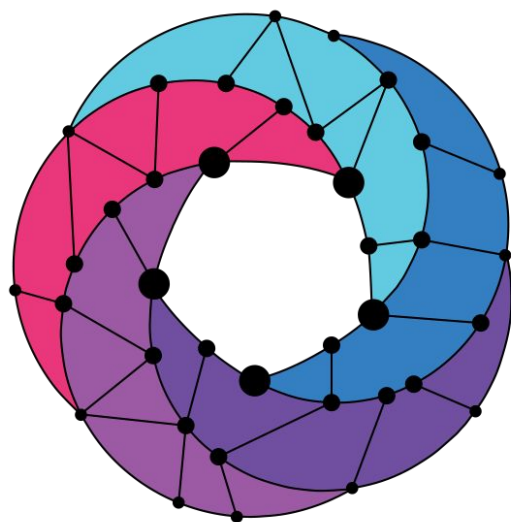




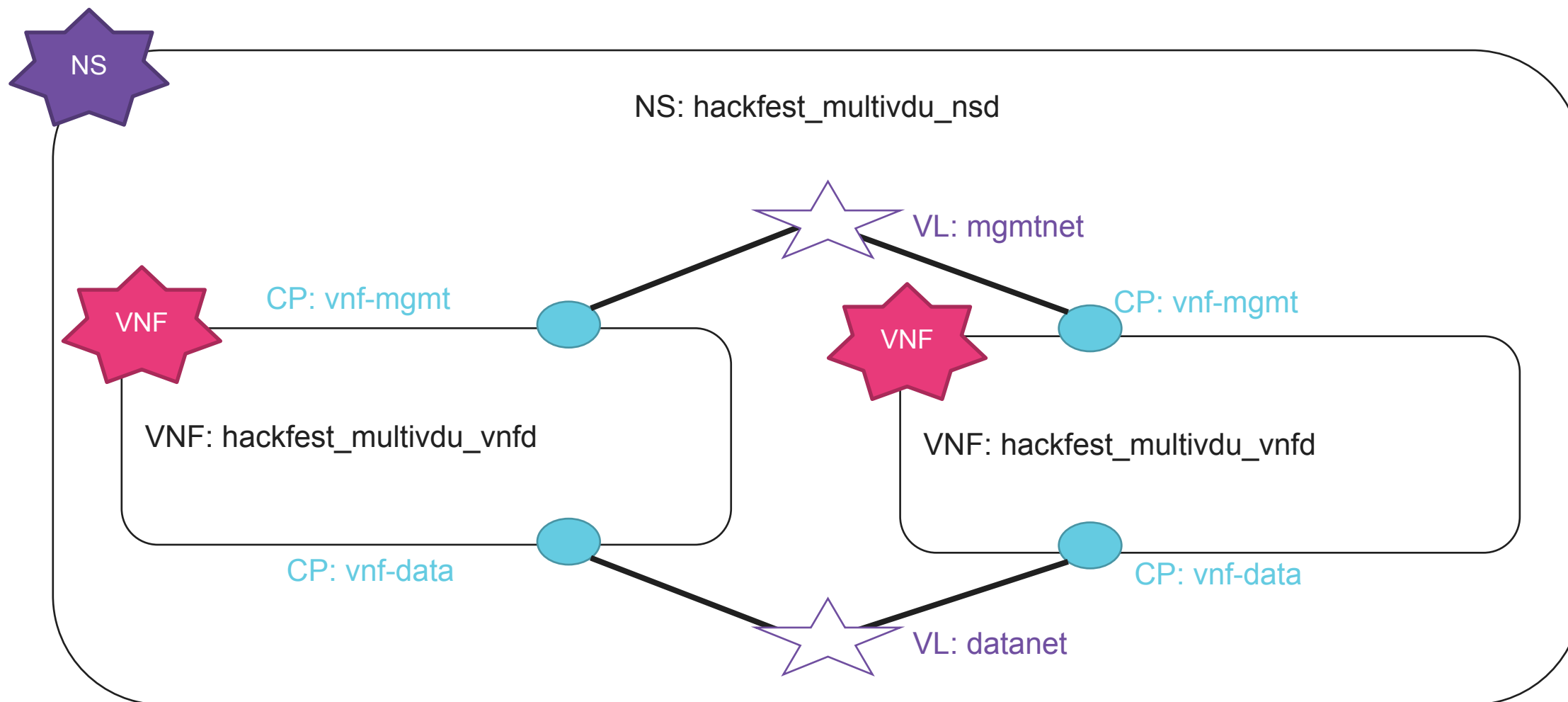
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OSM Hackfest – Session 3 Modeling multi-VDU VNF

