PNF Orchestration: Working in Brownfields

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Welcome to the Hackfest
Hackfest Environment

SSID: OSM_Hackfest
Password: WIFI4hackfest!

Remote Desktop

OpenStack

Virtual Desktop

OSM

Kubernetes

Hub for Interoperability and Validation at ETSI (HIVE)
Your Openstack Tenant
Brownfields and PNFs
Brownfield vs Greenfield

https://www.linkedin.com/pulse/software-development-brownfield-vs-greenfield-madhavan-ekanathan/
PNF vs VNF

PNF

Higher unit cost
Bulky
Fragile
Needs care

VNF

Low unit cost
Compact
Recyclable
Needs no care

PNF - Is It Bare Metal?

Physical Network Function

Implementation of a Network Function via a tightly coupled software and hardware system

● PNF refers to a function that is fixed
  ○ Purpose built to provide a specific function, a hardware appliance

● PNF does not have to mean bare metal
  ○ Could be unmanaged software in a VM

● VNF does not always mean running in VM or Container
  ○ OpenStack Ironic allows for management of bare metal like a VM

https://www.etsi.org/deliver/etsi_gs/nfv/001_099/003/01.04.01_60/gs_nfv003v010401p.pdf
Hackfest Environment

You → Remote Desktop

Hub for Interoperability and Verification at ETSI (HIVE)

OpenStack

Virtual Desktop

OSM

K8s

Apache Web Server
What Does This Look Like?

OSM External Network (172.21.18.0/23)

Private Network (192.168.239.0/24)
How do we Manage a PNF?

- OSM must be given information about the PNF
  - Register a PNF as a logical entity with IP and other info

- Use in standard network function package descriptors
  - Network service and virtual network function descriptors
  - Templates that tell OSM about the PNF

- On Network Service deployment
  - OSM does not launch any VM or Container
  - OSM creates an execution environment for the PNF
  - All actions execute in this environment
https://www.vyos.io/products/

- Runs on physical and virtual platforms alike: small x86 boards, big servers, KVM, Xen, VMware, Hyper-V, and more
- Completely free and open source, with documented internal APIs and build procedures
- Scriptable CLI
- Ansible playbooks for configuration
How a Primitive Runs

1. Execute action

2. Run VyOS ansible playbook task

3. Ansible network commands via ssh
Breaking it down: Creating Packages

./1.Build_Firewall_PNFD.sh
Telling OSM About the PDU

- Need to tell OSM some information
  - Name
  - Type
  - Interfaces with IP addresses

```
name: router01
description: VyOS Router
type: gateway
shared: false
interfaces:
  - name: gateway_public
    ip-address: 172.21.19.195
    mgmt: true
    vim-network-name: osm-ext
  - name: vnf_internal
    ip-address: 192.168.239.250
    mgmt: false
    vim-network-name: private
```

```
osm pdu-create \
  --descriptor_file \ firewall-pdu.yaml \ --vim_account openstack
```
Launch Service

2.Launch_Network_Service.sh

Launching network service with VIMID bf5f184c-8ce0-4959-99d9-598582483b80
dd336fb8-283d-4ae6-9d36-bb3d370d6399
Done
What is Happening?

- OSM
  - Creates an entry for this network service
  - Creates an environment for operations to run
Operations: Add Port Forward

Port 3389

IP: 192.168.239.100
Port 3389
Ansible Playbook

- hosts: vyos-routers
  gather_facts: false
  connection: local
  tasks:
    - name: backup switch (vyos)
      vyos_config:
        lines:
          - nat destination rule {{ ruleNumber }} destination port "{{ sourcePort }}"
          - nat destination rule {{ ruleNumber }} inbound-interface "eth0"
          - nat destination rule {{ ruleNumber }} protocol "tcp"
          - nat destination rule {{ ruleNumber }} translation port "{{ destinationPort }}"
          - nat destination rule {{ ruleNumber }} translation address "{{ destinationAddress }}"
  save: yes
Community installer

```
chmod +x install_osm.sh
./install_osm.sh
```

Charmed installer

```
chmod +x install_osm.sh
./install_osm.sh --charmed
```
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Thank You!