



arm

Containerized VNFs with Data Plane Acceleration On Arm platform

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Agenda

- Background
- Containerized VNFs on Arm
- Container networking acceleration with DPDK
- What we have done
- Next steps

Background

1. Infrastructure Layer

- Use ARM64 Server

2. Data Plane Layer

- Enable DPDK for Container

3. Compute Virtualization Layer

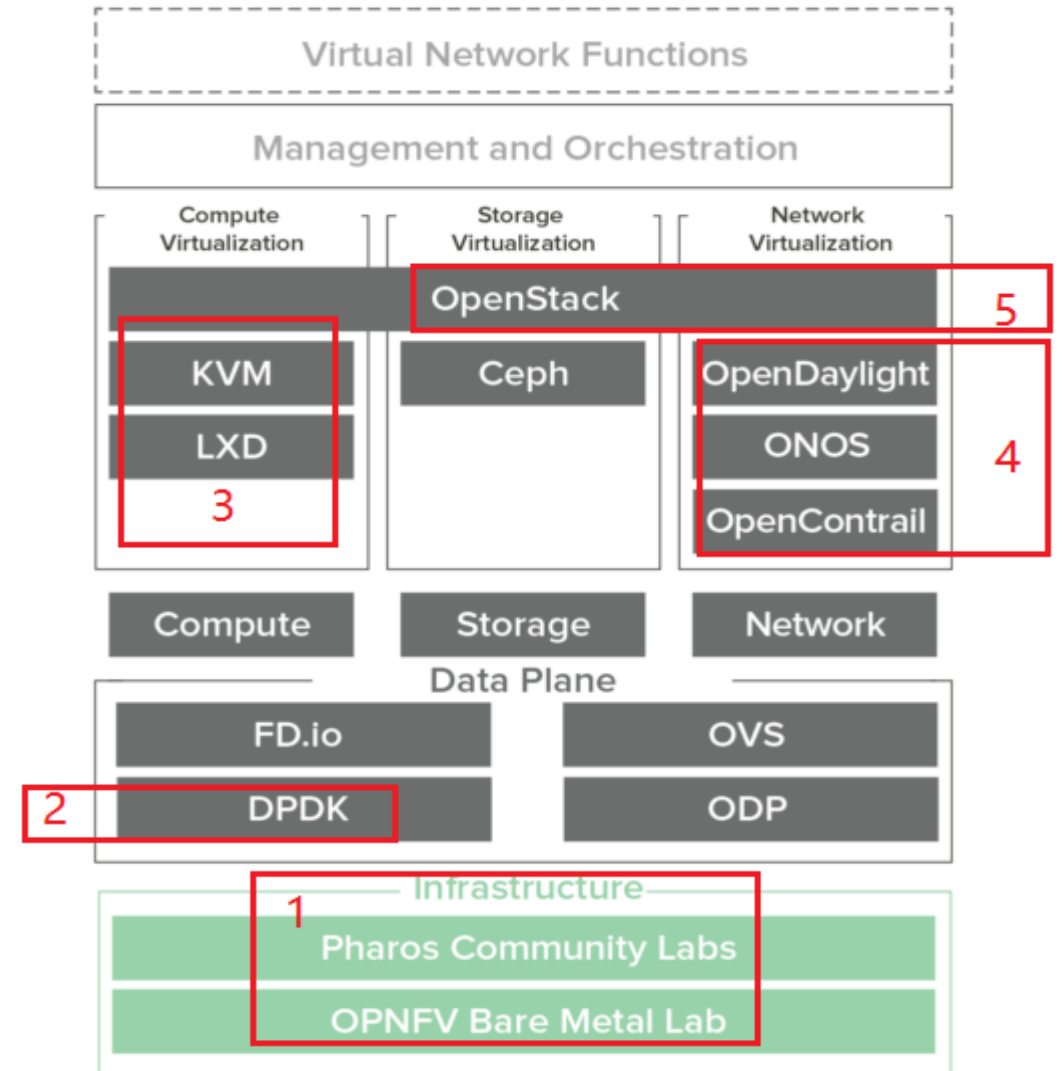
- Enable Docker Container

4. Network Virtualization Layer

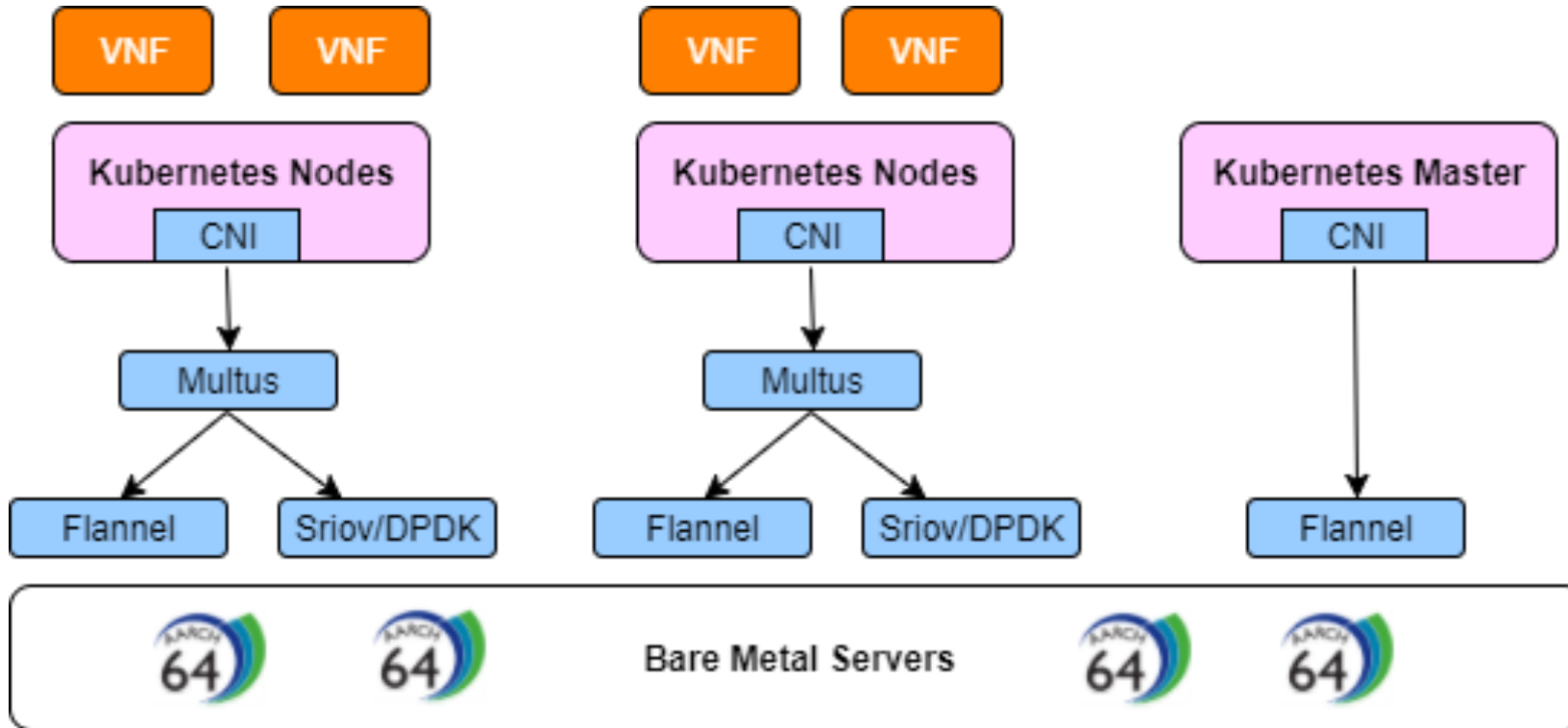
- Enhance Kubernetes SRIOV-CNI for DPDK deployment