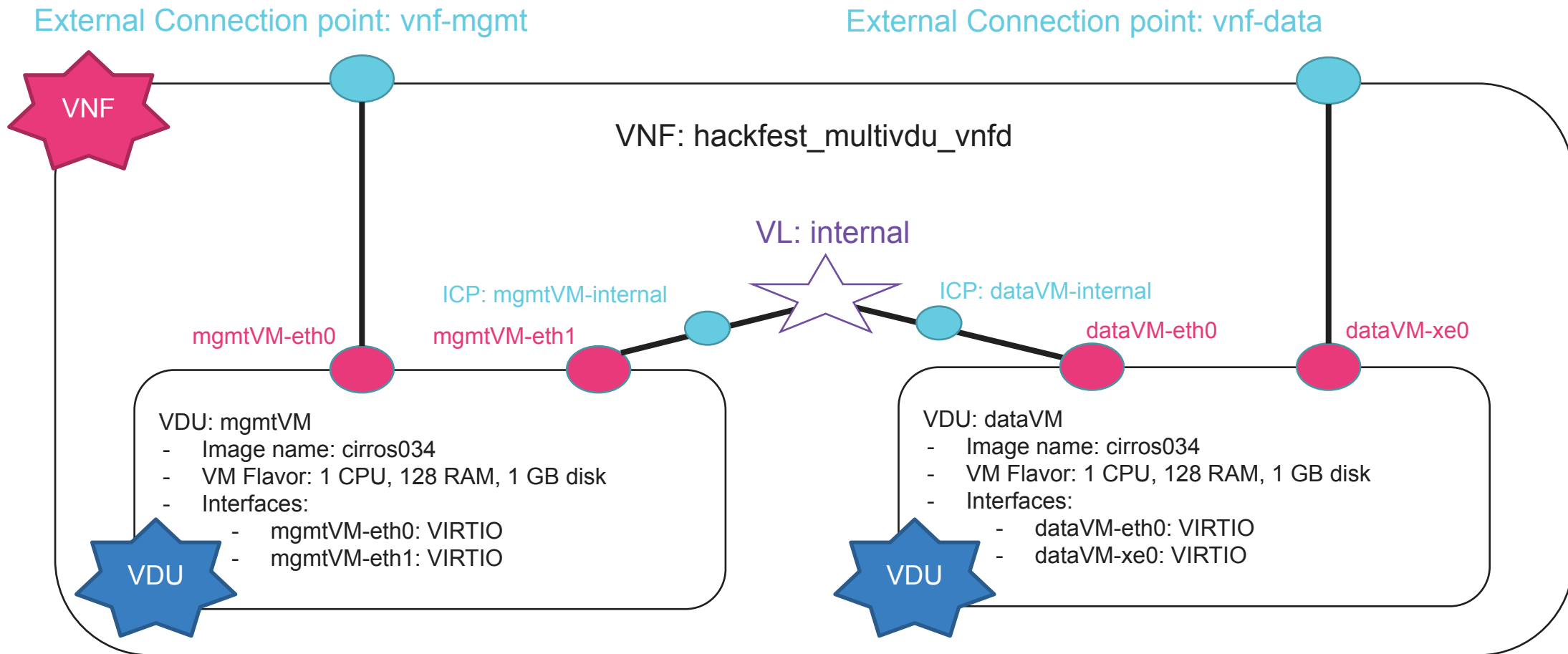
Adrián Candel (Altran)
Guillermo Calviño (Altran)



