DPDK

Event Adapters - Interfacing Devices to Eventdev
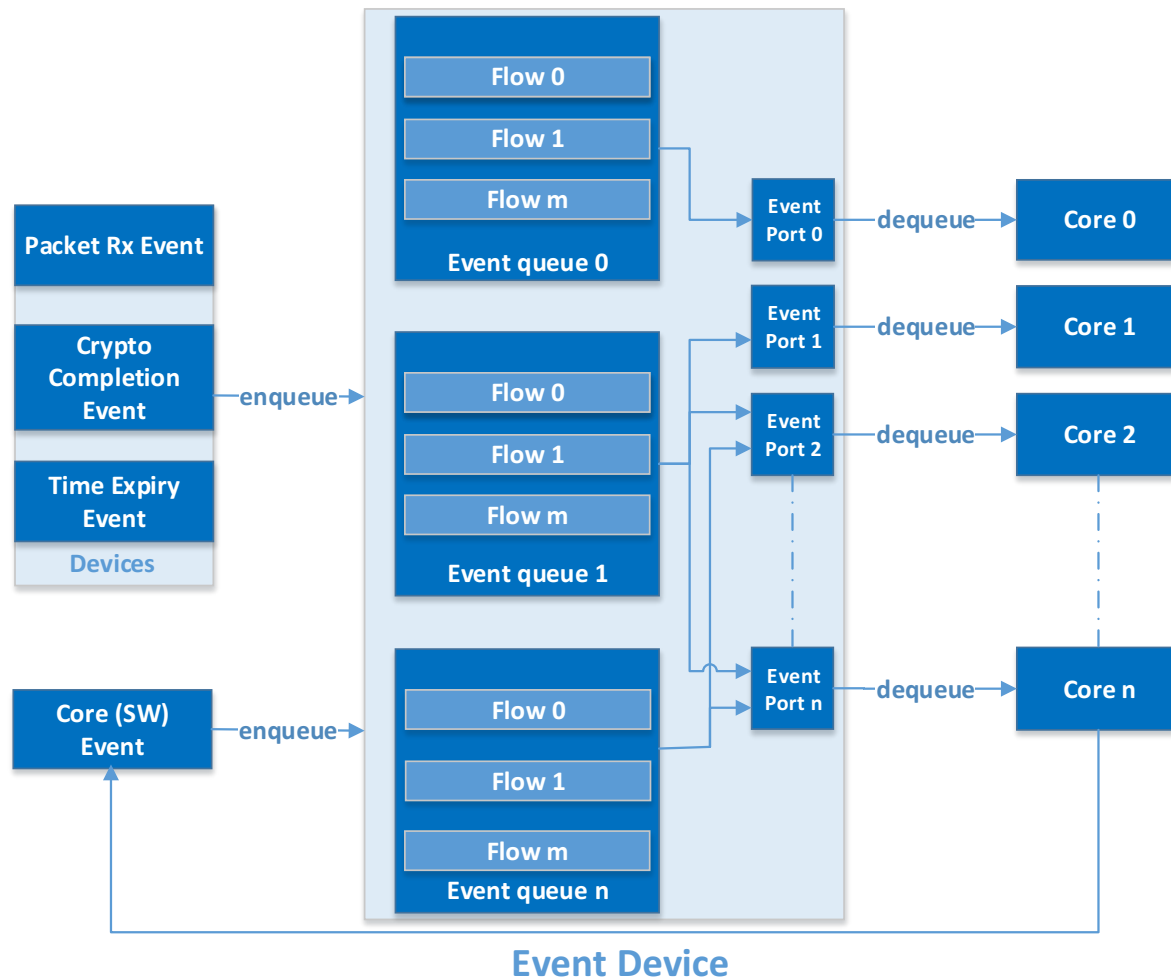
Nikhil P Rao