5. Virtualization Infrastructure Manager layer

- Use Kubernetes instead of OpenStack



Containerized VNFs on Arm - with Data Plane Acceleration



kubernetes



docker



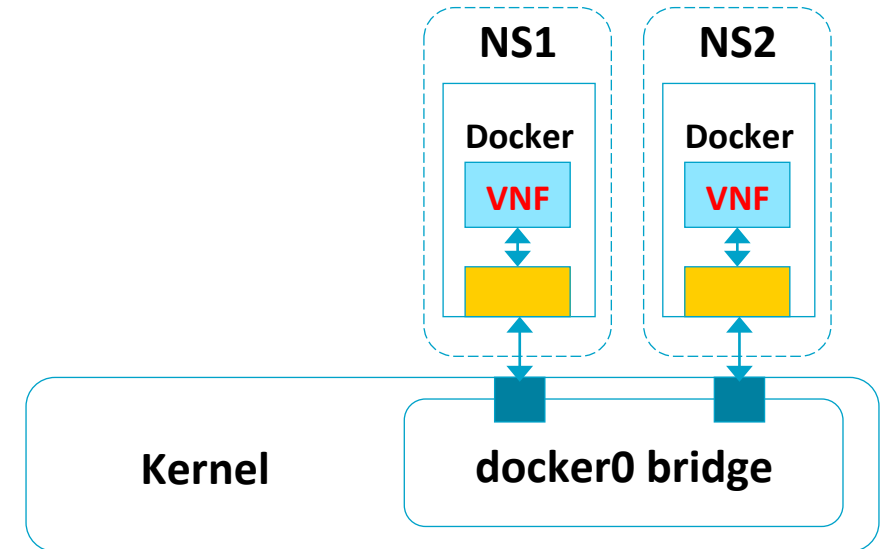
CNI



DPDK
DATA PLANE DEVELOPMENT KIT

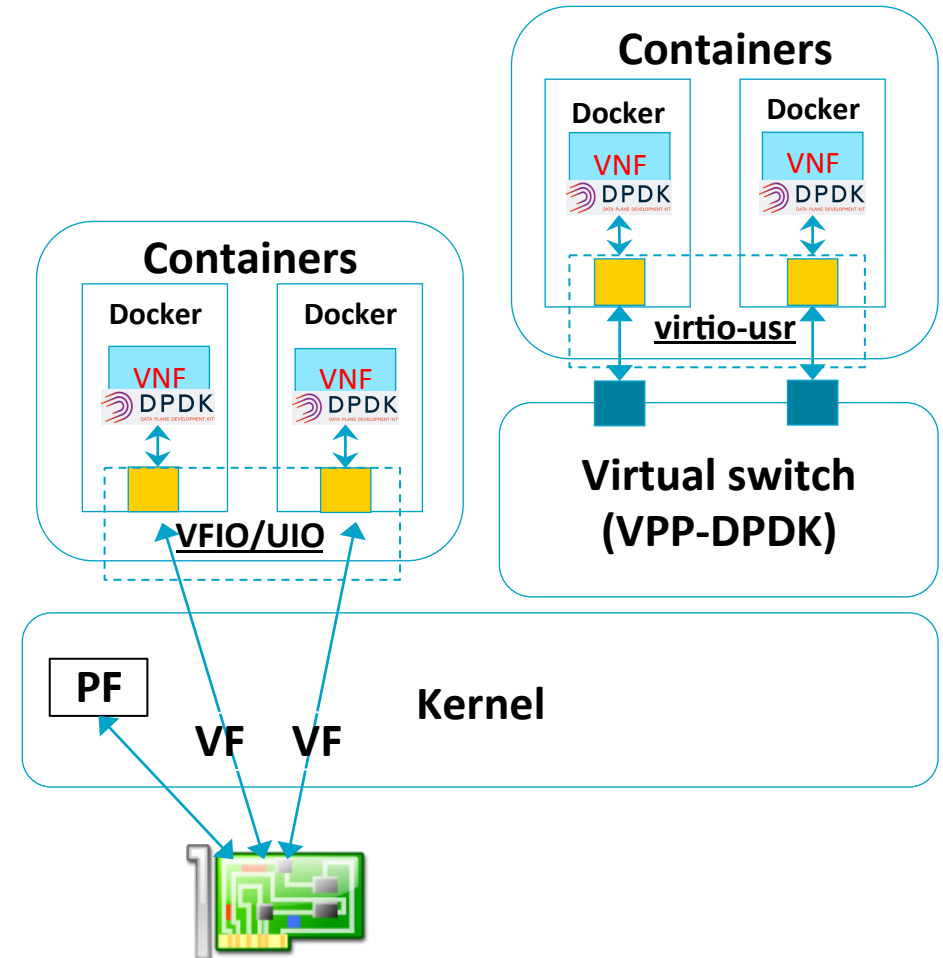
Container Networking

- Current status
 - Linux bridge, veth pair, Network namespace, iptables ...
 - Docker native network drivers
 - Host, bridge, overlay and MACVLAN
 - Other container network solutions
 - flannel, calico, contiv ...
- But may not be good enough for NFV
 - Complicated logic costs more CPU cycles
 - Low throughput and high latency for some use cases
 - Handling networking outside kernel is more popular