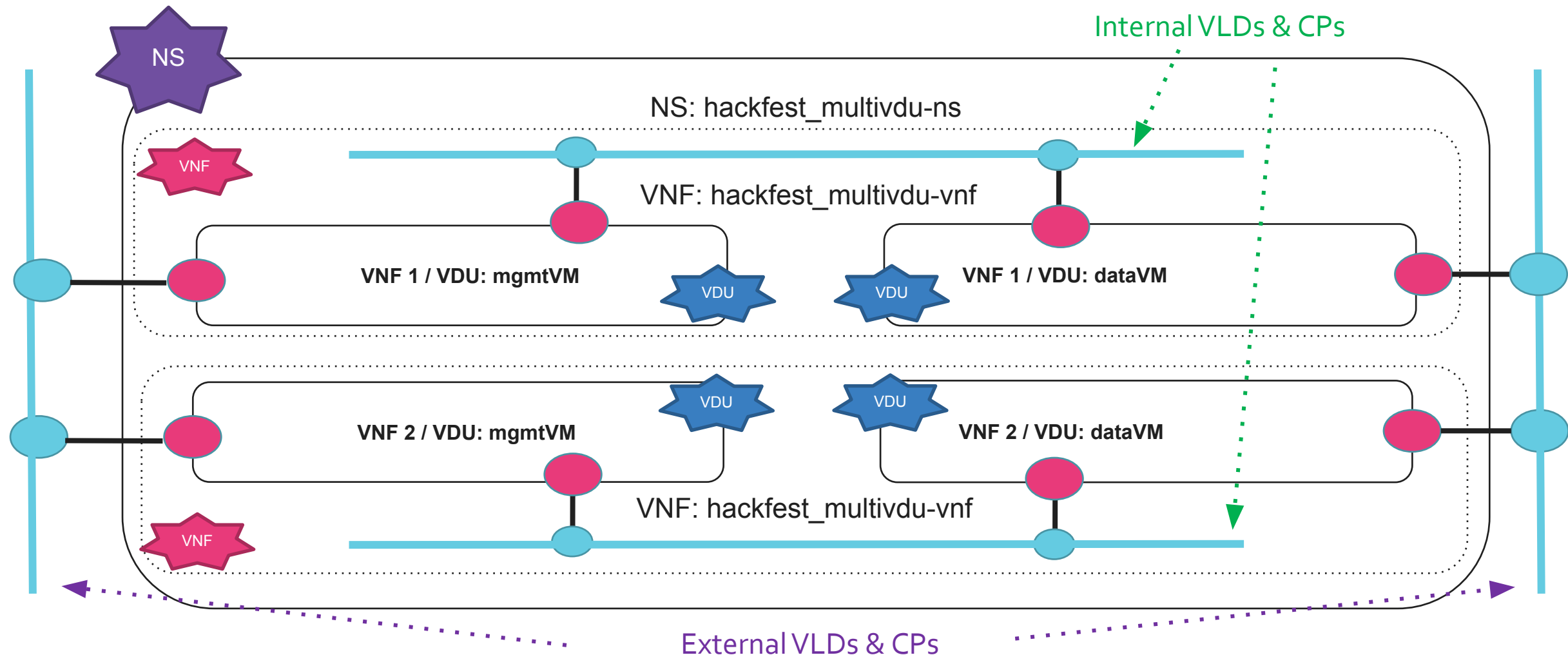
NS diagram



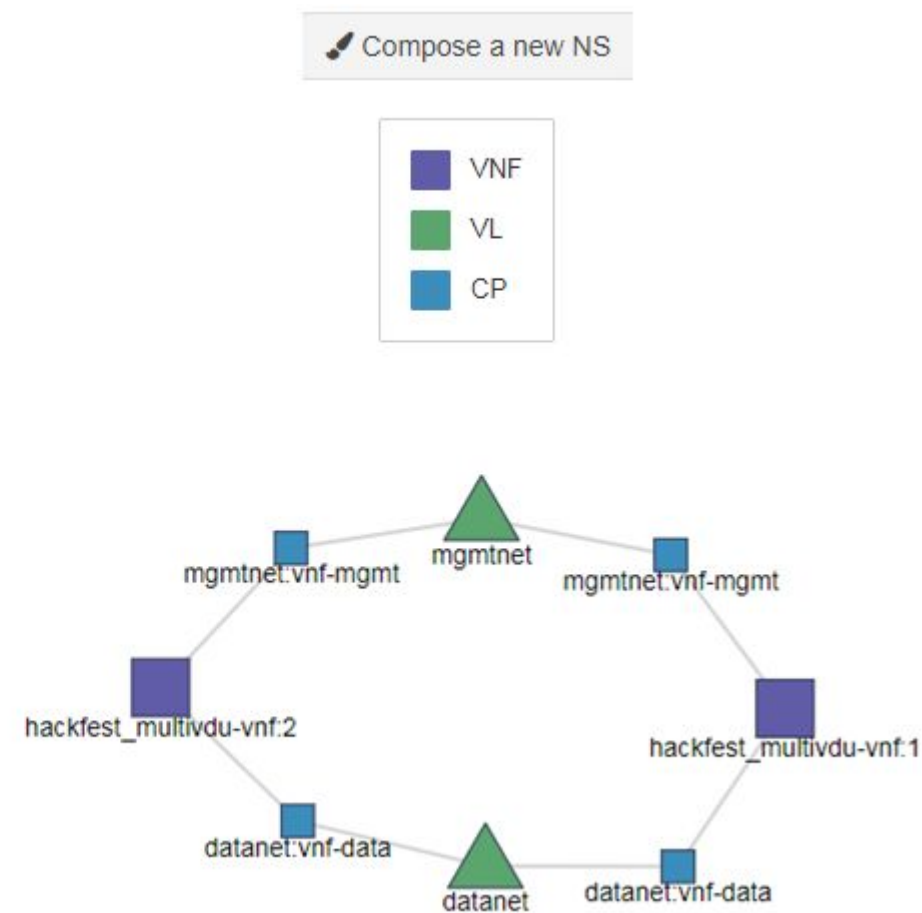
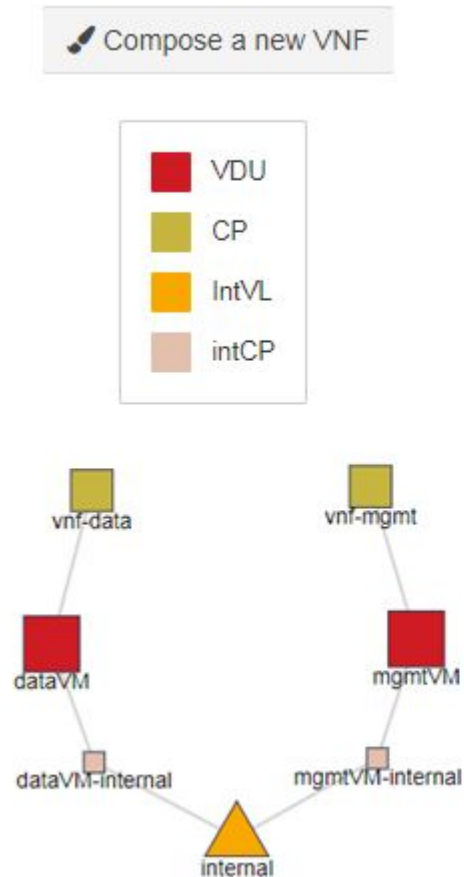
VNF diagram