DPDK Summit USA - San Jose - 2017
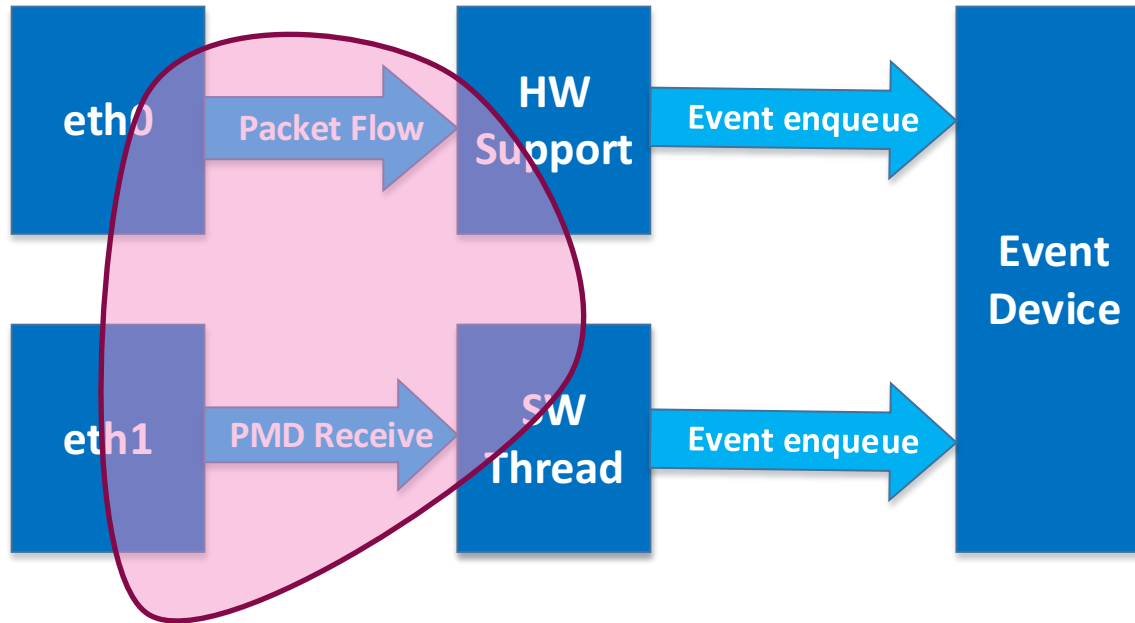
Outline

DPDK

▶ Event Adapters

▶ Ethernet Rx Event Adapter

▶ Crypto Adapter

▶ Timer Adapter

Eventdev Programming Review

- Dynamic Load Balancing provides Efficient Core Utilization
- "Ordered" scheduling takes care of preserving order across cores
- "Atomic" scheduling avoids need for SW synchronization

