

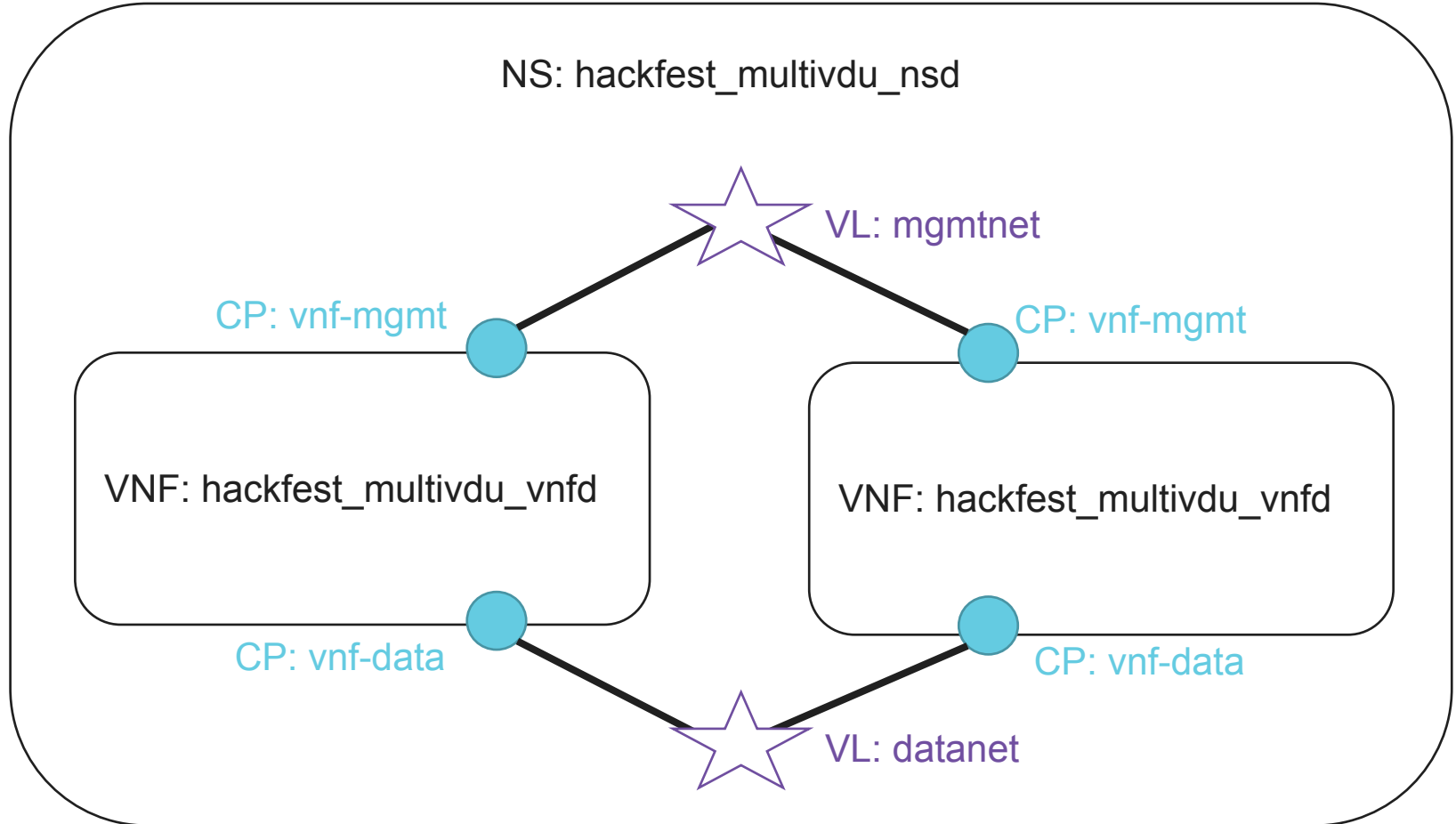
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OSM Hackfest – Session 3

