OSM#9 Hackfest
Orchestrating a PNF in OSM
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PNF / HNF - Definitions

• **PNF**: Physical network function. It refers to a HW box that provides a networking function. Routers, firewalls, load balancers, etc.

• **PDU**: Physical deployment unit. It refers to the “instance” of the physical appliance that will be incorporated to a Network Service instance.

• **HNF**: Hybrid network function: Network function composed of both physical and virtual elements.

In OSM, there are no fundamental differences between a VNF, a PNF or a Hybrid Network Function (HNF)

In those cases where we want to define NS packages consisting of PNF packages or HNF packages, **OSM needs to be instructed about the available PDUs.**
PNFD/HNFD vs PDU

PNFD/HNFD
...
pdu
- type
  interfaces
  - name
  mgmt
  - name
config
...

PDU

name
type
vim_accounts
shared
interfaces
- ip-address
  mgmt
  name
- ip-address
...

Deployment
Let’s orchestrate the PNF!

Magma EPC Network Slice

Orchestrator Subnet (shared)
- Magma Orchestrator (KNF)
  - other kdu
  - nginx_proxy kdu
  - orc8r_proxy kdu

Evolved Packet Core Network Service
- Magma AGW + Tester (VNF)
  - Magma vEPC
    - vdu
  - Generic eNodeB
    - +UE emulator
      - vdu

Physical Router (PNF)
- VyOS emulated

Web Cache KNF / Internet

Both Internet exit and management

Physical Switches (Data Plane)
- 192.168.239.7
- 172.21.250.200
- 172.21.250.200

S1 interface
SGi interface
(1) Tell OSM about the PDU instance(s)

Via the OSM CLI

a) Create a file that describes the PDU (for example, pdu.yaml)

```yaml
name: router01
description: VyOS Router
type: gateway
vim_accounts: [ YOUR_VIM_ID_HERE ]
shared: false
interfaces:
  - name: eth0
    ip-address: 172.21.250.200
    vim-network-name: osm-ext
    mgmt: true
  - name: eth1
    ip-address: 192.168.239.7
    mgmt: false
```

b) Create the PDU in OSM:

```
osm pdu-create --descriptor_file pdu.yaml```

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(1) Tell OSM about the PDU instance(s)

Or via the OSM GUI

New PDU

<table>
<thead>
<tr>
<th>Name *</th>
<th>router01</th>
<th>PDU type *</th>
<th>gateway</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vim Accounts *</td>
<td>xtsai-openstack</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Interfaces:

<table>
<thead>
<tr>
<th>Name</th>
<th>IP</th>
<th>Net name</th>
</tr>
</thead>
<tbody>
<tr>
<td>eth0</td>
<td>172.21.250.200</td>
<td>osm-ext</td>
</tr>
<tr>
<td>Mgmt</td>
<td>True</td>
<td></td>
</tr>
<tr>
<td>Name</td>
<td>IP</td>
<td>Net name</td>
</tr>
<tr>
<td>------</td>
<td>------------</td>
<td>----------</td>
</tr>
<tr>
<td>eth1</td>
<td>192.168.239.7</td>
<td>sgi</td>
</tr>
<tr>
<td>Mgmt</td>
<td>False</td>
<td></td>
</tr>
</tbody>
</table>
In the june_2 folder, you will find the PNFD under the hackfest_gateway_vnfd folder:

```yaml
vnfd-catalog:
  vnfd:
    - connection-point:
      - name: gateway_public
        type: VPORT
        description: Gateway PNF
        id: hackfest_gateway_vnfd
        mgmt-interface:
          cp: gateway_public
          name: hackfest_gateway_vnfd
          short-name: hackfest_gateway_vnfd
        vdu:
          - description: gateway_pdu
            id: gateway_pdu
            interface:
              - external-connection-point-ref: gateway_public
                name: eth0
                type: EXTERNAL
                pdu-type: gateway
            vnf-configuration:
...
(3) Next, include it in your NSD

In the june_2 folder, you will find the NSD under the hackfest_magma-agw-enb_nsd folder. Uncomment those lines to include the PNF.

```yaml
constituent-vnf:
- member-vnf-index: 'MagmaAGW+srsLTE'
  vnfd-id-ref: hackfest_magma-agw-enb_vnfd
# - member-vnf-index: 'VYOS-PNF'
# vnfd-id-ref: hackfest_gateway_vnfd

collection-point:
- name: nsd_cp_mgmt
  vld-id-ref: mgmt
- name: nsd_cp_sgi
  vld-id-ref: sgi
vld:
- id: mgmt
  name: mgmt
  short-name: mgmt
  type: ELAN
  mgmt-network: true
  vnfd-connection-point-ref:
    - member-vnf-index-ref: 'MagmaAGW+srsLTE'
      vnfd-id-ref: hackfest_magma-agw-enb_vnfd
      vnfd-connection-point-ref: agw-mgmt
    - member-vnf-index-ref: 'MagmaAGW+srsLTE'
      vnfd-id-ref: hackfest_magma-agw-enb_vnfd
      vnfd-connection-point-ref: srsLTE-mgmt
# - member-vnf-index-ref: 'VYOS-PNF'
# vnfd-id-ref: hackfest_gateway_vnfd
# vnfd-connection-point-ref: gateway_public
```
(4) Don’t forget to add automation!

PNF orchestration, since is an element that already exists in the environment, is all about automating its configuration in the context of our Network Service.

Stay tuned for the Automating Day 1 & 2 PNF Operations with OSM Primitives session!
Open Source MANO

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