Event Adapter Motivation

DPDK

▶ Configuration of HW Dependent Device to Eventdev Data Flows

▶ SW based data flow can be common code

▶ Event Adapters

   ▶ Common set of APIs

      ▶ Eventdev PMD callbacks for HW path configuration
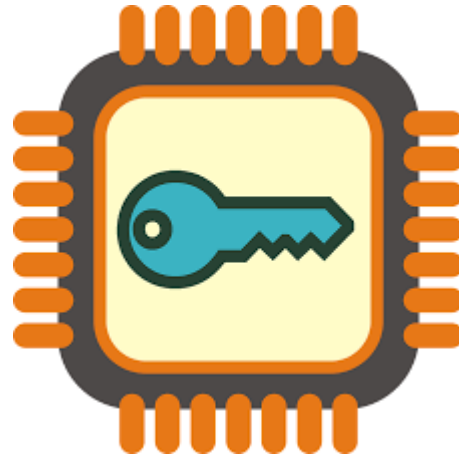
   ▶ Implementation of SW based data flow
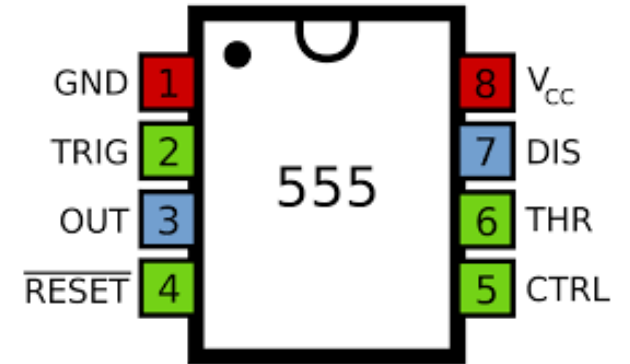
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Event Adapter Types
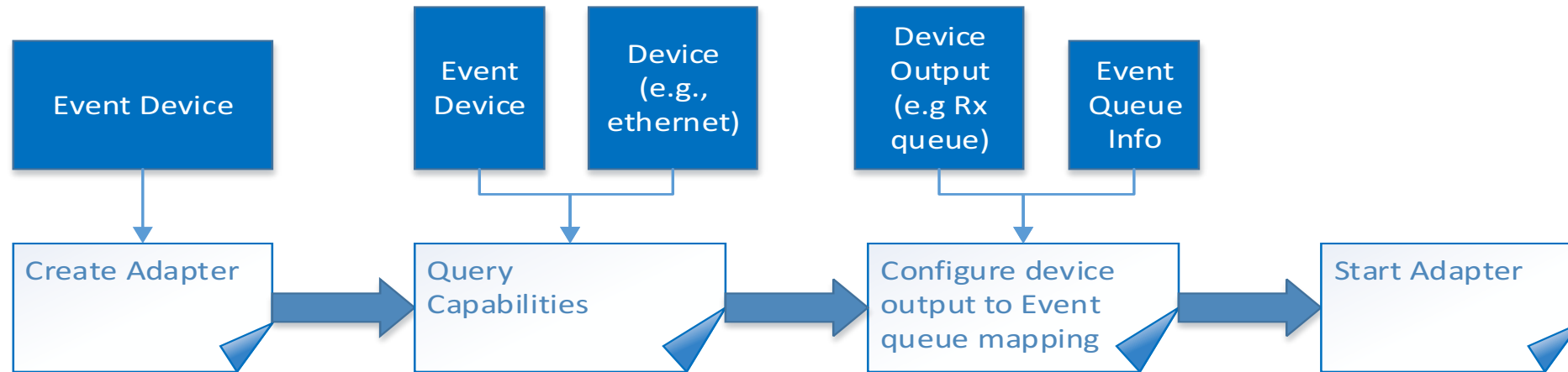
▶ Ethernet Rx

▶ Crypto

▶ Timer

Event Adapter Usage Overview

| Event Device | | Event Device | Device (e.g., ethernet) | Device Output (e.g Rx queue) | Event Queue Info |

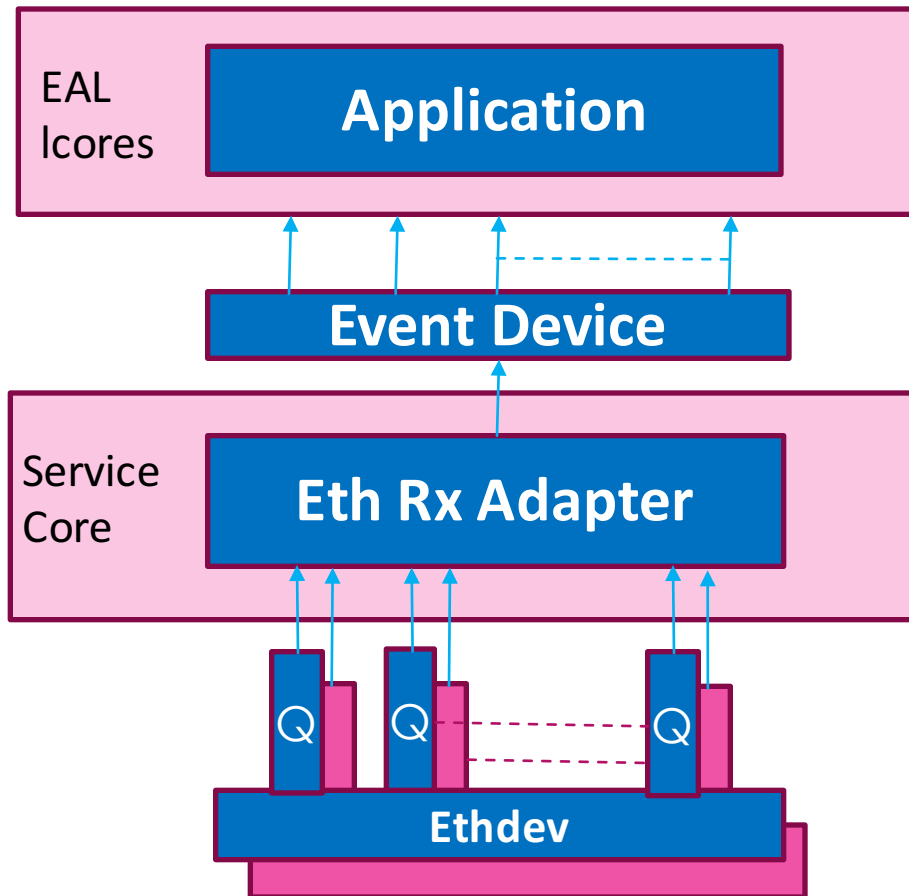| Create Adapter | Query Capabilities | Configure device output to Event queue mapping | Start Adapter |

