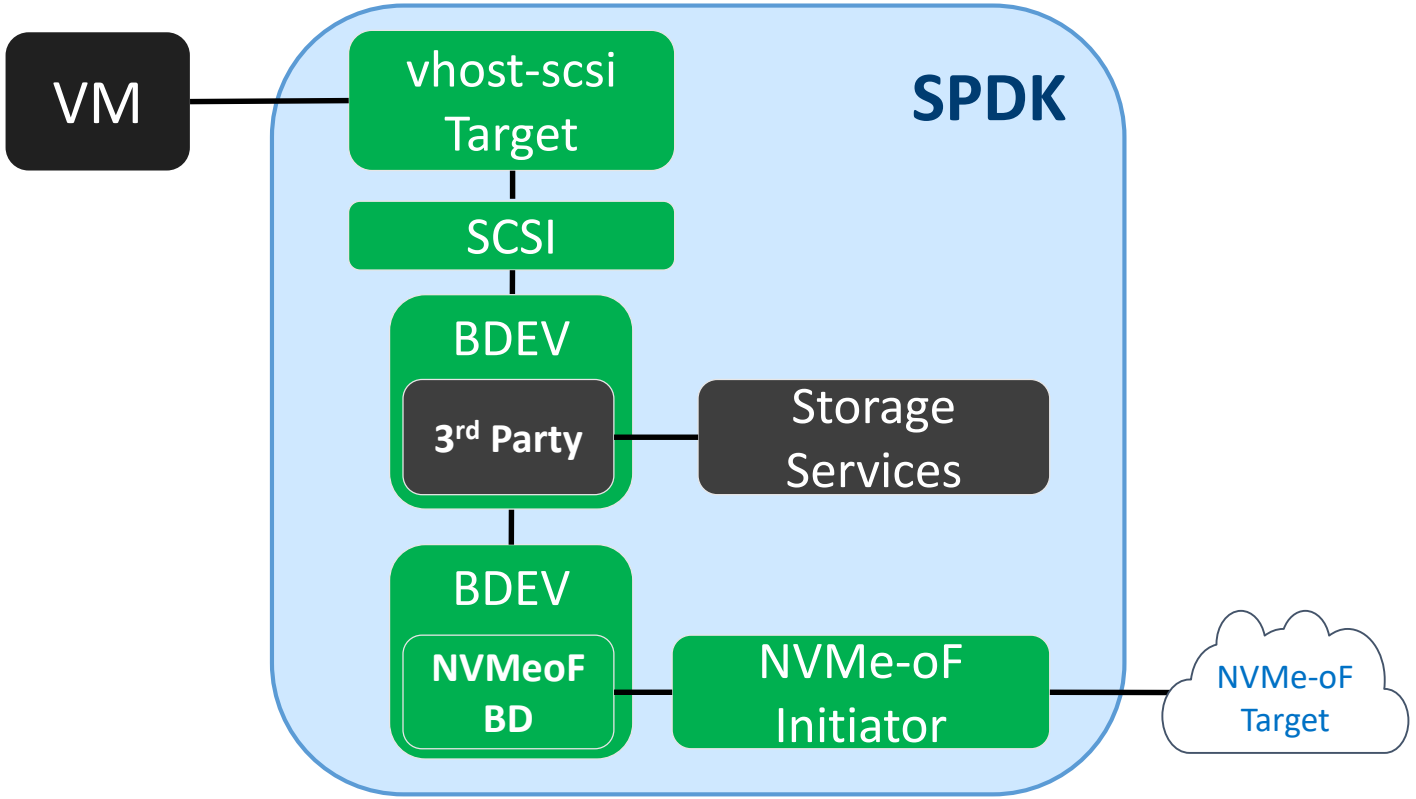
Released

Q2'17

- Improves Storage Virtualization
- Works with KVM/QEMU
- 6x efficiency vs. kernel vhost
- 10x efficiency vs. QEMU virtio
- Increased VM density

