OvS Offload: Too Many Models?

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Agenda

- OvS Offload Terminology
- OvS-DPDK Offload Models
- OvS Kernel Offload Models
- Comparison
- Summary

OvS Offload

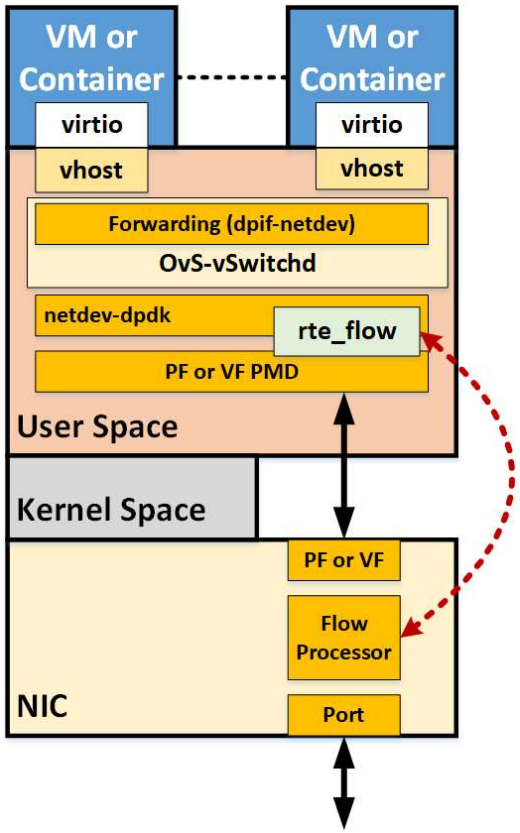
- **OvS Offload: Offloading of match/action processing from OvS**
- **Match Offload: Offloading of flow classification (RX only)**
- **Action Offload: Partial offloading of match and actions (TX/RX)**
- **Full Offload: Offloading of match and actions (TX/RX), OvS is bypassed**

Why Offload? Higher Throughput, Higher Efficiency, Lower Latency

OvS-DPDK Partial Offload Model

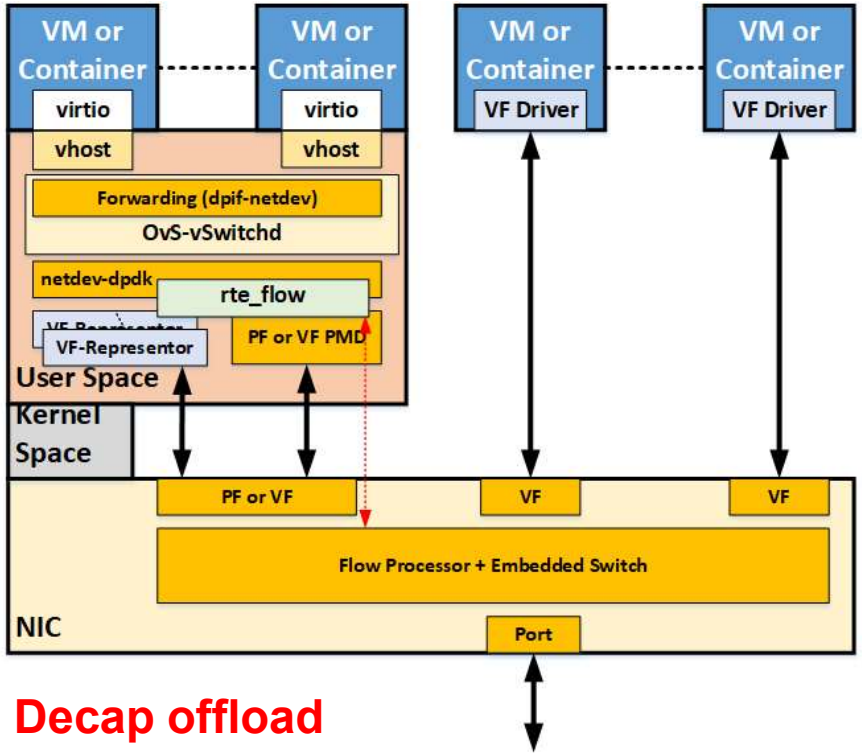
- VMs connect to OvS-DPDK using virtio
- OvS-DPDK provides VM-VM and VM-Net connectivity
- OvS-DPDK flow processing offloads are executed by NIC
- OvS-DPDK is always in the datapath
- Control Plane: rte_flow
- PF or trusted VF PMD per physical uplink port

- Match Offload (RX only) well integrated into OvS-DPDK
- Arch Challenges and Complexities with actions offload
- Benefits of actions offload are not characterized