Modeling multi-VDU VNF

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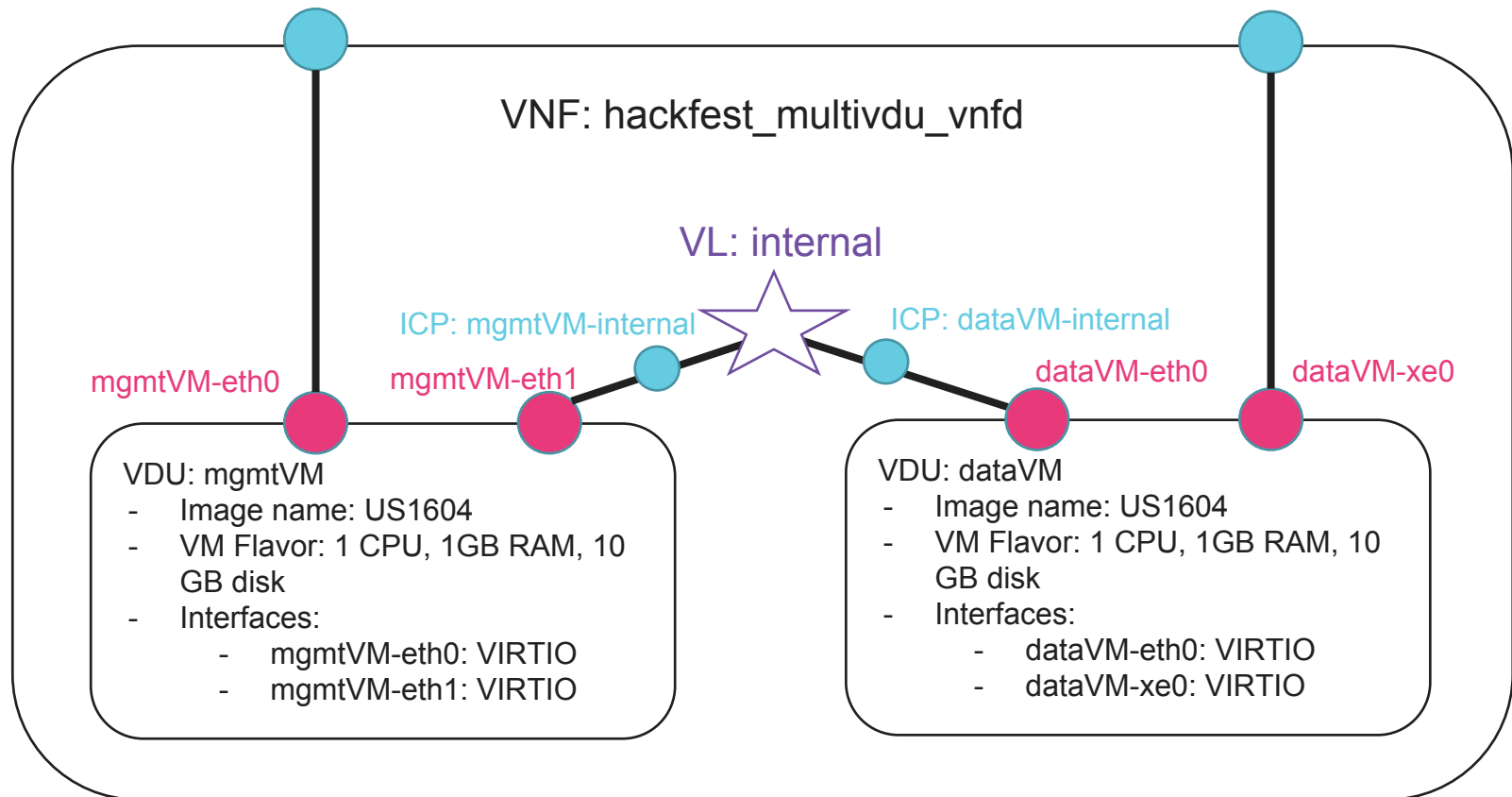
NS diagram



VNF diagram

External Connection point: vnf-mgmt

External Connection point: vnf-data



Creating the new multi-VDU VNF (1/3)

Use the tool to create a new VNFD called:
"hackfest_multivdu_vnfd"

`devops/descriptor-packages/tools/generate_descriptor_pkg.sh -t vnfd --image US1604 -c hackfest_multivdu_vnfd`

- Add 2 Connection Points (external):
 - CONNECTION POINT 1:
 - name: vnf-mgmt
 - CONNECTION POINT 2:
 - name: vnf-data
- Add new VLD 'internal' to the VNF:
 - Name: internal
 - TYPE: ELAN
 - Refer to internal CPs we will define later

