Seamless Transition to CNFs with Tungsten Fabric

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Who we are

- CodiLime has been providing networking engineering services since 2011
- We have been contributing to Tungsten Fabric since 2013
- Today we are presenting a working example of seamless transition to CNFs with Tungsten Fabric
Agenda

1. Intro to the VNF/CNF landscape
2. Combining VNFs and CNFs in a single system
3. Realizing the scenario with Tungsten Fabric, OpenStack and Kubernetes
4. Topology examples
5. What’s on the horizon
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The current state of the VNF world

- physical appliances moved to VMs 1:1
- tight coupling between layers and different products
- non-automated software release process
- limited testing capabilities
The current state of the VNF world

What we would like to have:

- clouds running many kinds of services at once
- continuous on-boarding and decommissioning of applications

What we wouldn't like to have:

- virtualization cluster as a single-purpose "appliance"
- same black-box appliances as physical, but requiring lots of more work and engagement
The need to go forward

- The usual promises of cloud native software:
  - easily deployable
  - testable
  - scalable
  - and maintainable
- applied to NFV products
The CNF challenges

- Software architecture
- Performance
- Security
- Integration with existing systems
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Combining VNFs and CNFs in a single system

- Single networking plane for workloads running on different orchestration platforms
- This is just one approach, another one can be running VMs on top of k8s (kubevirt)
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How can Tungsten Fabric help

- can act as the SDN plugin for OpenStack and Kubernetes (and other systems, not relevant here)
- most of the features are device agnostic (interface is the same pipe for packets on VMs and in containers)
- can be used in more interesting scenarios - VNF, CNF and PNF integration
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4. **Topology examples**
5. What’s on the horizon
Topology 1: starting point

left-vm (client) --> left-net --> VNF --> right-net --> right-vm (server)
Topology 1: starting point
Topology 2: CNF swap
apiVersion: v1
kind: Pod
metadata:
  name: cnfPod
annotations:
  k8s.v1.cni.cncf.io/networks: '[
    { "name": "right-net" },
    { "name": "left-net" },
    { "name": "mgmt-net" }
  ]'
...

Topology 2: CNF swap
Topology 2: CNF swap
Topology 3: VNF/CNF multipath
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Topology 4: in-service CNF swap
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left-vm (client) -- left-net -- right-net -- right-vm (server)

CNF
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But that’s just a start

- unified orchestration - MANO
- CNF performance features equal to the VM offering
- workload placement optimization
- higher-level k8s objects in the service chain
- native k8s API:
  CNTT and CNCF TUG Common API Framework @ 15:20
Resources

- Our LFN demo booth at ground floor
- Service chaining demo online: https://youtu.be/-IZzcq9aZg4
- Blog post about running VMs on k8s: https://codilime.com/vnfs-in-cnfs/
- DPDK-based CNI Support Using Integrated Tungsten Fabric – VPP Solution (Tungsten Fabric, DPDK, FD.io, Kubernetes)
  Presented by ATS @ LFN demo booth