- ▶ Event Adapter instance associated with Event Device

- ▶ Eth Rx & Crypto Adapter Instance can handle multiple Ethdev/Cryptodevs (across HW & SW transfer mechanisms)

Event Adapters & Service Cores

Device

Event Device

▶ Service Cores allow DPDK component to run on lcores with minimal application changes

▶ Event adapter uses a Service Core for SW based transfers

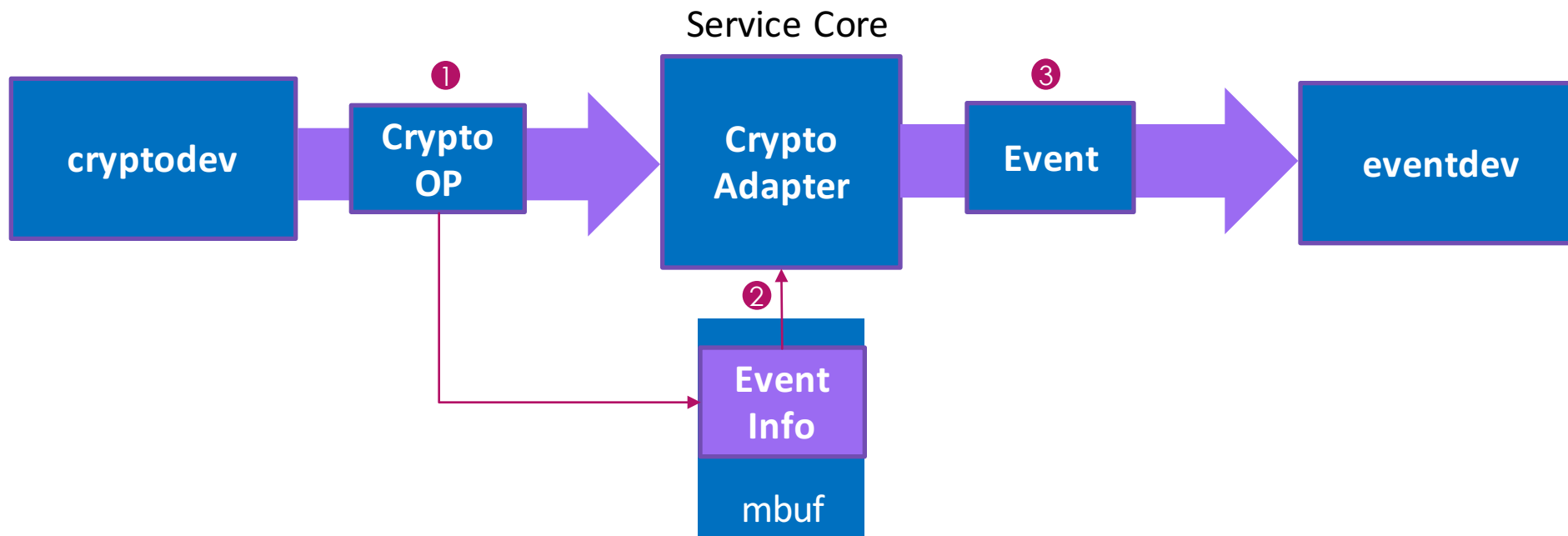▶ Application configures Service Core mapping