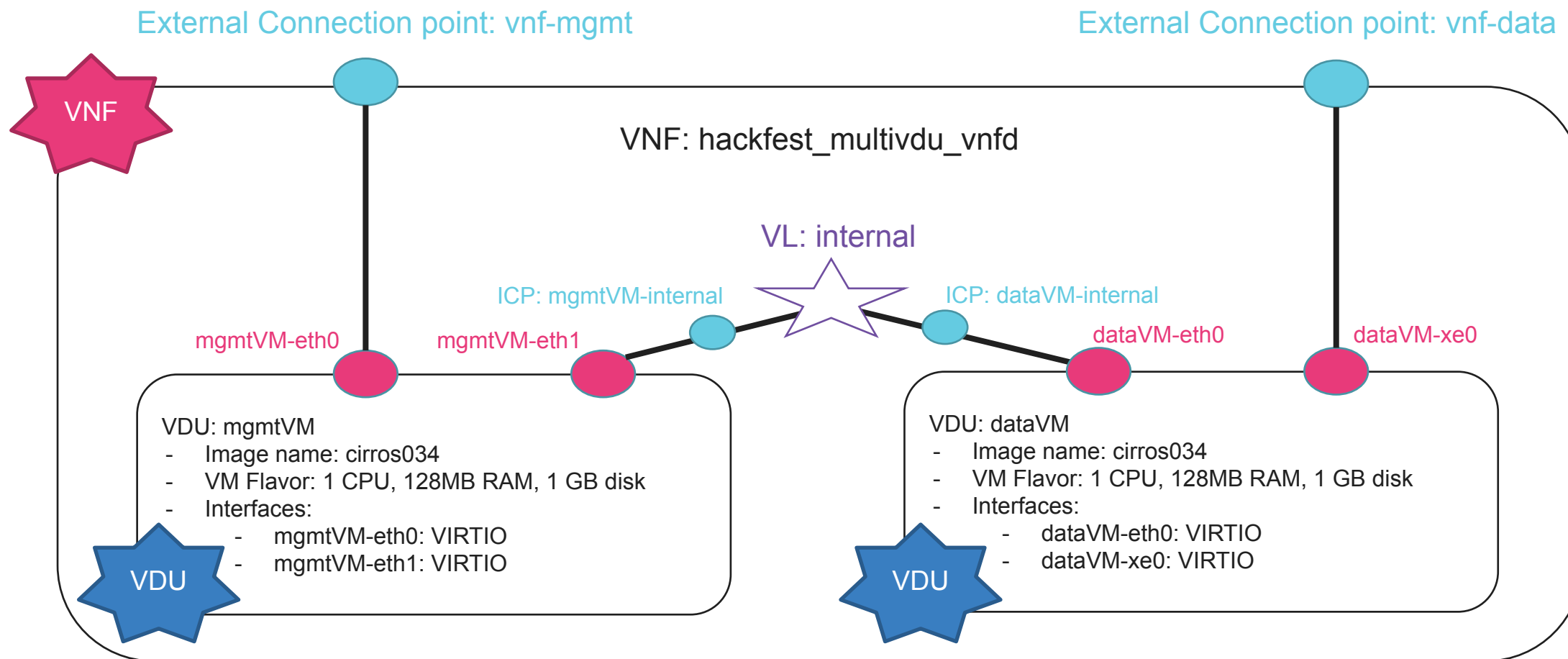
Final Multi-VDU Picture



- Compose a VNF or NS graphically.



