A high performance framework for symmetric crypto packet processing in Data Plane Development Kit(DPDK)

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Agenda

- About Cryptodev
- Current status
- Future features
- Hardware based Virtualization
- Performance
- Summary

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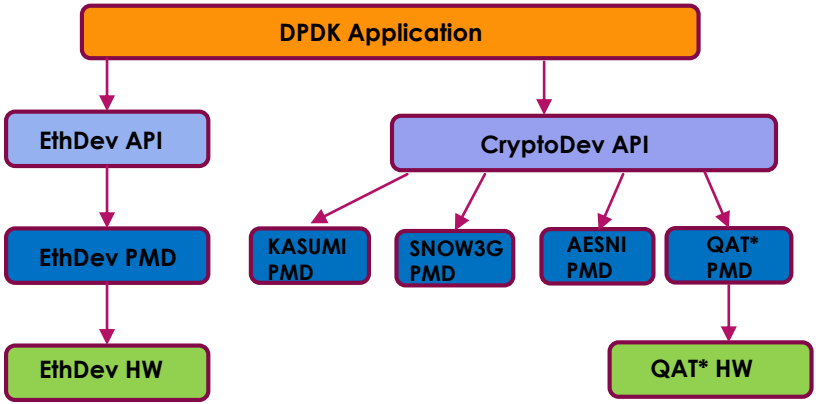
About Cryptodev

- Crypto framework for processing symmetric crypto workloads in DPDK.
- Defines an API which supports both hardware accelerated lookaside (Intel® QuickAssist Technology) and software based crypto processing.
- Poll mode driver infrastructure for hardware and software crypto devices.
- Each PMD supports the **full cryptodev API**, but may only support a subset of all the possible algorithms/modes.
- Supports per device capabilities querying.



* QAT = Intel(R) QuickAssist Technology

About Cryptodev

DPDK

DPDK CRYPTODEV API COMPONENTS

- Device Management
- Device Capabilities
- Symmetric Algorithms Definitions
- Symmetric Session Management
- Queue Pair Management
- Device Statistics
- Operation Provisioning
- Operation Processing Enqueue/Dequeue

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Supported algorithms in Cryptodev

DPDK

CIPHER ALGORITHMS

AES CBC/CTR 128/192/256 bit, Snow3G (UEA2), KASUMI F8 , NULL**

HASH ALGORITHMS

MD5_HMAC/SHA1/224*/256/384*/512, AES XCBC, Snow3G UIA2, KASUMI F9*, NULL**

AEAD ALGORITHMS

*AES GCM 128/192**/256** bit*

*Software Only,
**Hardware Only

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Planned features in future releases

DPDK

Performance

QAT* PMD optimizations

SW PMD optimizations

Refactoring & Clean up

Algorithm support

QAT* PMD

KASUMI (F8/F9)
AES-GMAC
MD5-HMAC
SHA224/384_HMAC
NULL, 3DES-CBC

SW PMD

ZUC
3DES-CBC,
MD5
SHA1/224/256/384/512
AES-GMAC

Scheduler

Multi op scheduler with ordering maintained

Allows using hardware and software acceleration together

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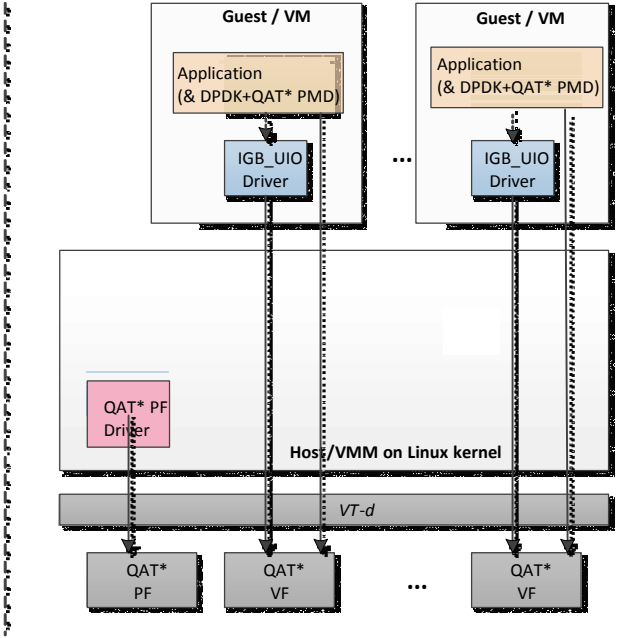
Hardware Based Virtualization

DPDK

- PF driver
  - Typically runs in VMM/host
  - Manages resources common to all VFs, e.g. firmware download, arbiter config, handling device/PCIe errors, etc.
- VF PMD
  - Typically runs in VM/guest, but can also be run in the VMM/host
  - Manages resources specific to the VF



Hardware-Based Virtualization SR-IOV

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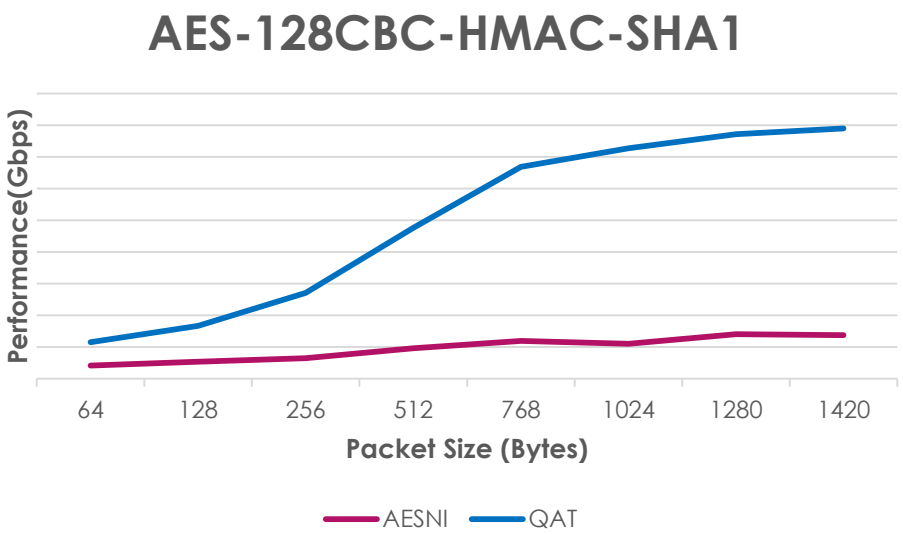
Performance

- **SW PMD**
  - Intel® **Performance** Libraries for **AESNI, SNOW3G, KASUMI** can be used for performance boost.
- **QAT PMD in virtualized environment**
  - **Throughput** largely remains same when compared to non virtualized environment
  - **Offload Cost** also remains largely the same
  - Main difference is address translation, which is done in hardware (**VT-d IOMMU**)
  - Can add some latency depending on rate of IOTLB cache hits/misses, which can impact throughput

Performance§ from DPDK IPSec sample application

DPDK



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- Cryptodev currently provides support of symmetric algorithms.
- Provides both SW and Hardware(Intel® QuickAssist Technology) implementation.
- Healthy pipeline of features planned for Future release
- HW provides provides major boost in performance over SW implementation

Questions?

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