



DPDK

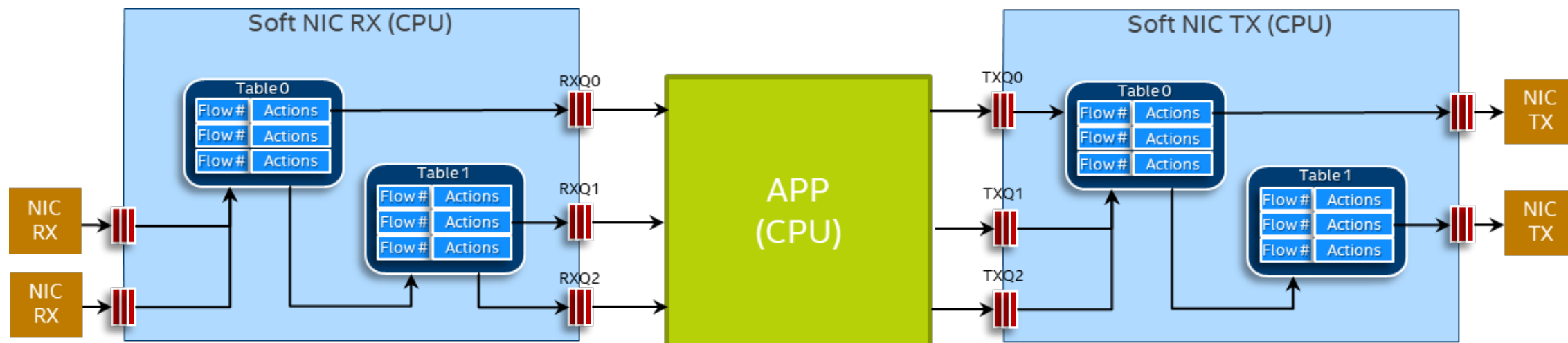
DATA PLANE DEVELOPMENT KIT

Soft NIC: Build Your Own NIC in SW

CRISTIAN DUMITRESCU

SW ARCHITECT - INTEL

Soft NIC: Build Your Own NIC in SW

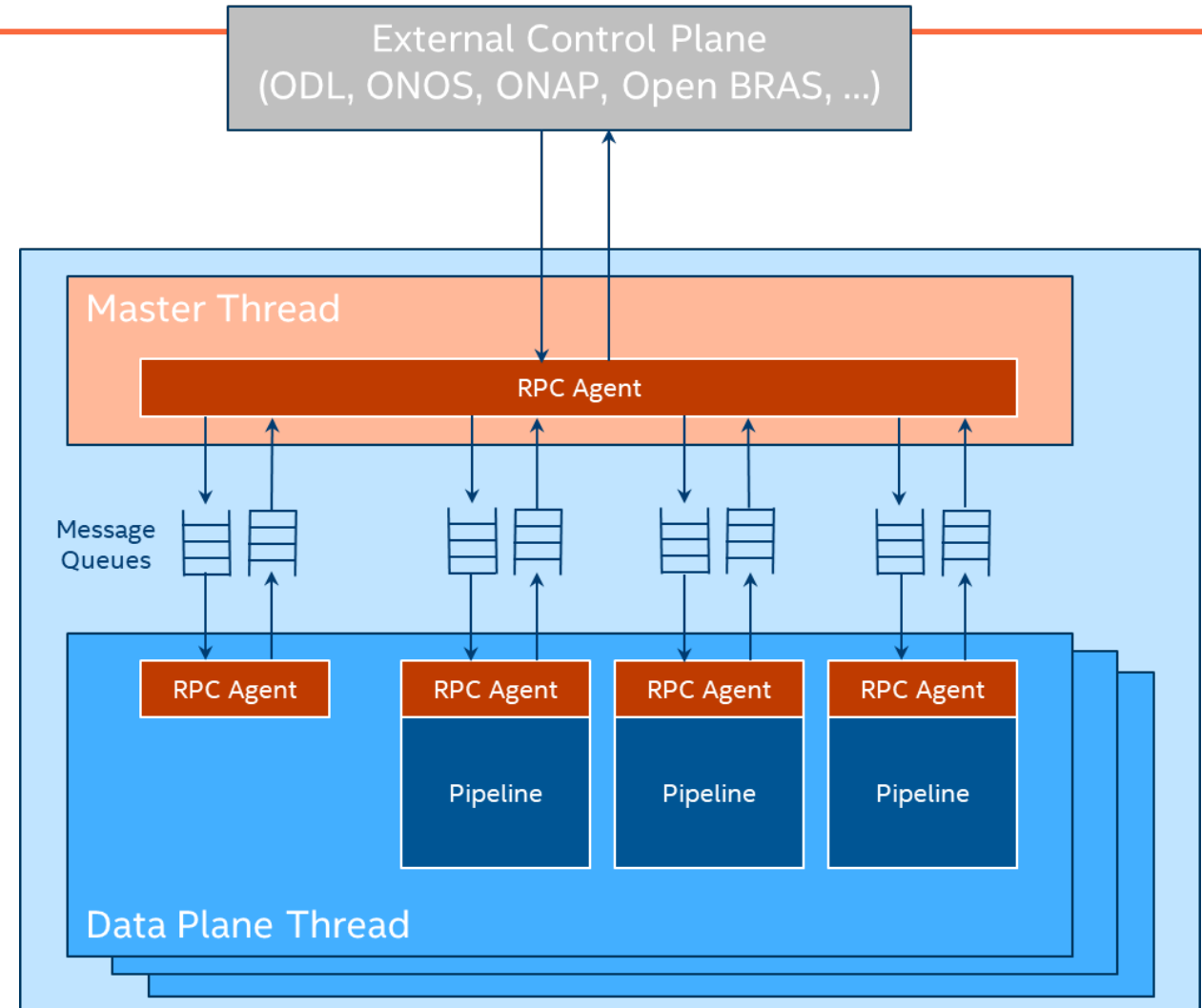


- The Soft NIC pipeline is DIY and reconfigurable through “firmware” (DPDK Packet Framework script).
- Configured through the standard DPDK ethdev API (including flow, QoS, sec). The internal framework is not externally visible.
- Key benefits:
 - Usability: Can be used to augment missing features to HW NICs.
 - Usability: Allows consumption of advanced DPDK features without application redesign.
 - Performance: Allows out-of-the-box performance boost of DPDK consumers apps.

IP Pipeline

Modular high performance data plane framework for multi-core CPUs based on lockless design.

1. True application generator due to endless possibilities to create custom pipelines.
2. Uses DPDK Packet Framework to create custom pipelines out of performance optimized ports, tables and actions.
3. Each pipeline is created by the master thread.
4. Each pipeline is executed by a single data plane thread, which also performs run-time updates periodically (e.g. table population, stats, etc).
5. Connectivity with external agents.



Soft NIC Internals

- App thread [Master thread]
 - Call the DPDK ethdev API to configure Soft NIC
 - Config: define #RXQs and #TXQs
 - Queue config: create an rte_ring for each RXQ and TXQ
 - Start: run the “firmware” script, which is 99% identical to IP pipeline CLI script
 - Detect LINK objects
 - Create MEMPOOLS, SWQs, TMs, etc
 - Creates PIPELINEs: action profiles, input ports, output ports, tables, pipelines
 - Maps pipelines to CPU cores
 - Stop: destroys all objects previously created by the firmware
 - Call the DPDK ethdev API to read packets from/write packets to Soft NIC queues
 - Call the DPDK ethdev APIs to update Soft NIC: flow, QoS, security
- Soft NIC threads [Dataplane threads]
 - Call the Soft NIC run API to execute the pipelines assigned to current thread