OvS-DPDK Full Offload with SR-IOV

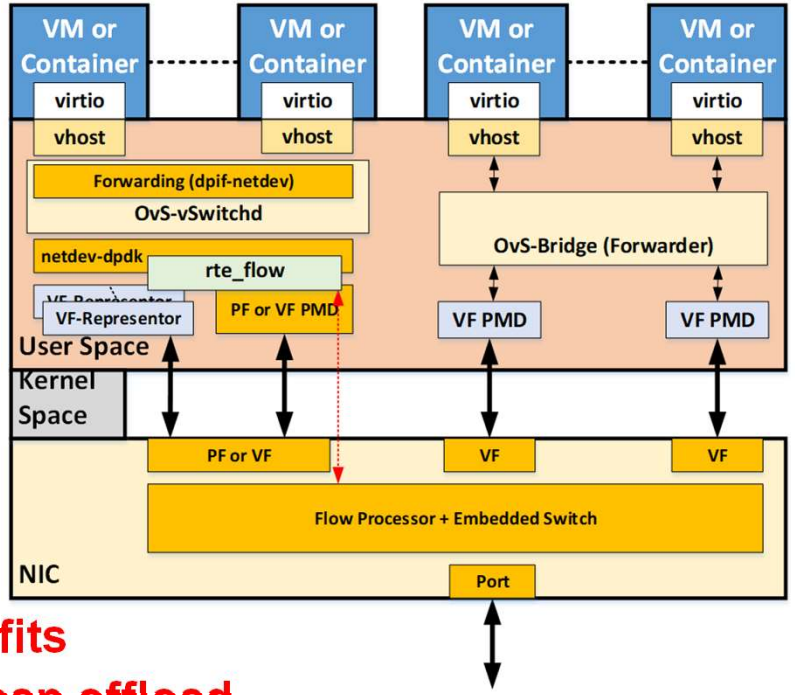
- VMs bypass OvS-DPDK
- NIC applies OvS policies
- VF-Reps represent VFs in OvS-DPDK
- Control plane: rte_flow & VF-Rep
- PF or trusted VF PMD per phy uplink port



- Control plane infrastructure is in place
- Full benefits of offload and OvS bypass
- Requires vendor specific VF driver in VM
- Doesn't support live VM migration
- Two bridge design is challenging for Tunnel Decap offload

OvS-DPDK Full vhost Offload with SR-IOV

- VMs use virtio
- NIC applies OvS policies
- VF-Reps represent VFs in OvS-DPDK
- Control plane: rte_flow & VF-Rep
- PF or trusted VF PMD per phy uplink port

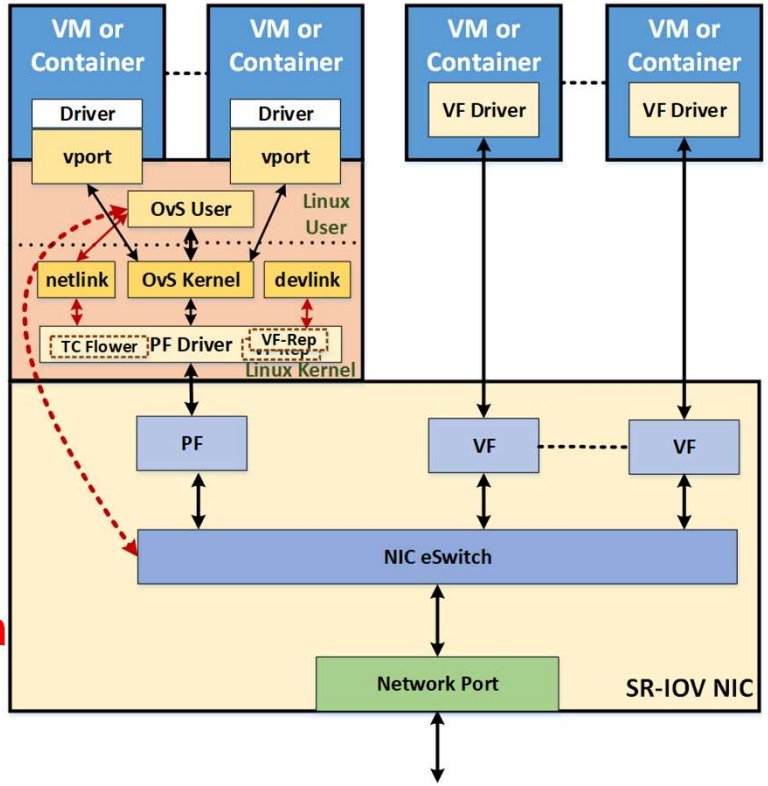


- Doesn't require vendor specific driver in VM
- Live VM migration is supported
- Control plane infrastructure is in place
- SW forwarder overhead reduces offload benefits
- Two bridge design challenging for Tunnel Decap offload

OvS-Kernel DP Full Offload with SR-IOV

- VMs can bypass OvS
- NIC applies OvS policies
- VF-Reps represent VFs in OvS
- Control plane: TC-Flower & VF-Rep
- Management plane: switchdev

- Control & Management planes are in place
- Full benefits of offload and OvS bypass
- Requires vendor specific VF driver in VM
- Doesn't support live VM migration
- Does not Support User Mode Appliances/Switch



Comparison of OvS Offload Models

Model	OvS Bypass	Supports VM Migration	VM Driver	Control Plane
OvS-DPDK Partial Action Offload	No	Yes	virtio	rte_flow
OvS-DPDK Full Offload w/ SR-IOV	Yes	No	Vendor Specific	rte_flow VF-Rep
OvS-DPDK VHOST Full Offload (w/ virtio & SR-IOV)	Yes (FWD bridge)	Yes	virtio	rte_flow VF-Rep
OvS-TC-flower Full Offload w/ SR-IOV	Yes	No	Vendor Specific	TC Flower VF-Rep

Summary

- OvS Data Path Offload: Models exist for user and kernel modes
- OvS Offload Layer (Control Plane) remains challenging
- Action Offload: Inherently Challenging with OvS architecture & Offload Layer
- Full Offload: SR-IOV infrastructure exists, Issues - VM migration & offload design

Over choice of OvS Offload Models and Complexity of Offload Layer are Challenging for the Deployment and Adoption of OvS Offload