



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

Agenda

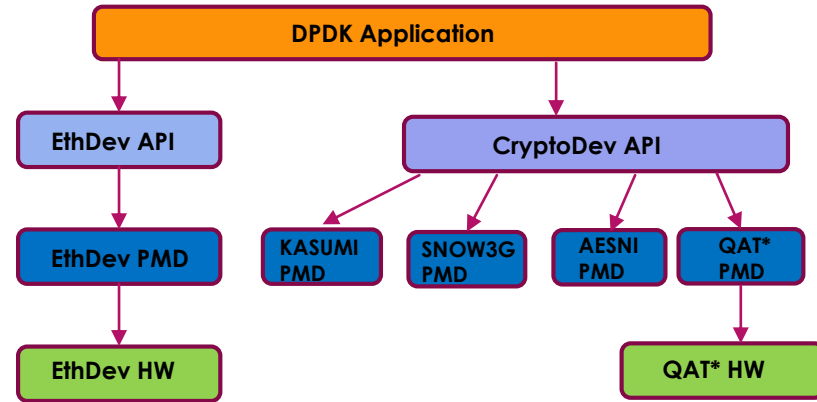


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About Cryptodev



- ▶ 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.



About Cryptodev



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



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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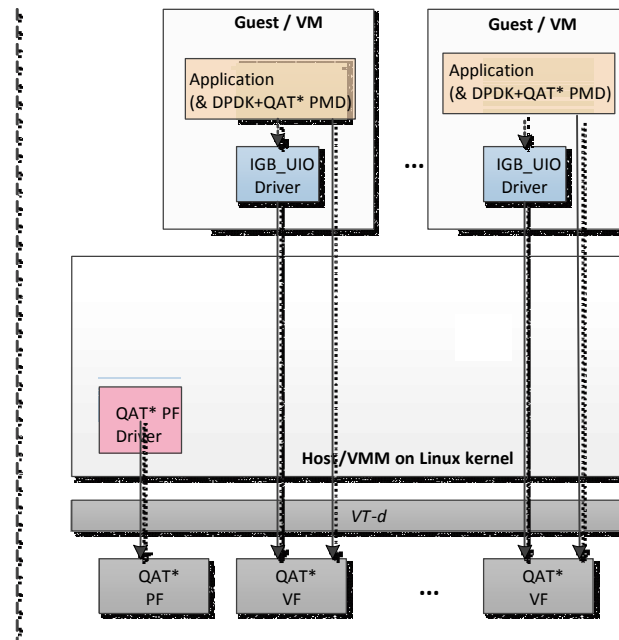


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Hardware Based Virtualization



- ▶ 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

* QAT = Intel(R) QuickAssist Technology



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Performance



▶ SW PMD

- ▶ Intel® **Performance** Libraries for **AESNI**, **SNOW3G**, **KASUMI** can be used for performance boost.

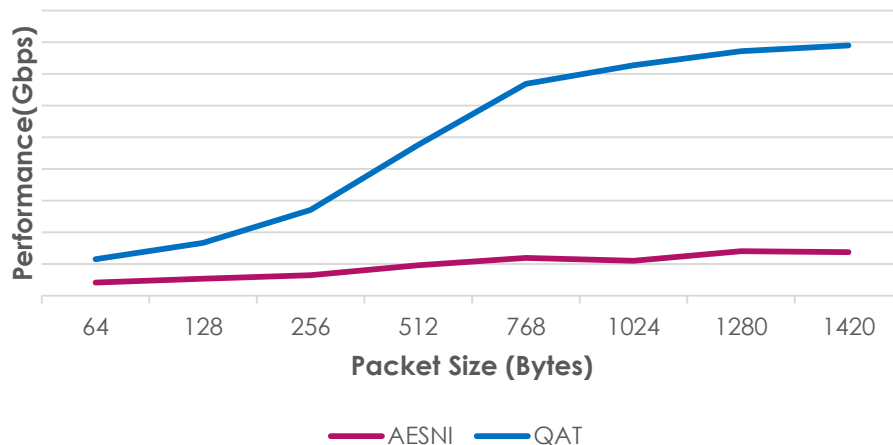
▶ QAT PMD in virtualized environment

- ▶ **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



AES-128CBC-HMAC-SHA1



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Summary



- ▶ 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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