Internal VLD example

```
...
  mgmt-interface:
    cp: vnf-mgmt
  connection-point:
    - id: vnf-mgmt
      name: vnf-mgmt
      type: VPORT
    - id: vnf-data
      name: vnf-data
      type: VPORT
  internal-vld:
    - id: internal
      name: internal
      short-name: internal
      type: ELAN
      internal-connection-point:
        - id-ref: mgmtVM-internal
        - id-ref: dataVM-internal
...
```

Creating the new multi-VDU VNF(2/4)

- Add VDU1 in the VNF
 - Name: mgmtVM
 - Image: US1604
 - VM Flavor:
 - VCPU COUNT: 1
 - MEMORY MB: 1024
 - STORAGE GB: 10
 - Add 1 internal connection point:
 - ID: mgmtVM-internal
 - Name: mgmtVM-internal
 - Type: VPORT
 - Add 2 interfaces to the VDU:
 - Interface 1:
 - Name: mgmtVM-eth0
 - Position: 1
 - Connection-point-type: EXTERNAL
 - EXTERNAL-CONNECTION-POINT-REF: vnf-mgmt
 - Virtual-interface:
 - Type: VIRTIO

```
...
interface:
- name: mgmtVM-eth0
  position: '1'
  type: EXTERNAL
  virtual-interface:
    type: VIRTIO
  external-connection-point-ref: vnf-mgmt
- name: mgmtVM-eth1
  position: '2'
  type: INTERNAL
  virtual-interface:
    type: VIRTIO
  internal-connection-point-ref: mgmtVM-internal
internal-connection-point:
- id: mgmtVM-internal
  name: mgmtVM-internal
  short-name: mgmtVM-internal
  type: VPORT
...
```

- Interface 2:
 - Name: mgmtVM-eth1
 - Position: 2
 - Connection-point-type: INTERNAL
 - INTERNAL-CONNECTION-POINT-REF: mgmtVM-internal
 - Virtual-interface:
 - Type: VIRTIO

Creating the new multi-VDU VNF (3/4)

- Add VDU2 in the VNF
 - Name: dataVM
 - Image: US1604
 - VM Flavor:
 - VCPU COUNT: 1
 - MEMORY MB: 1024
 - STORAGE GB: 10
 - Add 1 internal connection point:
 - ID: dataVM-internal
 - Name: dataVM-internal
 - Type: VPORT
 - Add 2 interfaces to the VDU:
 - Interface 1:
 - Name: dataVM-eth0
 - Position: 1
 - Connection-point-type: INTERNAL
 - INTERNAL-CONNECTION-POINT-REF: dataVM-internal
 - Virtual-interface:
 - Type: VIRTIO

```
...
interface:
- name: dataVM-etho
  position: '1'
  type: INTERNAL
  virtual-interface:
    type: VIRTIO
  internal-connection-point-ref: dataVM-internal
- name: dataVM-xeo
  position: '2'
  type: EXTERNAL
  virtual-interface:
    type: VIRTIO
  external-connection-point-ref: vnf-data
internal-connection-point:
- id: dataVM-internal
  name: dataVM-internal
  short-name: dataVM-internal
  type: VPORT
...
```

- Interface 2:
 - Name: dataVM-xe0
 - Position: 2
 - Connection-point-type: EXTERNAL
 - EXTERNAL-CONNECTION-POINT-REF: vnf-data
 - Virtual-interface:
 - Type: VIRTIO

Creating the new multi-VDU VNF (4/4)

- Validate your descriptor using the tool:

```
devops/descriptor-packages/tools/validate_descriptor.py  
<DESCRIPTOR_FILE>
```

- Generate VNF package (from parent folder)

