

Open Source MANO

OSM-MR#9 Hackfest – HD4.1 - Slicing our Network Services

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Recap on the OSM access

Two ways to interact with OSM:

- Dashboard

<http://172.21.248.12>

<http://172.21.248.35>

(user / pass: osm_hackfest_x)

- CLI, vía SSH to the mgmt VM

`ssh osm_hackfest_x@172.21.248.4`

(user / pass: osm_hackfest_x)



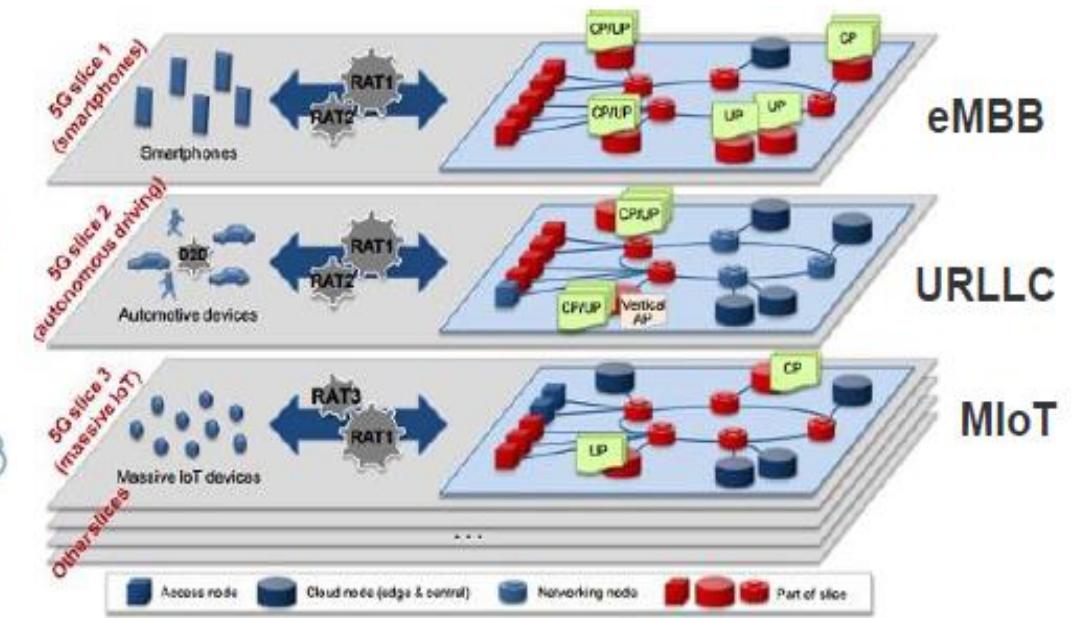
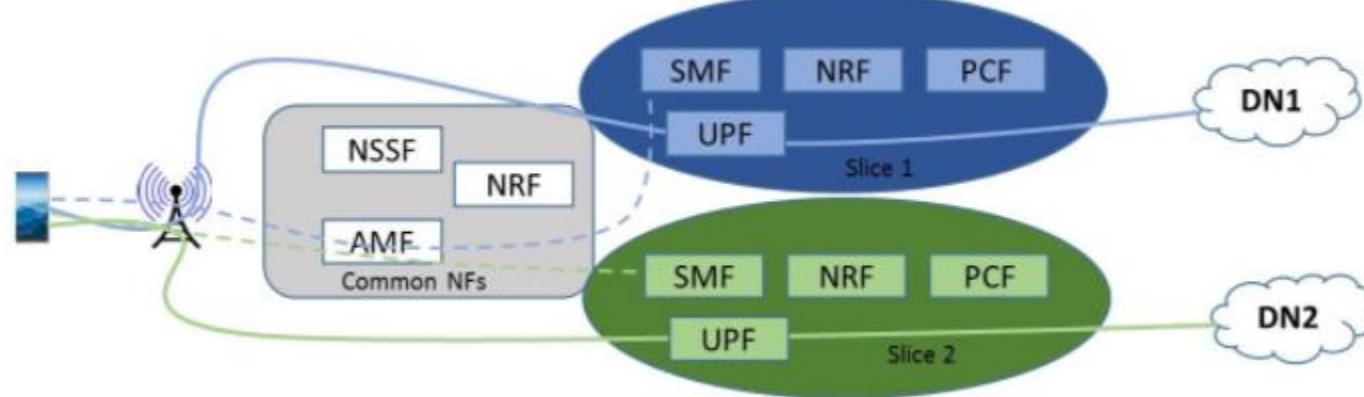
Open Source MANO

Presentation &
Hands-on:
Slicing our Network
Services



Network Slicing Overview

- In the scope of 5G, a Network Slice is a logical network that provides specific network capabilities and network characteristics, through a set of Network Function instances and the required resources (e.g. compute, storage and networking resources).
- Different network slices addressing different types of usage requiring different levels of functionality, performance and reliability.