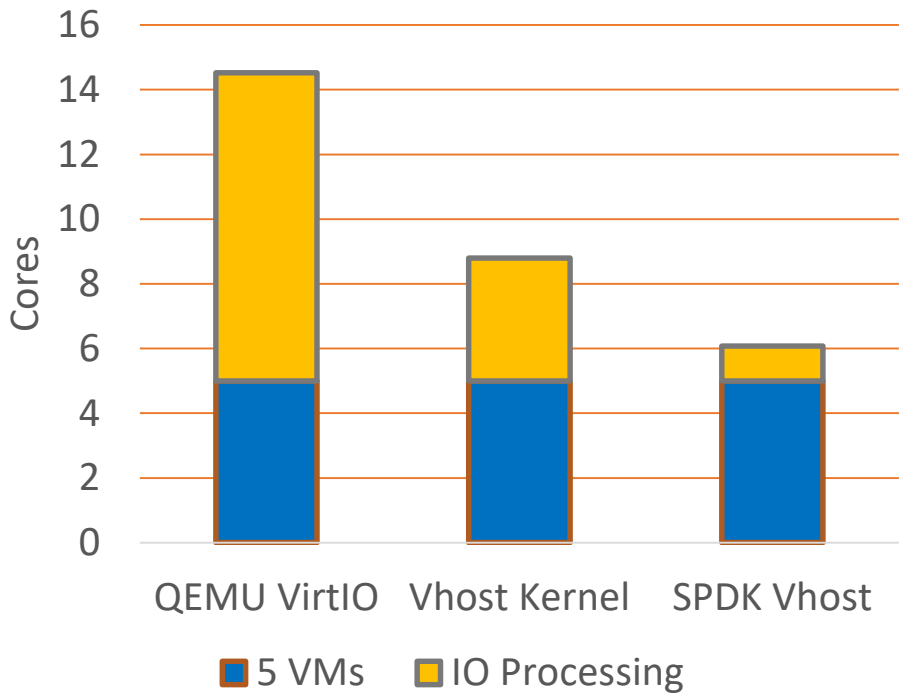
VM Remote Storage

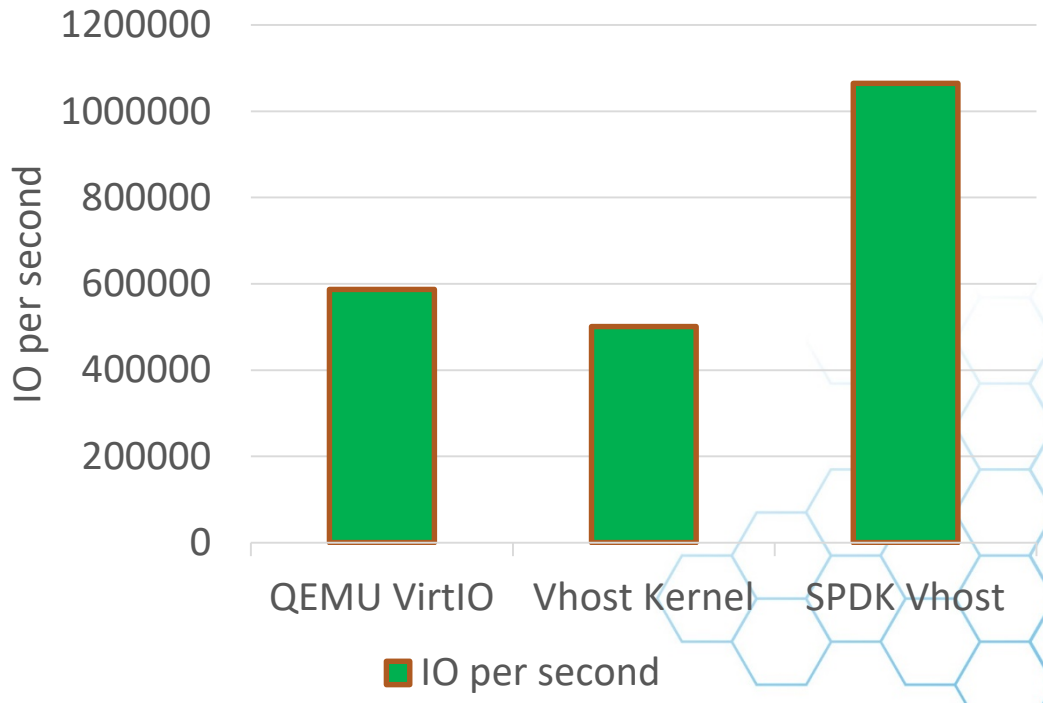
Released



- Enable disaggregation and migration of VMs using remote storage
- Improves Storage Virtualization & Flexibility
- Works with KVM/QEMU

