EUROPE
OPEN NETWORKING //
Enabling Collaborative Development & Innovation
Cloud Native Network Provisioning with NSM in the CNF Testbed

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Agenda

- Intro to Network Service Mesh
- Intro to CNF Testbed
- Network Service Mesh Use Cases in the CNF Testbed
- Stay Connected
  - CNF Testbed
  - Network Service Mesh
- Q&A
Get these slides at https://sched.co/SYyw
Network Service Mesh
Network Service Mesh

Network Service Mesh is:

• A Network Service definition
• A gRPC API to describe, publish and consume NS
• A distributed control plane

NSM augments Kubernetes networking API to facilitate L2/L3 connectivity between:

• containers
• virtual machines
• HW-resources
NSM is composed of

- Forwarder
- NS Managers as agents
- NS Clients and Endpoints
  - SDK

![Diagram of NSM components](image)
NSM status

• Releases
  • Alpha v0.1.0
    • Single Kubernetes cluster
    • VxLAN for cross-node tunnels
    • VPP forwarder
  • WIP Beta v0.2.0
    • Multi-cluster
    • SPIFFE based Security
    • Client DNS side-car
    • SRv6
    • Multi-forwarder
CNF Testbed

- Open source initiative from CNCF
- Testing and reviewing emerging cloud native technologies in the Telecom domain
- Funneling the new technology to early adopters
- Providing fully reproducible use cases and examples
- Running on top of on-demand hardware from the bare metal hosting company, Packet
Components of the CNF Testbed

- Hardware provisioning
- Workload provisioning (eg. K8s or OpenStack)
- Use Cases
- Network Functions
- Testing tools (eg. NFVbench)
CNF Testbed Software components

- VM NF
- VM NF
- VM NF

- vhost-user
- QEMU/KVM
- Kernel

- VPP Neutron Agent
- VPP vSwitch
- DPDK
- memif

- OpenStack controller
- OS “rocky” services
- Neutron, API
- Kernel

- Kubernetes master
- K8s
- Kernel

- Packet API

- Packet.net router

- Ubuntu 18.04 LTS

- Container NF
- Container NF

- HW GW

- NSMgr
- NSM Forwarder

- K8s
- DPDK

- NFVbench
- TReX
- DPDK

- Docker
- Kernel

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### [CNF Testbed] Roadmap for Oct 2019 to Jan 2020

| Oct 2019 | NSM IPSec single-node use case  
 | NSM 2-node IPsec use case  
 | NSM IPFwd Service Chain benchmark test  
 | Separate hardware and workload provisioning stages + Kubespray for K8s | TBD |
| Nov 2019 | NSM Hybrid K8s+Openstack use case  
 | DANM SR-IOV use case | NSMCon, KubeCon NA (Nov 18-21) |
| Dec 2019 | NSM SR-IOV Use Case  
 | Intel Multus + CPU Pooler use case  
 | TBD: Kolla/Openstack-helm (TBD) | TBD |
| Jan 2020 | GSM/5G GW use case with NSM | TBD |
Use Cases

Network Service Mesh

CNF Testbed
Components of use cases

NSM Forwarder:
- Acts as a switchboard operator creating connections
- Keeps track of connections

Testing:
- Multiple connection types (memif + tap)
- Direct and switchboard connections
- Chaining multiple network functions (eg. VPN, GW, packet filter)
- Physical VLAN access
Use case - Single node packet filter

- Github [examples/use_case/packet-filtering-on-k8s-nsm-on-packet](https://github.com/examples/use_case/packet-filtering-on-k8s-nsm-on-packet)
Use case - Physical NIC GW with shared access

- Client #2 (vEth/Tap)
- Client #1 (Memif)
- Packet filter CNF
- Physical NIC Gateway CNF
- NSM Forwarder

Diagram:
- vEth
- Memif
- Packet VLAN with internal network (eg. 10.0.0.5/24)
- Packet switch
- Test end point
The Use case

- Physical NIC GW network function
- Multiple service chains with private networks
- DPDK + VPP-based access to Packet’s Intel x710 NIC
  - n2.xlarge machine type
  - host provisioning required
  - privileged GW container

- Github [use_case/external-packet-filtering-on-k8s-nsm-on-packet]
Provisioning the Network Service

- Network Service - descriptor + service chain composition + deployment
- Packet filter NF
  - VPP: ACL-based filtering + routing
- NS Endpoint
- NS Client
- Physical NIC GW
  - VPP + DPDK
  - NS Endpoint
Accessing the Network Service

- Clients request access to the service chain
  - Side-car container
  - SDK client
Q&A

Network Service Mesh

CNF Testbed
Stay Connected

Network Service Mesh

CNF Testbed
Connect with Network Service Mesh

- Create issues/PRs on GitHub:
  - https://github.com/networkservicemesh/networkservicemesh/issues
- Join the #nsm channel on CNCF slack
  - slack.cncf.io
- Subscribe to the Network Service Mesh mailing list:
  - https://groups.google.com/forum/#!forum/networkservicemesh
- Attend Network Service Mesh Working Group meetings:
  - Weekly: every Tuesday at 8:00AM PT
  - Biweekly: every other Tuesday at 10:00AM CET
- Follow us on twitter: @nservicemesh
Connect with the CNF Testbed

• Create issues/PRs on GitHub:
  • https://github.com/cncf/cnf-testbed/issues
• Join the #cnf-testbed channel on CNCF slack
  • slack.cncf.io
• Subscribe to the CNCF Telecom User Group mailing list:
  • telecom-user-group@lists.cncf.io
• Attend CNCF Telecom User Group meetings on Zoom:
  • https://github.com/cncf/telecom-user-group
• Follow us on twitter: @cnftestbed
Thank you

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