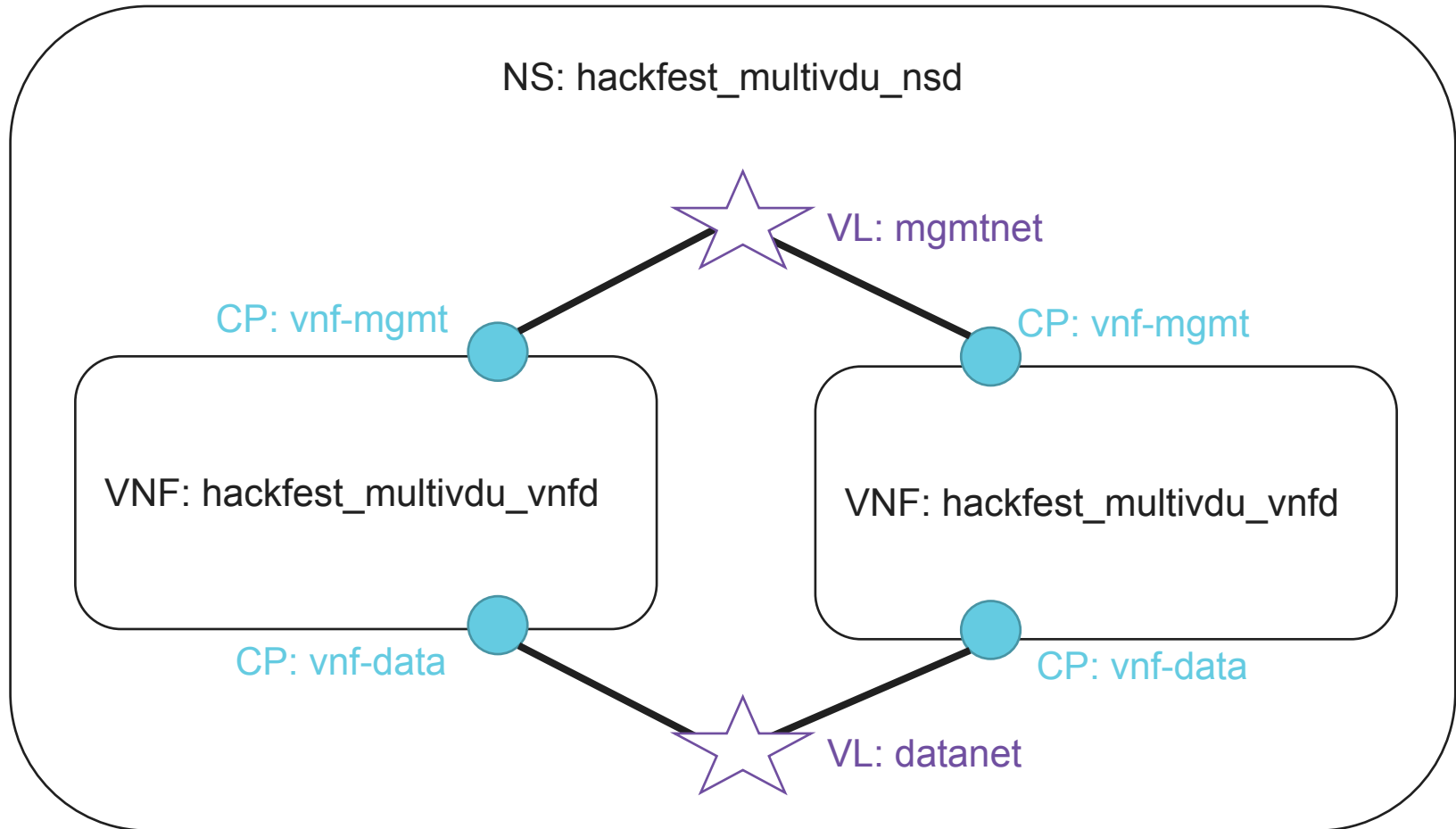
```
devops/descriptor-packages/tools/generate_descriptor_pkg.sh  
-t vnfd -N <VNFD_FOLDER>
```

- And finally, this is the sample file:

Hackfest Multi VDU VNF Descriptor

- https://osm-download.etsi.org/ftp/osm-5.0-five/5th-hackfest/packages/hackfest_multivdu_vnf.tar.gz

NS diagram



Creating the NSD (1/3)

Use the tool to create a new NSD called: "hackfest_multivdu_nsd":

```
devops/descriptor-packages/tools/generate_descriptor_pkg.sh -t nsd -c  
hackfest_multivdu
```

- Specify constituent VNFs (hackfest_multivdu_vnfd)
- Add first VLD:
 - VLD1:
 - name (optional): mgmtnet
 - TYPE: ELAN
 - MGMT NETWORK: True
 - VIM NETWORK NAME
 - vim-network-name: **PUBLIC** <- This is to have a default mapped VIM network change accordingly
 - Refer VNF Connection Points to the VL:
 - vnf-mgmt → VL:mgmtnet