Source: NGMN

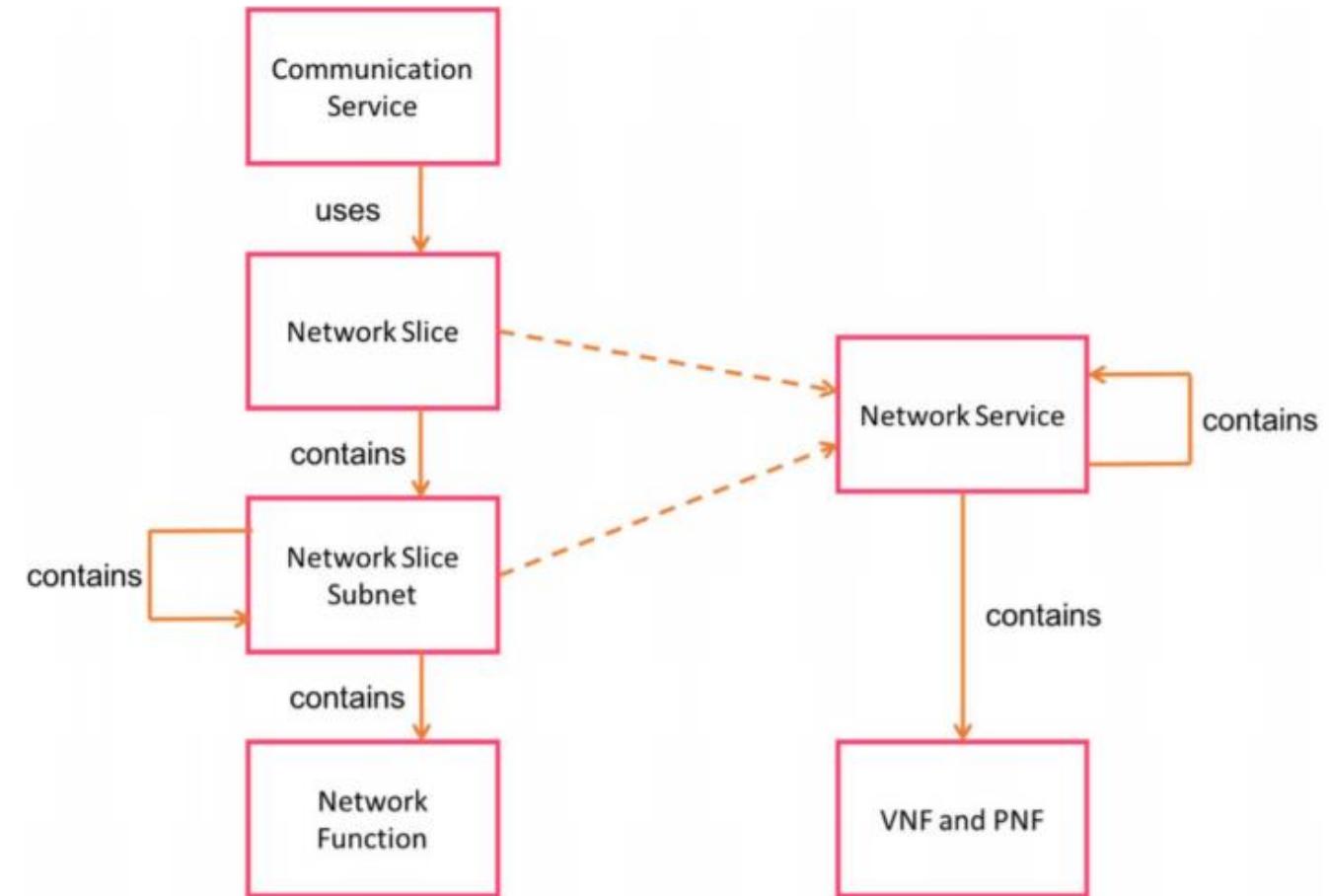
ETSI NFV Framework for Network Slicing



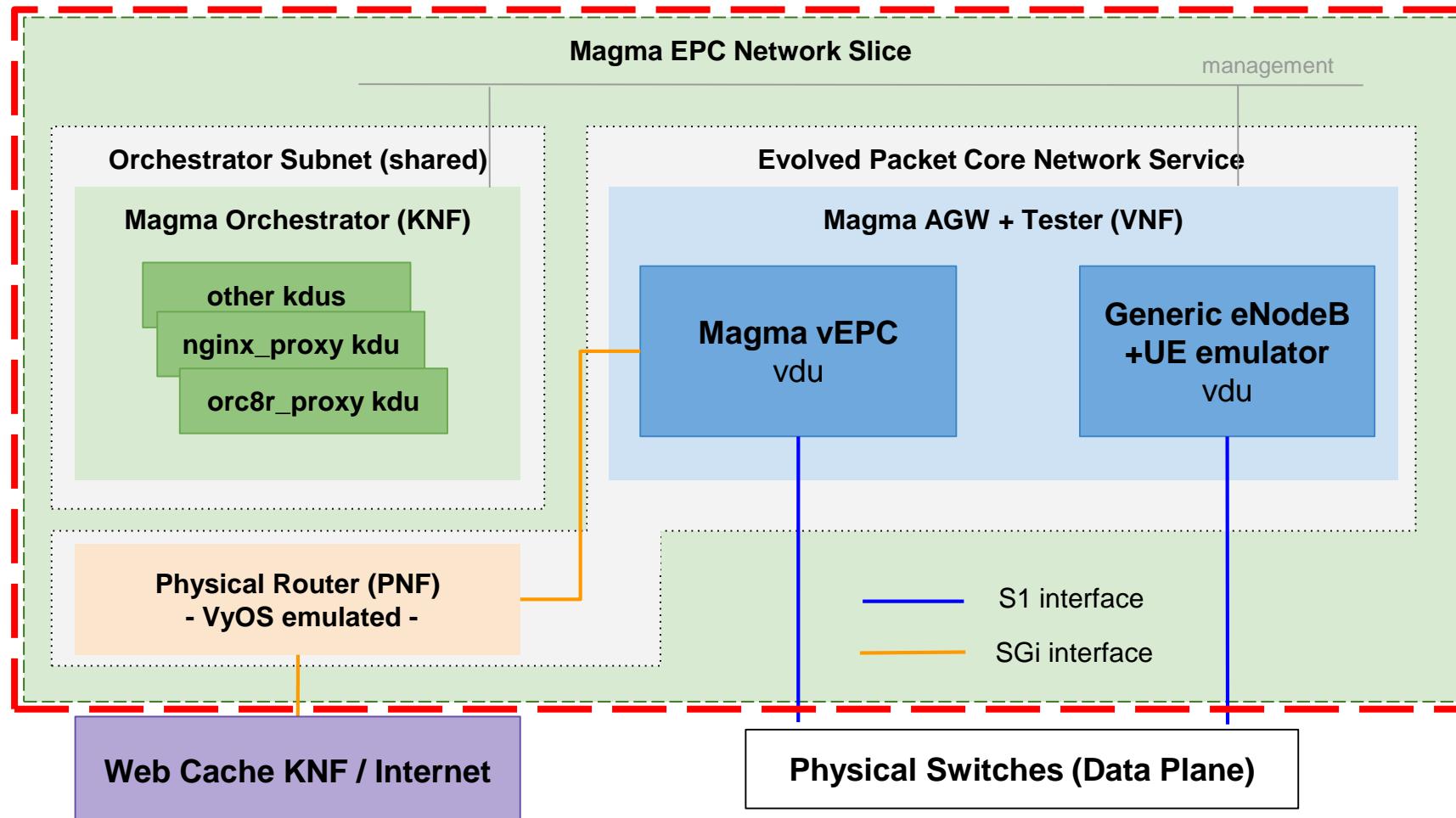
Analysis of 3GPP and alignment of NFV architecture in the ETSI GR NFV-EVE 012

Considerations:

