OvS

Open vSwitch

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OvS Offload – Dynamic Rebalancing

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Agenda

- **Dynamic Rebalancing**
- **Design and Implementation for OVS TC-Flower (Kernel) Offload**
- **Proposed changes for OVS DPDK (User mode) Offload**

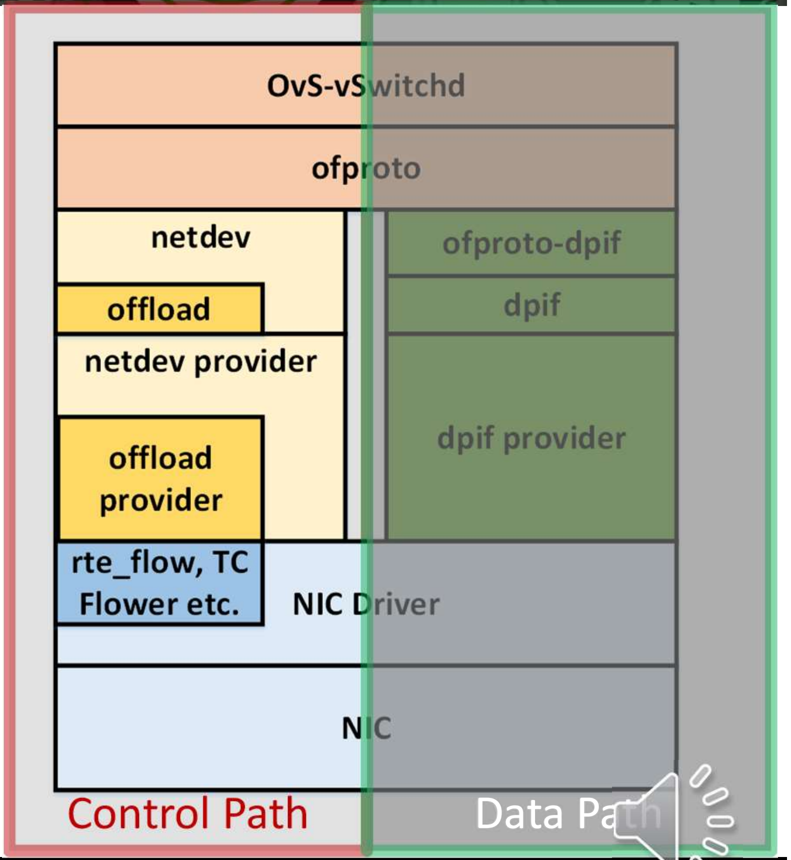
Dynamic Rebalancing

- **Problem Description**
  - HW flow offload resources: Limited by NIC capacity
  - Once offloaded, a flow stays offloaded until deleted by OVS
  - New offload requests may fail due to offload capacity
  - Leads to inefficient utilization of HW and CPU resources

Can the flows be offloaded and managed more intelligently ?

Dynamic Rebalancing – TC-Flower Offload

- **Design Points**
  - Dynamic discovery of capacity exhaustion
  - Offload selection
    - Based on flow PPS rate
  - Rebalancing of offloaded flows
    - Higher PPS flows replace lower PPS flows
  - User config – “offload-rebalance” option
- **Layered Design**
  - OOR error reporting (driver)
  - OOR detection (dpif-provider - handler)
  - Offload selection (ofproto-dpif - revalidator)
  - Rebalancing (ofproto-dpif - revalidator)



Dynamic Rebalancing – OvS-DPDK Proposal

- **Leverage rebalancing design from OvS-TC flower (kernel)**
  - Rebalancing in the offload layer (transparent to users and applications)
  - PPS estimation based on flow packet counts over a sample period
- **OvS-DPDK Gaps/Challenges for rebalancing**
  - Resource exhaustion reporting in PMD
  - Asynchronous processing of candidate flows by offload thread
  - Offloaded flows maintained in user data path and HW (different from OvS-TC flower)
- **Proposal**
  - Add OOR error reporting in PMD → ENOSPC from rte_flow_create()
  - OOR detection in OvS-DPDK offload thread
  - Rebalancing logic in revalidators (reuse)
  - Add a mechanism to sync between offload thread & revalidators during rebalancing
  - Rebalanced flows need to be inserted/removed from HW only