Ethernet Rx Adapter Usage

EAL lcores

| Application |

| Event Device |

Service Core

| Eth Rx Adapter |

Q Q Q

Ethdev

▶ Configure Ethdev, Eventdev

▶ Create Adapter Instance

▶ Add Rx Queues and Event Info to Adapter

▶ Configure Service Core Mapping (if required)
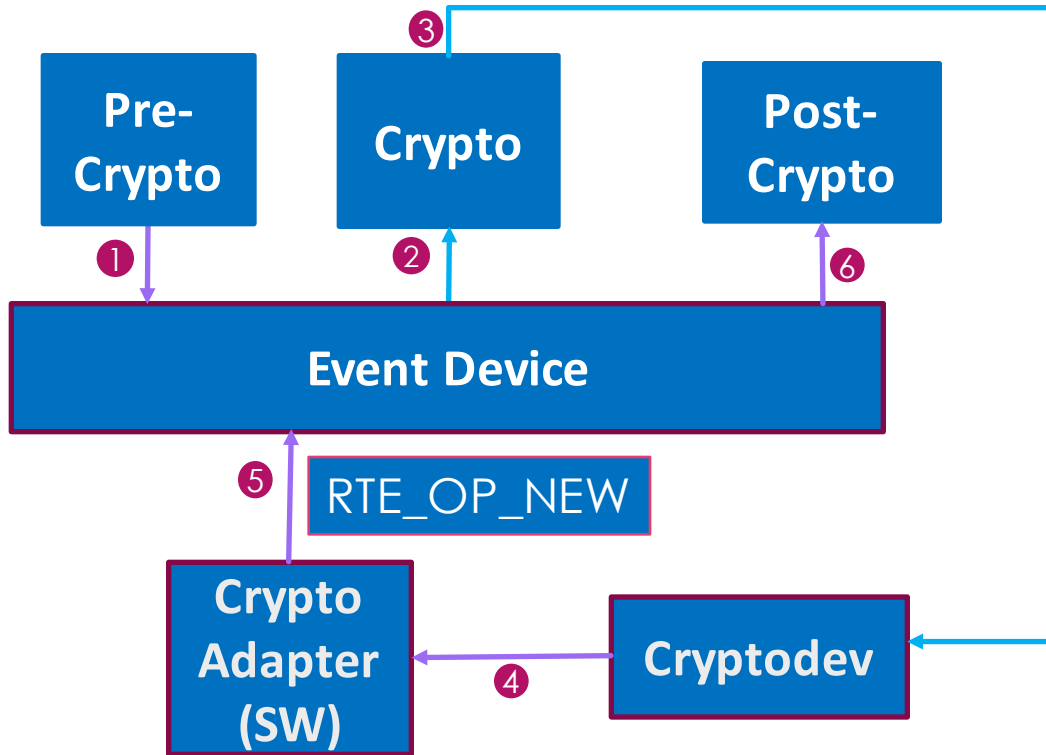
▶ Start Adapter

Crypto Adapter (RFC)

▶ Event queue mapping is per Crypto QP

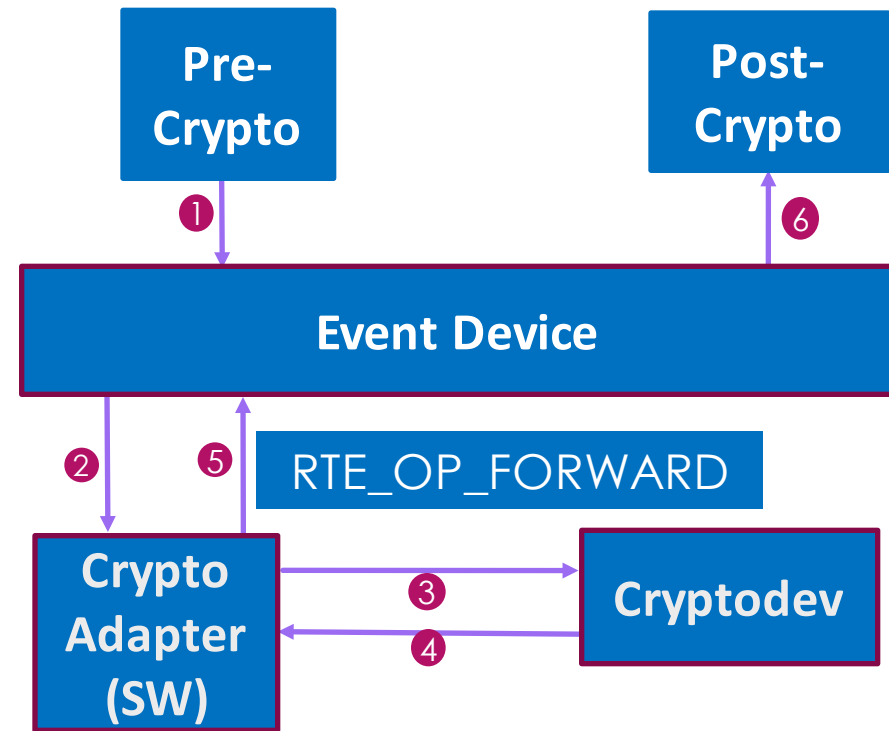▶ SW implementation also supports per-mbuf Event Information