Benchmarks





System configuration: 44x Intel(R) Xeon(R) CPU E5-2699 v4 @ 2.20GHz (HT off); Cores per socket: 22; 8x Samsung 8GB DDR4 @2400 12x Intel SSD DC P3700 Series 1,5T @ FW 8DV101H0 DPDK: 17.02; Host Dist/Kernel: Fedora 25/Kernel 4.8.15-300; Guest Dist/Kernel: Ubuntu 16.04/Kernel 4.4.0-59-generic, mq enabled; Fio ver: fio-2.2.10; Fio workload: blocksize=4k, iodepth=512, iodepth_batch=128, iodepth_low=256, ioengine=libaio, size=10G, ramp_time=10, group_reporting, thread, numjobs=1, direct=1, rw=randread

Plans

- VFIO Support
- Support for vhost-blk protocol
- Live migration
- Performance tuning, including
  - -multiqueue
  - -completion event coalescing

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Accelerate Crypto Service by DPDK vhost

Xin Zeng, Intel

主办方： intel

参与方： 腾讯云 ZTE 美团云 Panabit® 太一星晨 Balance Your Networks UnitedStack 云杉网络 Yunshan Networks

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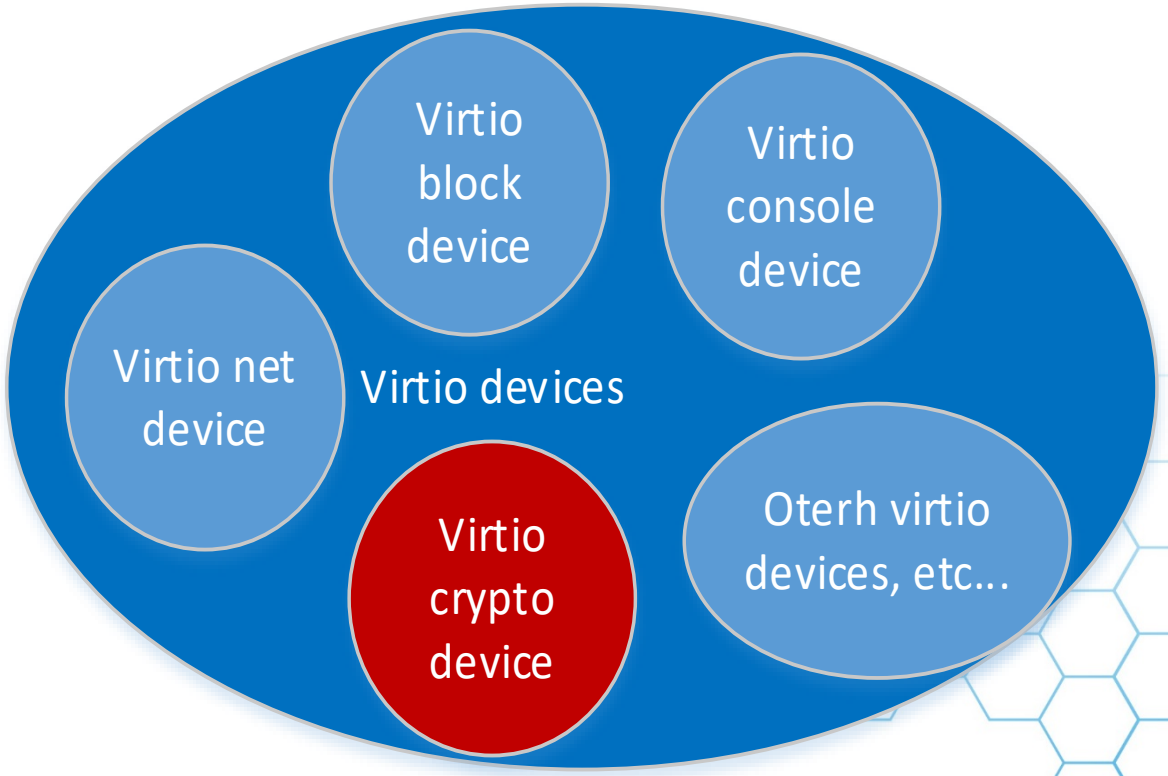
Agenda

- Virtio Crypto Device Introduction
- Boost SSL/TLS Service by virtio-crypto
- DPDK vhost-user for virtio-crypto
- Plans
- Summary