Creating the NSD (2/3)

- Add second VLD:
 - VLD2:
 - name (optional): datanet
 - TYPE:ELAN
 - MGMT NETWORK: False (default)
 - Refer VNF Connection Points to the VL:
 - vnf-data → VL:datanet

Creating the NSD (3/3)

- Validate your descriptor using the tool:

```
devops/descriptor-packages/tools/validate_descriptor.py  
<DESCRIPTOR_FILE>
```

- And finally, against the sample file:

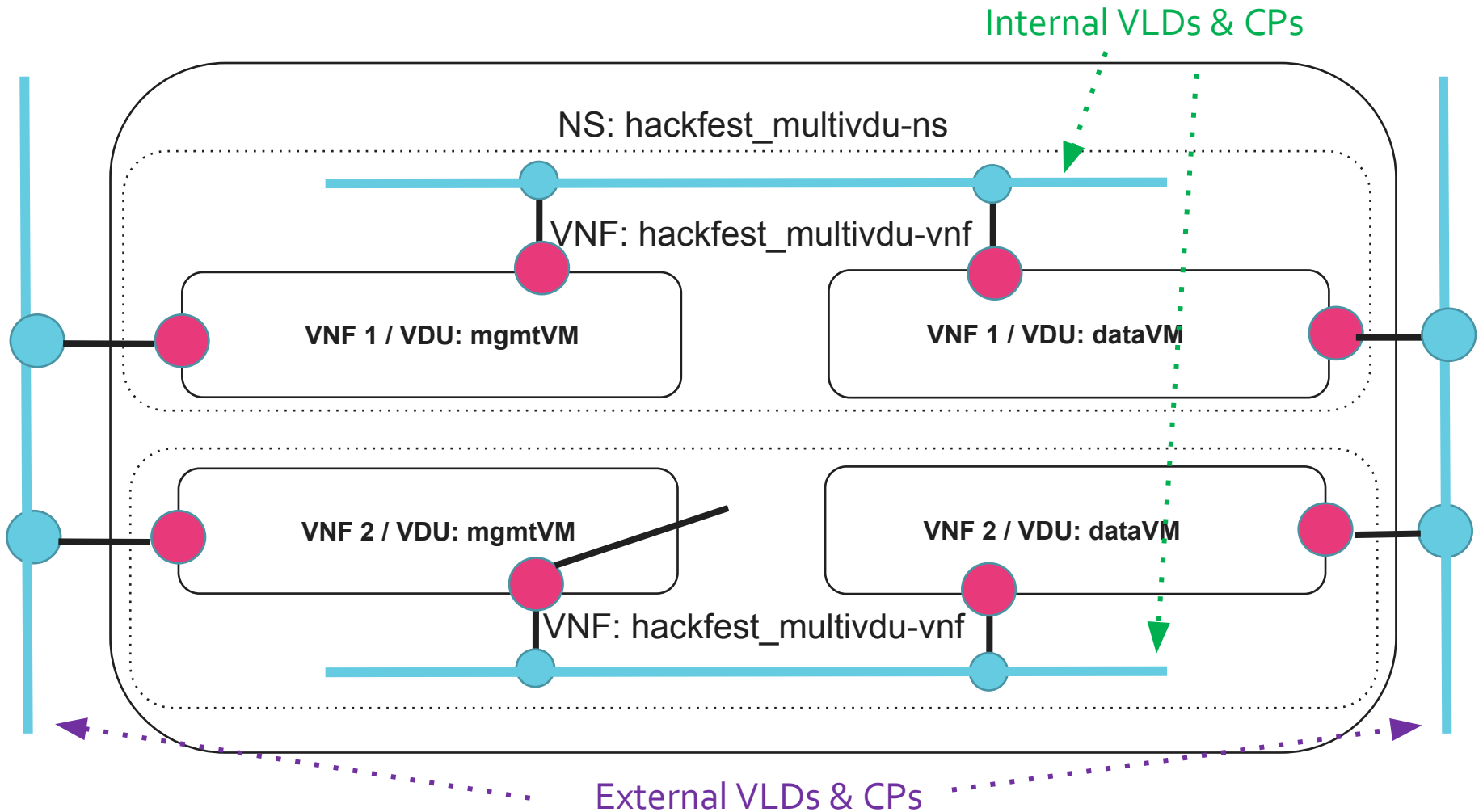
Hackfest MultiVDU NS Descriptor

- https://osm-download.etsi.org/ftp/osm-5.0-five/5th-hackfest/packages/hackfest_multivdu_ns.tar.gz