Crypto Adapter (RFC) Enqueue Mode
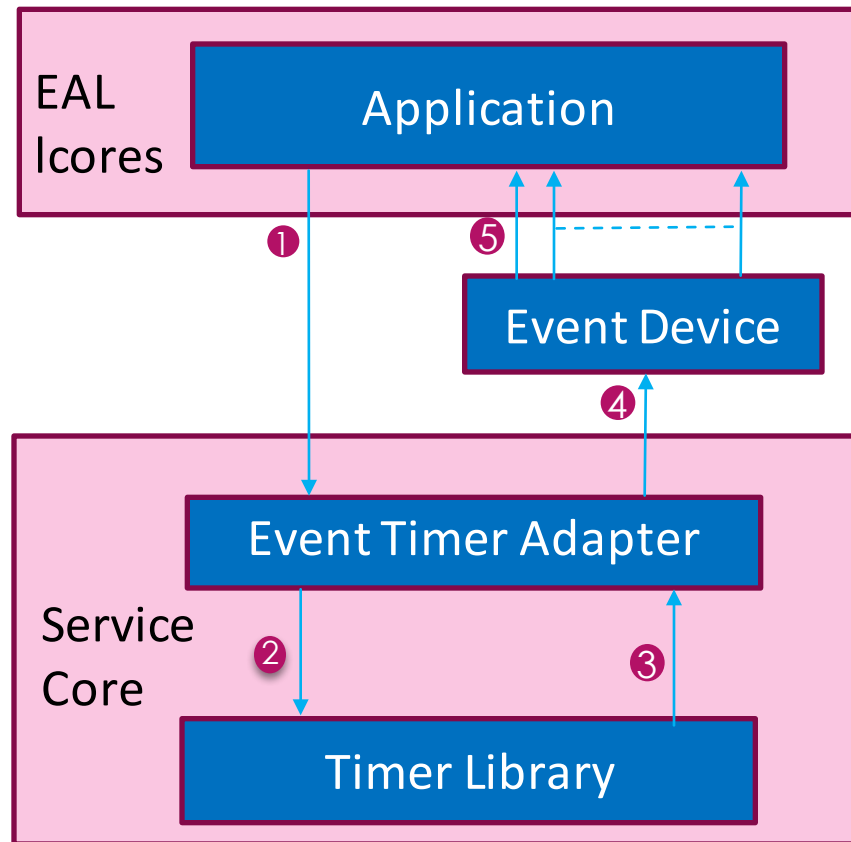
Dequeue only

Pre-Crypto → ❶ → Event Device
Crypto ← ❷ ← Event Device
Post-Crypto ← ❻ ← Event Device
❸
Event Device → ❺ → Crypto Adapter (SW)
RTE_OP_NEW
Crypto Adapter (SW) ← ❹ ← Cryptodev

Enqueue + Dequeue

Pre-Crypto → ❶ → Event Device
Post-Crypto ← ❻ ← Event Device
Event Device → ❷ → Crypto Adapter (SW)
❺
RTE_OP_FORWARD
Crypto Adapter (SW) → ❸ → Cryptodev
Crypto Adapter (SW) ← ❹ ← Cryptodev

► RTE_OP_FORWARD v/s RTE_OP_NEW

► Better performance for "Closed System" Event Devs

► Doesn't have the risk of dropping an event

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Timer Adapter (RFC)

Timer SW Adapter

- ▶ Configure Eventdev
- ▶ Create Adapter Instance
- ▶ Configure Service Core (if SW adapter)
- ▶ Start Adapter
- ▶ Arm Timers

Event Adapter Status

▶ Ethernet Rx Adapter available in 17.11 (special thanks to Jerin Jacob for his contributions)

  ▶ Includes Cavium & NXP eventdev PMD support

▶ Timer Adapter, working on RFC feedback

▶ Crypto Adapter RFC posted

Questions?

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