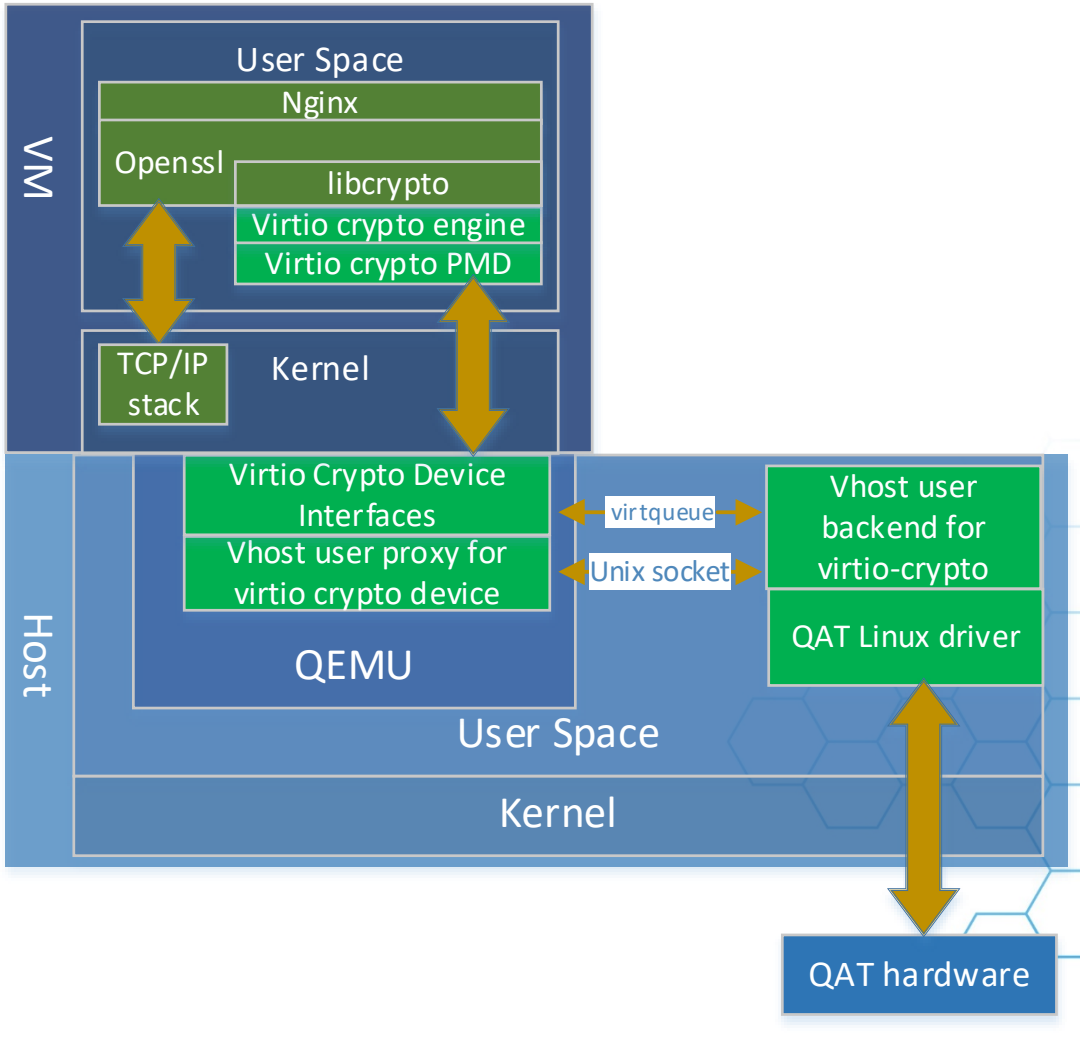
Virtio Crypto Device

- A virtual cryptography device under virtio device framework
- Provides an set of operation interfaces for different cryptography services
- Mainly contributed by Huawei & Intel in community