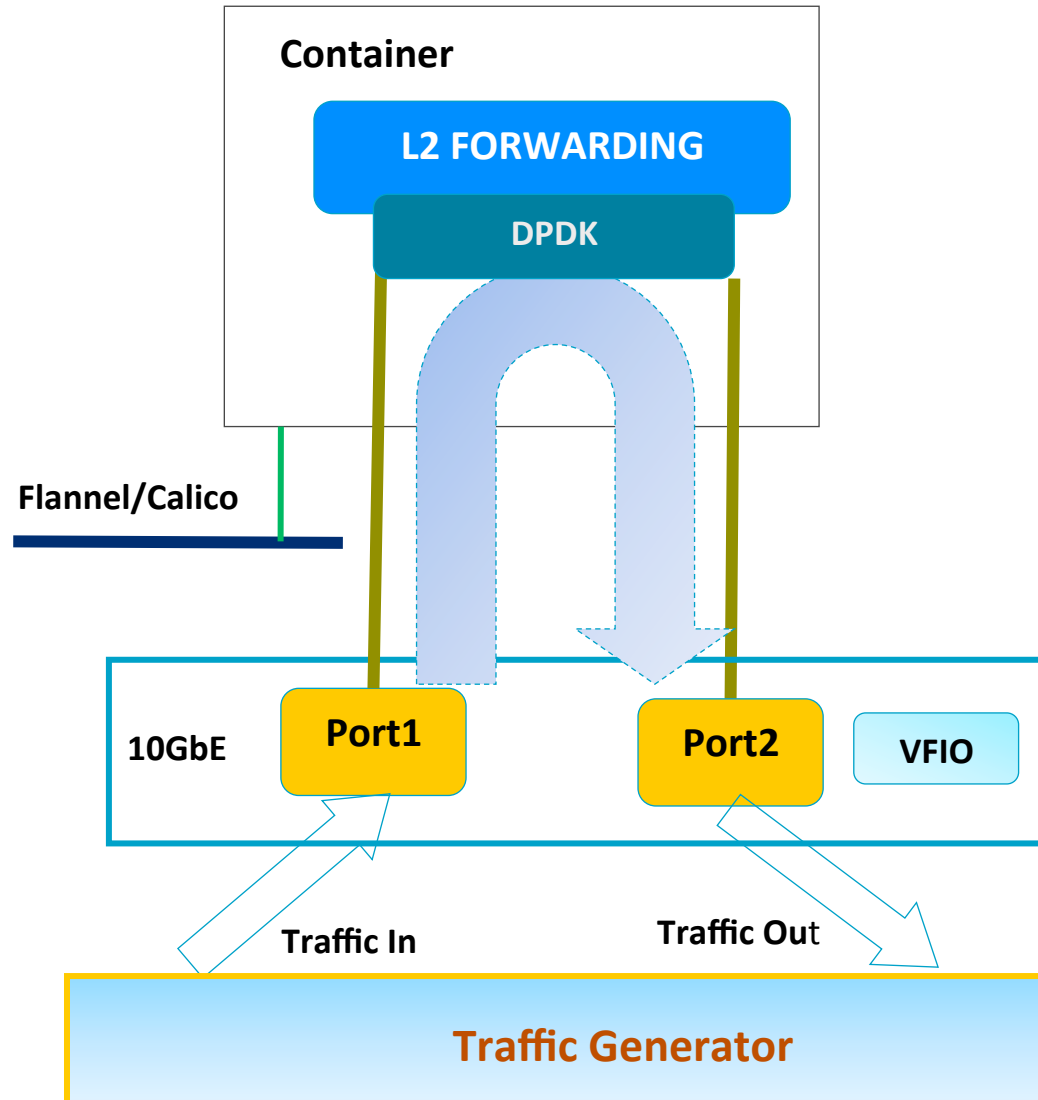


Container Networking Acceleration with DPDK

- Data Plane Development Kit (DPDK)
 - Libraries and poll-mode drivers for fast packet processing
 - Kernel bypassing, core affinity, huge pages, lockless synchronization, polling, NUMA awareness ...
 - Multi-arch support – x86, ARM64 and PPC
- NIC passthrough and SR-IOV VF passthrough
 - Device assignment by VFIO/UIO
 - High throughput, low latency
- Virtio-user in container
 - Virtio-user as DPDK virtual device
 - Reuse existing vhost-user backend