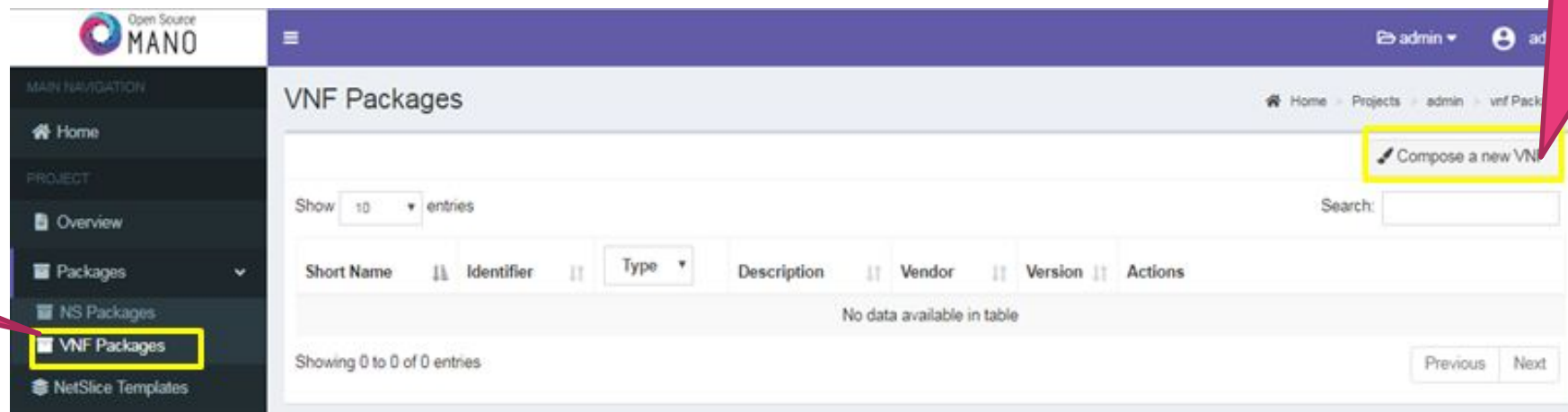
VNF diagram



User Interface

- Steps:
 - Compose a new VNF

VNF PACKAGES



COMPOSE A NEW VNF

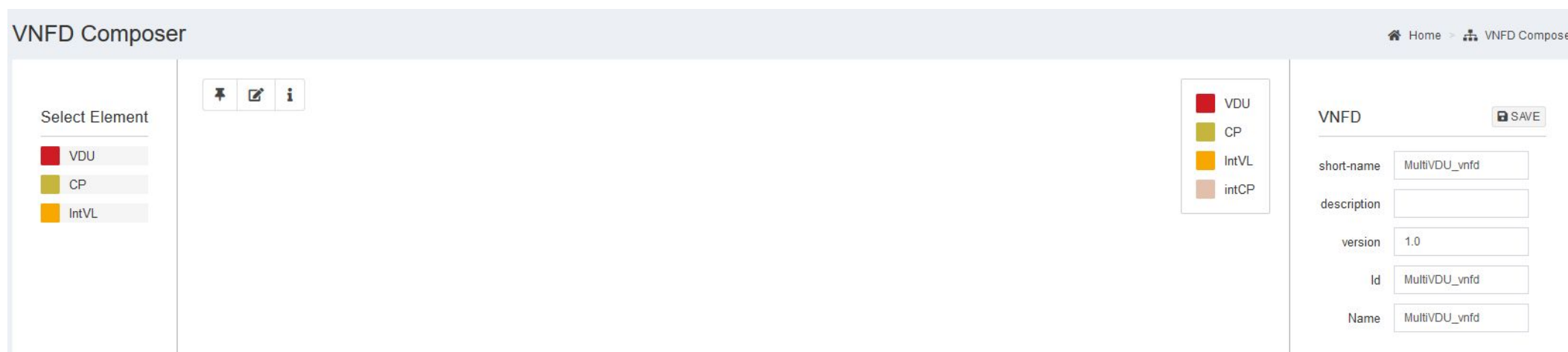
- Create new Package

Create new Package

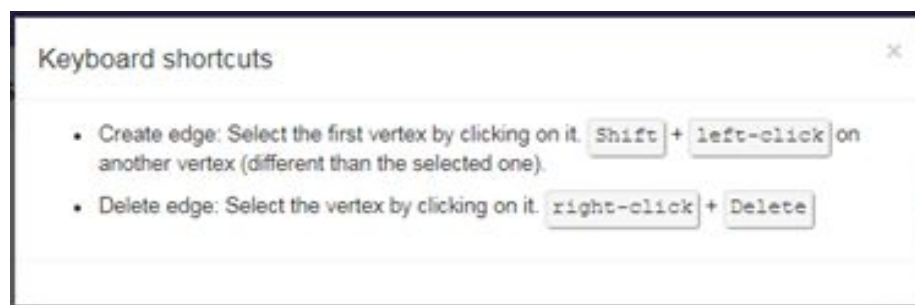
Package name *

- Steps

- VNFD Composer



- Keyboard shortcuts 



Creating the new multi-VDU VNF (1/4)

- Steps

- Create VDUs



(Drag and drop)

VDU SAVE

count	1
description	
Name	mgmtVM
image	cirros034
Id	mgmtVM

VDU SAVE

count	1
description	
Name	dataVM
image	cirros034
Id	dataVM

- Edit the descriptor  to add the flavor:

- vm-flavor: {memory-mb: '128', storage-gb: '1', vcpu-count: '1'}

Edit VNFD Descriptor

YAML

JSON

```
1  vnfd:vnfd-catalog:
2    vnfd:
3      - connection-point: []
4        description: ''
5        id: MultiVDU_vnfd
6        internal-vld: []
7        mgmt-interface:
8          cp: ''
9        name: MultiVDU_vnfd
10       short-name: MultiVDU_vnfd
11       vdu:
12         - count: '1'
13           description: ''
14           id: mgmtVM
15           image: cirros034
16           interface: []
17           internal-connection-point: []
18           monitoring-param: []
19           name: mgmtVM
20           vm-flavor: {}
21           count: '1'
22           description: ''
23           id: dataVM
24           image: cirros034
25           interface: []
26           internal-connection-point: []
27           monitoring-param: []
28           name: dataVM
29           vm-flavor: {}
30       version: '1.0'
```

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

- Steps

- Create Connection Points:   (Drag and drop)

Connection Point		Connection Point	
Type	VPORT	Type	VPORT
Name	vnf-mgmt	Name	vnf-data

- Link CPs with VDUs (Shift + Left Click)



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

- Steps

- Create Internal VL:  (Drag and drop)

Virtual Link SAVE

short-name

Name

ip-profile-ref

Type

Id

- Link internal VL with VDUs (Shift + Left Click)
 - VNFD composer automatically create the internal connection points:

mgmtVM-internal dataVM-internal

- Edit the descriptor  to add the CP in mgmt-interface

Edit VNFD Descriptor

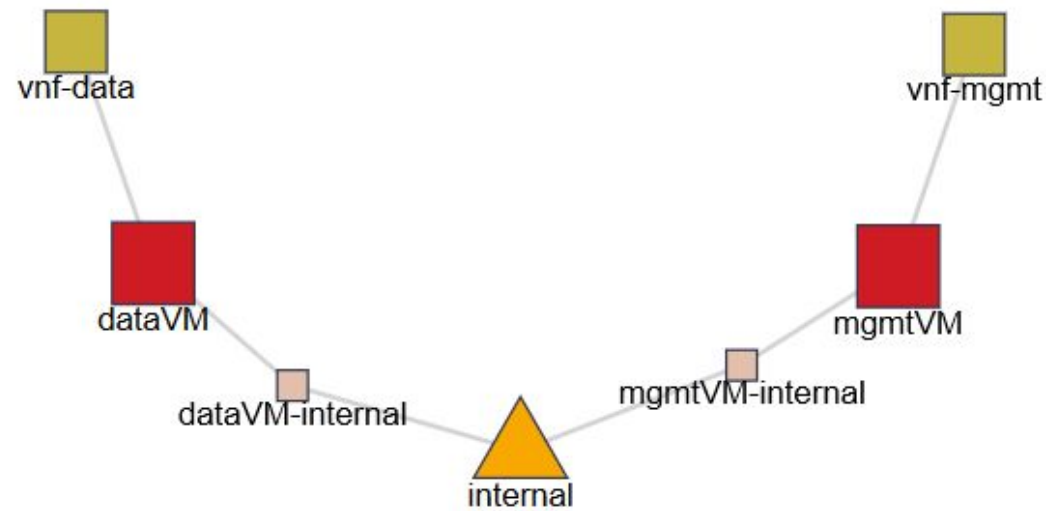
YAML

JSON

```
1  vnfd:vnfd-catalog:
2    vnfd:
3      - connection-point:
4        - name: vnf-mgmt
5          type: VPORT
6        - name: vnf-data
7          type: VPORT
8      description: ''
9      id: MultiVDU_vnfd
10     internal-vld:
11       - id: internal
12         internal-connection-point:
13           - id-ref: intcp_j5j9
14             id-ref: intcp_ih6y
15           ip-profile-ref: ''
16           name: internal
17           short-name: internal
18           type: ELAN
19     mgmt-interface:
20       cp: 'vnf-mgmt'
21     name: MultiVDU_vnfd
22     short-name: MultiVDU_vnfd
```

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

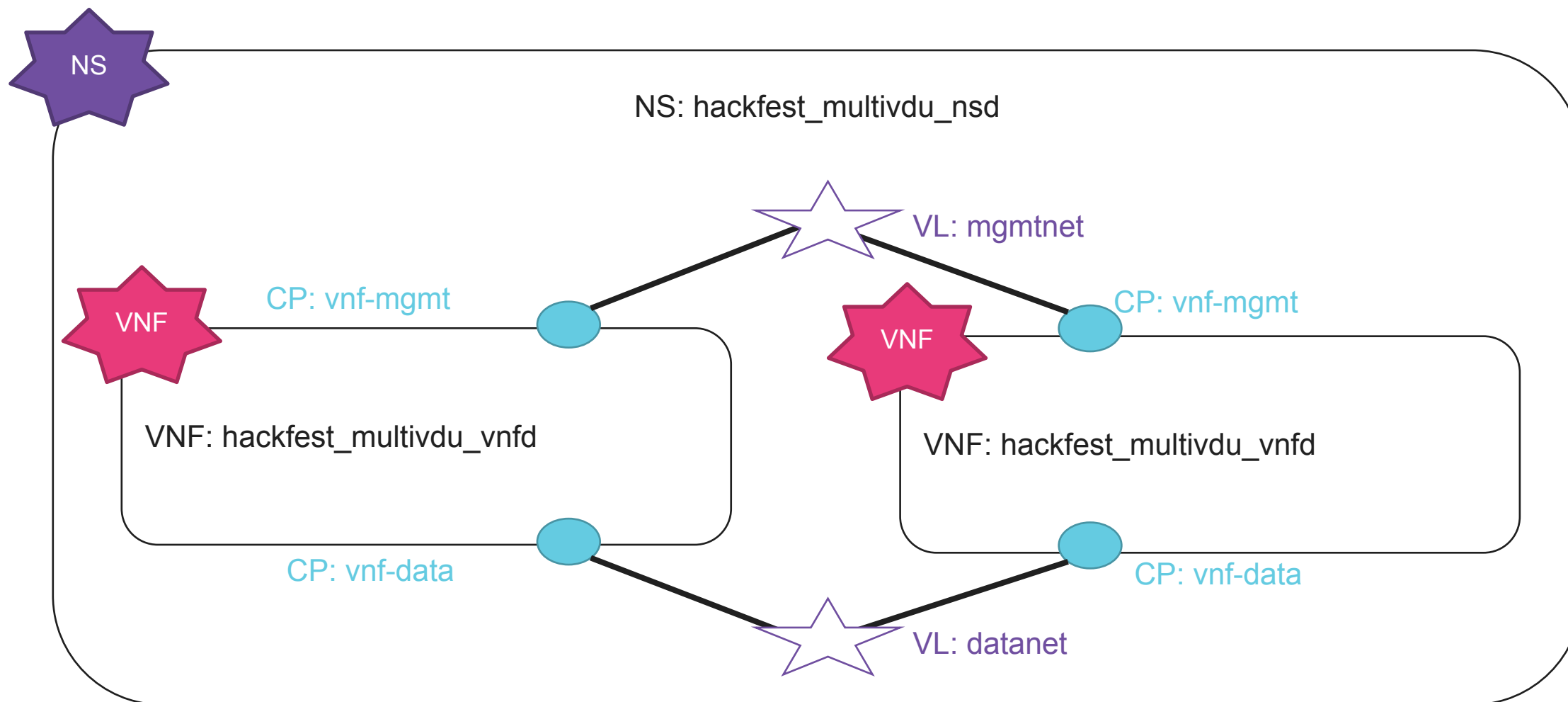
- Final Scenario multiVDU_vnfd



And finally, this is the sample file of Hackfest Multi VDU VNF Descriptor

https://osm-download.etsi.org/ftp/osm-6.0-six/7th-hackfest/packages/hackfest_multivdu_vnf.tar.gz