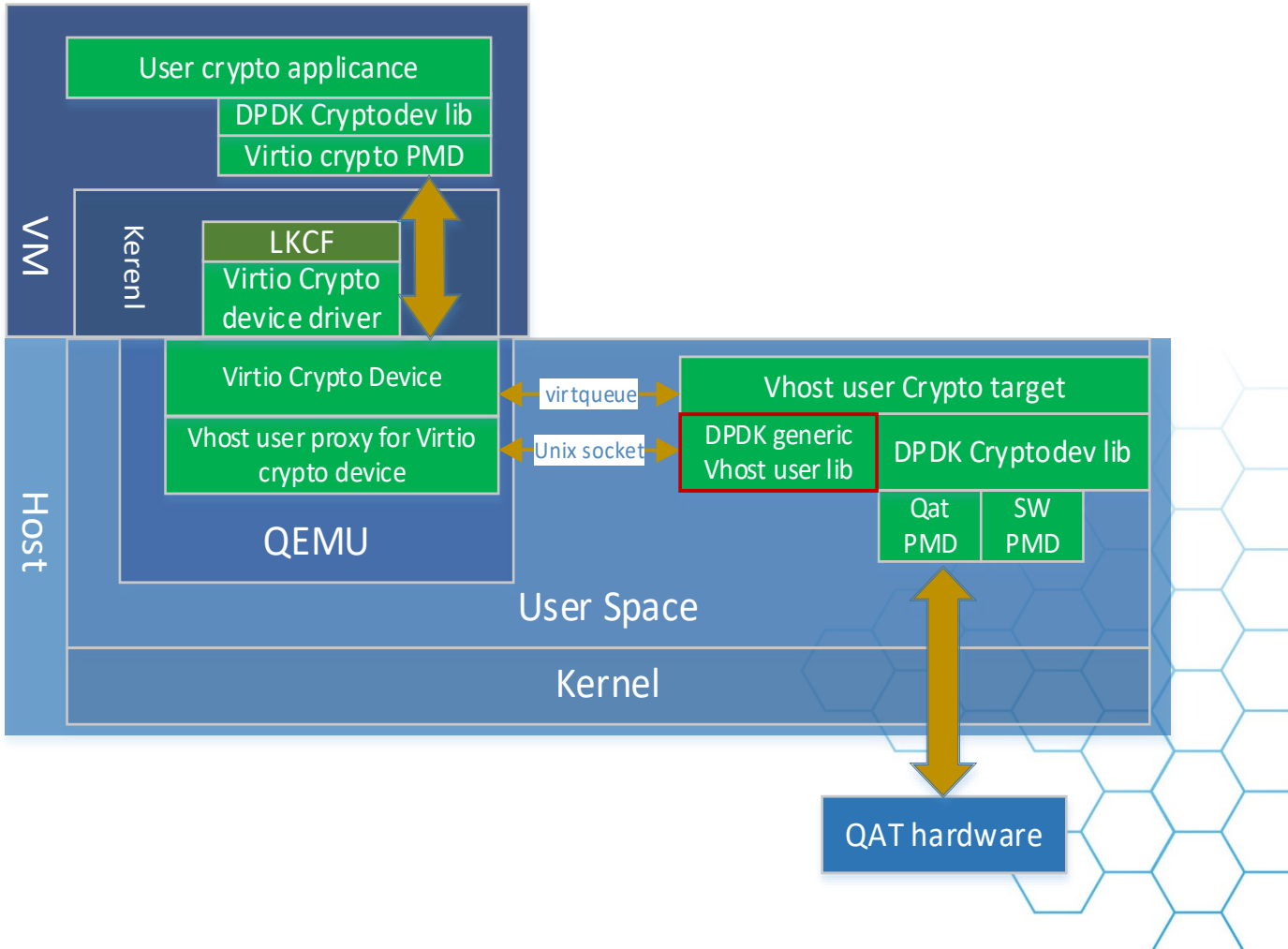
Boost SSL/TLS Service by virtio-crypto

- Motivation
  - Unified Driver in the Guest
  - Accelerator as a service for better performance
  - Friendly Cloud Characteristic
- PoC Workload
  - Nginx HTTPS Web Server
  - RSA2K session establishment
- Ingredients
  - virtio-crypto PMD
  - vhost-user for Crypto
  - Intel® QAT DH895XCC device driver in Linux
- Performance
  - ~4.5x throughput (TLS connection per second) compared to software solution



DPDK vhost-user for virtio-crypto

- viritio-crypto in VM
  - Crypto appliance
  - Under LKCF framework
  - virtio Crypto PMD
- New vhost proxy in QEMU
- virtio-crypto backend in Host
  - Build vhost user crypto target on top of DPDK generic vhost lib
  - Connect with DPDK crypto device



Intel® QAT Overview

- ➢A hardware-based acceleration technology
- ➢Accelerate compute-intensive security and compression operations
- For more details of Intel® QAT, visit here

WIP and Plans

- New device type (virtio-crypto) proposal in virtio spec. v1.1
- Upstream vhost user for virtio-crypto in DPDK community
- Live migration support
- Multi-queue support
- Performance optimization