L2FWD with DPDK in Container



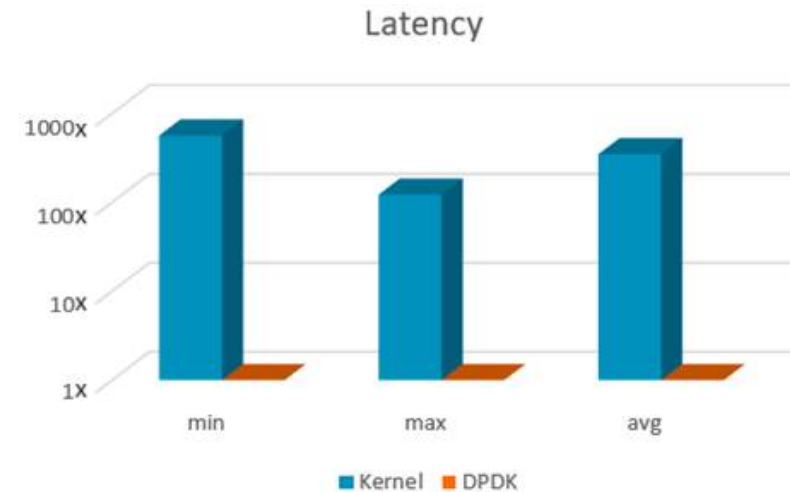
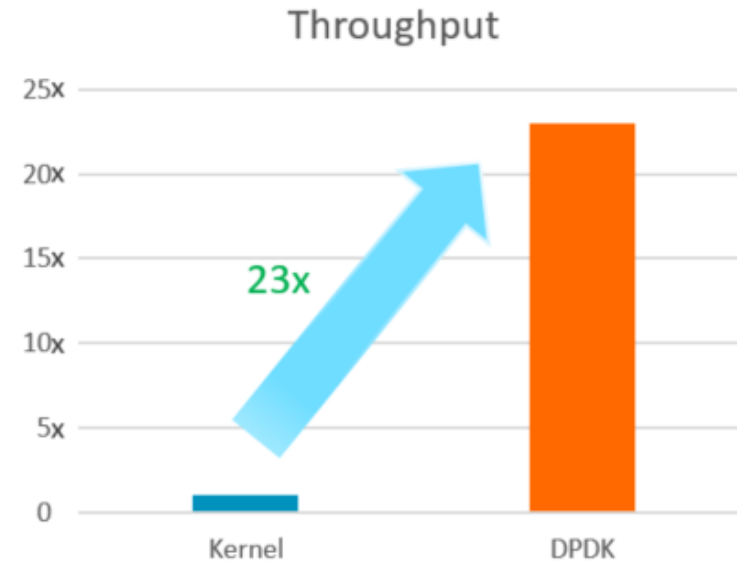
L2FWD Performance

- Hardware

- ARMv8 64-bit, 2.4Ghz
 - 2 cores dedicated
 - 1G Hugepage size
- Intel 2-port 82599ES 10Gbe
- IXIA traffic generator

- Software

- Linaro ERP 17.08 (Debian based)
 - Kernel 4.12
- DPDK 17.08



What We Have Done

- Enabled DPDK in container on ARM64 platform
- Enhanced SRIOV-CNI with DPDK acceleration
- Performance test with DPDK for container networking
- Enabled K8s as VIM on ARM64 platform

Next Steps

- Enable VPP-DPDK for OPNFV on Arm
- Enable VPP-ODP for OPNFV on Arm
- Performance tuning of DPDK in container on Arm
- Enable new features of high performance container networking in K8s on Arm
 - Resource allocation for DPDK in K8s: cpuset, NUMA, cache...