Deploying NS in the UI

- Using the corresponding tool, create your packages
 - `devops/descriptor-packages/tools/generate_descriptor_pkg.sh -t vnfd -N <VNFD_FOLDER>`
 - `devops/descriptor-packages/tools/generate_descriptor_pkg.sh -t nsd -N <NSD_FOLDER>`
- Onboard VNFD and NSD to catalog using the UI
- Launch the NS from the UI
 - Depending on the VIM, specify a VIM network name to map MGMTNET
 - If you need to change the VIM, change the network name using config:
`{vld: [{name: mgmtnet, vim-network-name: PUBLIC}]}`
- Click the info button to see the mgmt IP address of each VNF
- Connect to each VNF:
 - `ssh osm@<IP> (pwd: osm4u)`

Final Multi-VDU Picture



Network modelling with IP Profiles

- Using IP Profiles, we can configure the attributes of subnets that are created by OSM. We can do it for internal or external VLDs.
- Subnet's DHCP server will not deliver a default gateway if explicitly set to 0.0.0.0

External VLD with IP Profile (NSD level)

```
...
- id: NS1-nsd
  ...
  ip-profiles:
  - name: profile_external1
    description: external network
    ip-profile-params:
      ip-version: ipv4
      dns-server: 8.8.8.8
      gateway-address:
      subnet-address: 192.168.17.0/24
      dhcp-params:
        enabled: true
  vld:
  - id: external1
    ip-profile-ref: profile_external1
  ...
```

Internal VLD with IP Profile (VNFD level)

```
...
- id: VNF1-vnfd
  ...
  ip-profiles:
  - name: p1
    description: p1
    ip-profile-params:
      ip-version: ipv4
      dns-server:
      gateway-address: 0.0.0.0
      subnet-address: 192.168.100.0/24
      dhcp-params:
        enabled: true
  internal-vld:
  - id: internal
    ip-profile-ref: p1
  ...
```

Note: attributes with no values are informational only, they can be removed.

Network modelling with Static IPs

- We can also set static IP addresses, having IP Profile and DHCP enabled.

External VLD with IP Profile (NSD level)

```
...
- id: NS1-nsd
...
ip-profiles:
- name: profile_external1
  description: external network
  ip-profile-params:
    ip-version: ipv4
    subnet-address: 192.168.17.0/24
  dhcp-params:
    enabled: true
vld:
- id: external1
  ip-profile-ref: profile_external1
...
vnfd-connection-point-ref:
- ...
  ip-address: 192.168.17.100
```

Internal VLD with IP Profile (VNFD level)

```
...
- id: VNF1-vnfd
...
ip-profiles:
- name: p1
  description: p1
  ip-profile-params:
    ip-version: ipv4
    subnet-address: 192.168.100.0/24
  dhcp-params:
    enabled: true
internal-vld:
- id: internal
  ip-profile-ref: p1
...
internal-connection-point:
- id-ref: mgmtVM-internal
  ip-address: 192.168.100.100
```

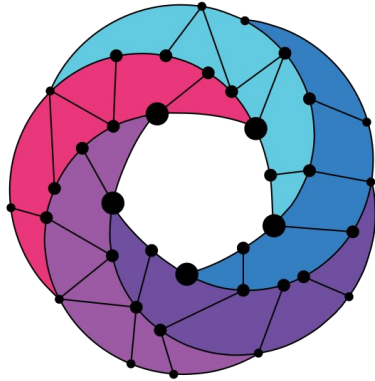
Network modelling with MACs

- We can set MAC addresses as well, just set them up at the VDU level.

Changing MAC (VNFD level)

```
...
interface:
- name: mgmtVM-eth0
  position: '1'
  type: EXTERNAL
  virtual-interface:
    type: VIRTIO
  external-connection-point-ref: vnf-mgmt
  mac-address: '01:02:03:01:02:03'
- name: mgmtVM-eth1
  position: '2'
  type: INTERNAL
  virtual-interface:
    type: VIRTIO
  internal-connection-point-ref: mgmtVM-internal
  mac-address: '03:02:01:03:02:01'
...
```

--> Be careful about duplicated MACs!



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