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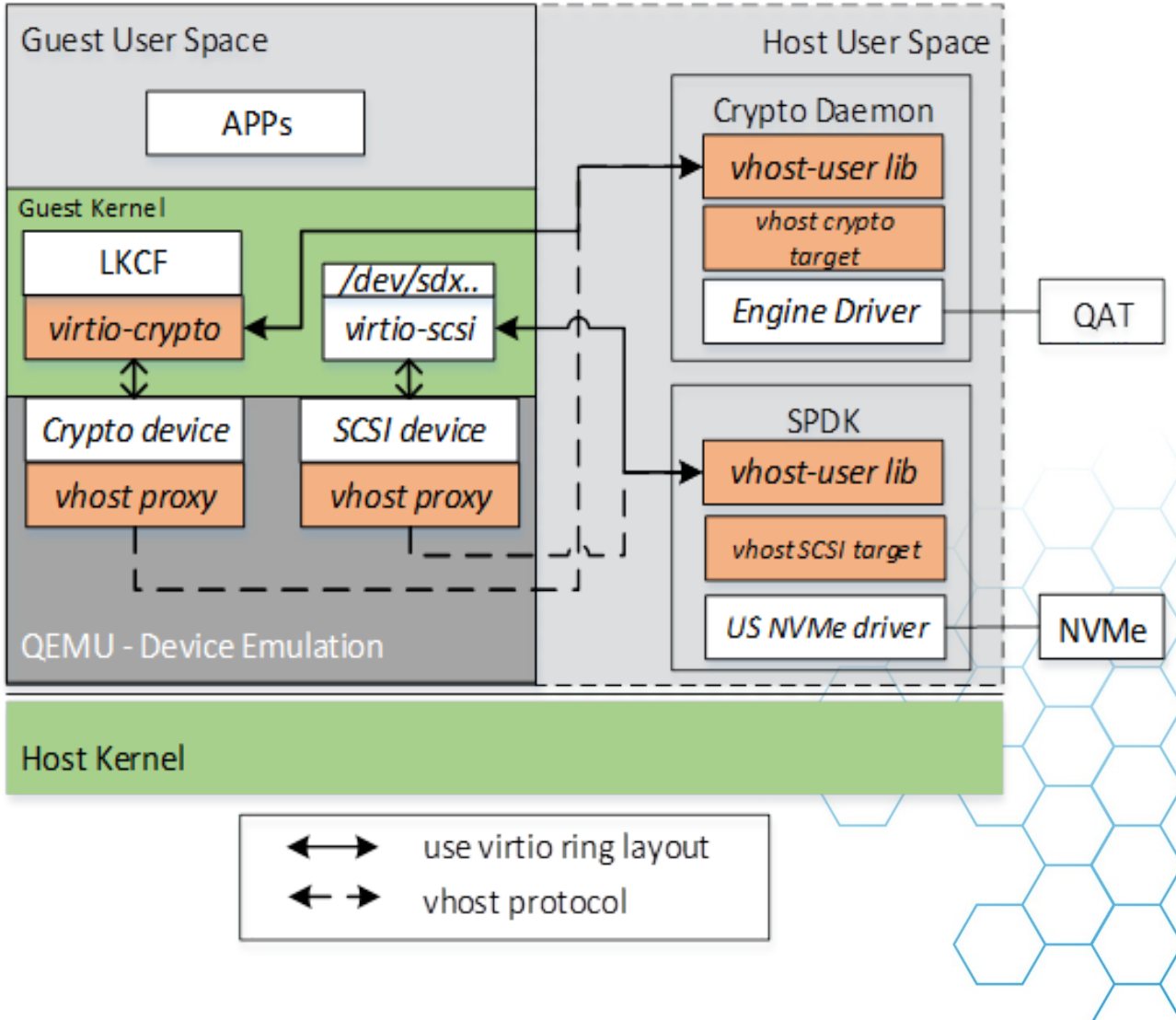
- Cunming Liang

Summary

- DPDK generic vhost user library is ready (available in DPDK 17.05)
- vhost user for SCSI and Crypto devices are ongoing.
- Benefits from DPDK vhost library
  - Why Reinvent Wheel?
  - General APIs to build vhost user application
  - Leverage fast I/O capacity by DPDK PMD
  - High Performance
- Welcome contributions!



Thanks!!

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Backup

- http://spdk.io
- Code available at https://github.com/spdk/spdk
- Submit your patch via https://review.gerrithub.io/spdk/spdk