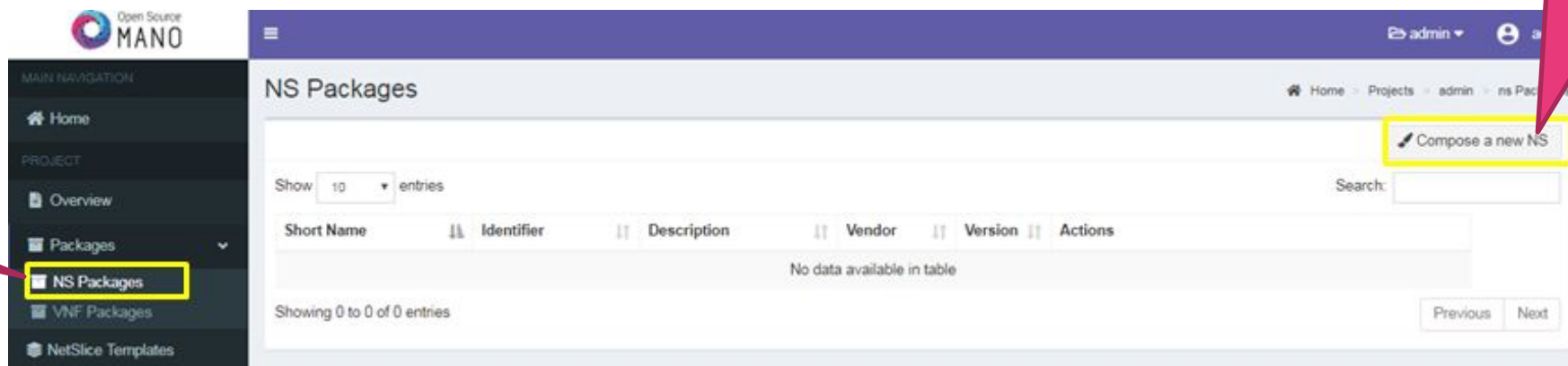
NS diagram



User Interface

- Steps:
 - Compose a new NS

NS PACKAGES



- Create new Package

Create new Package

Package name *

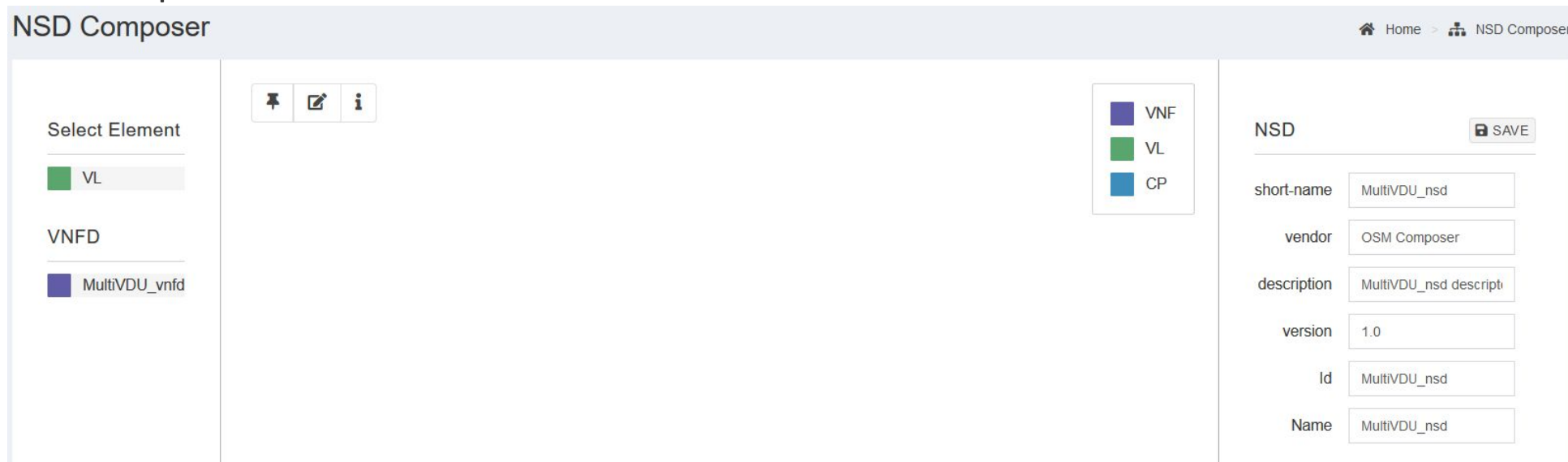
MultiVDU_nsd

Cancel

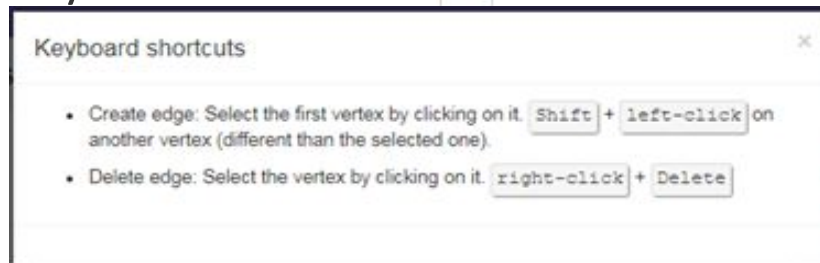
Create

- Steps

- NSD Composer



- Keyboard shortcuts



Creating the NSD (1/3)

- Select VNFs:   (Drag and drop)

VNF	VNF
member-vnf-index 1	member-vnf-index 2
vnfd-id-ref MultiVDU_vnfd	vnfd-id-ref MultiVDU_vnfd

