Network Cloud OVS-DPDK Blueprint and Feature Project

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Network Cloud Unicycle Blueprint with OVS-DPDK

- New SPECIES to add OVS-DPDK support into existing Network Cloud Unicycle Blueprint Family
- Joint community effort by Ericsson and AT&T
- Integration with feature project to add OVS-DPDK support to Airship distribution
- Based on Dell PowerEdge R740XD Servers to deploy kubernetes (undercloud) and containerized Openstack platform (overcloud) using Airship
- VNF Orchestration using ONAP
Packet Processing Options

<table>
<thead>
<tr>
<th>Interface from application</th>
<th>To VNIC via sockets (Linux kernel)</th>
<th>Direct to VNIC using DPDK</th>
<th>To physical NIC via virtual function (e.g., SR-IOV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comments</td>
<td>+ High portability - Poor performance</td>
<td>+ Good portability + Good performance for most use cases + Functionality in open source, outside the VM</td>
<td>+ Good performance for most use cases - HW dependency and vendor lock-in - Functionality pushed to VM</td>
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</tbody>
</table>
OVS-DPDK Software Stack

userspace

- OVS
  - vswitchd
  - DPDK
- Neutron
- Nova
- VM
- VM
- libvirt / qemu

K8s

Docker

kernel

NICs
OVS-DPDK Core Components

- **OpenVswitch**
  - Functionality split in two pods
  - `openvswitch-db`
    - OVSDB server and database
  - `openvswitch-vswitchd`
    - DPDK-enabled userspace switch

- **Neutron**
  - Functionality spread across 10+ pods
  - `neutron-ovs-agent`
    - Performs configuration of OVS
    - DPDK specific operations
      - Loading of kernel modules
      - Binding of NICs to DPDK
      - Creation of DPDK-enabled bridges
      - Adding of DPDK ports (NICs) to bridges
      - Configuration of IPs for overlay tunneling

- "other Neutron components"
DPDK Configuration for OpenStack-Helm

› New configuration parameters

Hugepage configuration
resources:
  enabled: false
ovs:
  vswitchd:
    requests:
      memory: "128Mi"
      cpu: "100m"
    limits:
      memory: "1024Mi"
      cpu: "2000m"
    hugepages-1Gi: "1Gi"
    # hugepages-2Mi: "512Mi"

DPDK configuration
dpdk:
  enabled: false
  socket_memory: 1024
  hugepages_mountpath: /dev/hugepages
  mem_channels: 4
  lcore_mask: 0x1
  pmd_cpu_mask: 0x4

OVS agent configuration
ovs_dpdk:
  enabled: false
driver: uio_pci_generic
  nics:
    - name: dpdk0
      pci_id: '0000:05:00.0'
      bridge: br-phy
      migrate_ip: true
      n_rxq: 2
      pmd_rxq_affinity: "0:3,1:27"
    ofport_request: 1
  bridges:
    - name: br-phy

› New configuration parameters

“other Neutron components”
Integration in Network Cloud Blueprint

› Extension of the Network Cloud blueprint
  › Additional DPDK-specific configuration
  › New set of templates to render DPDK configuration for Airship

› Open and ongoing items
  › Support for advanced features
    › NIC bonding, jumbo frames, queue sizes
  › Troubleshooting and configuration guide
References

› Project wiki
  › https://wiki.akraino.org/display/AK/Support+of+OVS-DPDK+in+Airship

› Airship
  › https://www.airshipit.org/

› OpenStack-Helm
  › https://github.com/openstack/openstack-openstack-helm