- Create VLs:   (Drag and drop)

Virtual Link SAVE

Vim network name	osm-ext
Name	mgmtnet
Mgmt network	true
Type	ELAN
Id	mgmtnet

Virtual Link SAVE

Vim network name	
Name	datanet
Mgmt network	false
Type	ELAN
Id	datanet

Creating the NSD (2/3)

- Steps
 - Link VLs with VNFs (Shift + Left Click)
 - You need to know the name for the CPs (vnf-data and vnf-mgmt)

Please insert the vnfd-connection-point-ref: ✕

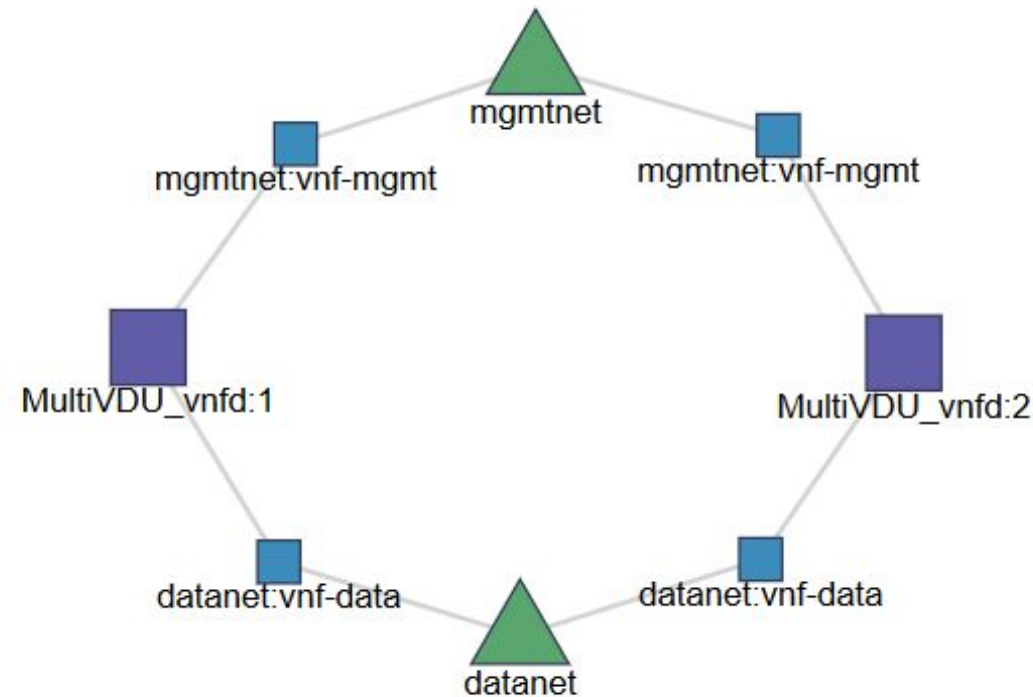
Cancel OK

Please insert the vnfd-connection-point-ref: ✕

Cancel OK

Creating the NSD (3/3)

- Final Scenario multiVDU_nsd



And finally, this is the sample file of Hackfest Multi VDU VNF Descriptor

https://osm-download.etsi.org/ftp/osm-6.0-six/7th-hackfest/packages/hackfest_multivdu_ns.tar.gz

Deploying NS in the UI

- 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: osm-ext}]}
```
- Click the info button to see the mgmt IP address of each VNF
- Connect to each VNF:
 - `ssh cirros@<IP>`
 - password: **cubswin:)**



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: MultiVDU_nsd
  ...
  ip-profiles:
  - name: profile_externall
    description: external network
    ip-profile-params:
      ip-version: ipv4
      dns-server: 8.8.8.8
      gateway-address: 0.0.0.0
      subnet-address: 192.168.17.0/24
      dhcp-params:
        enabled: true
  vld:
  - id: datanet
    ip-profile-ref: profile_externall
  ...
```

Internal VLD with IP Profile (VNFD level)

```
...
- id: MultiVDU_vnfd
  ...
  ip-profiles:
  - name: p1
    description: p1
    ip-profile-params:
      ip-version: ipv4
      dns-server: 0.0.0.0
      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 (0.0.0.0) 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: MultiVDU_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: datanet
    ip-profile-ref: profile_external1
    ...
    vnfd-connection-point-ref:
    - ...
      ip-address: 192.168.17.100
```

Internal VLD with IP Profile (VNFD level)

```
...
- id: MultiVDU_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
```

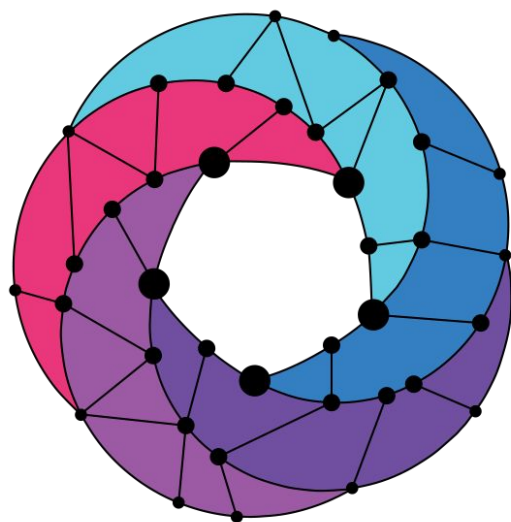
Network modelling with MACs

- 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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