- Network Slice Subnet can be considered as an NFV Network Service.
- Network Slice Subnets can be shared between different Network Slices

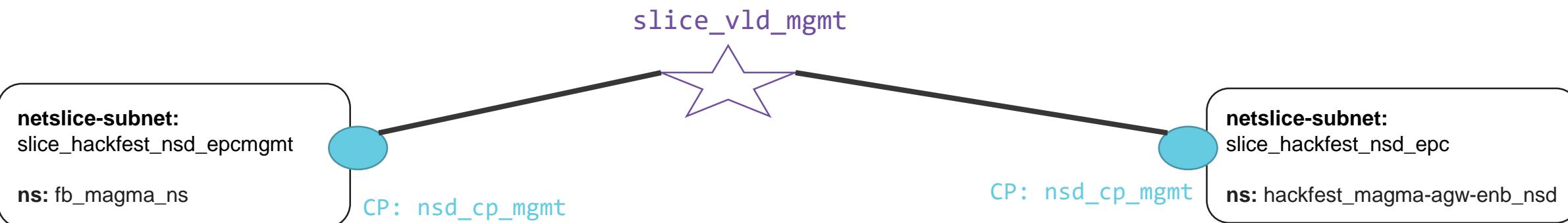


Let's continue with the Slice deployment



NST diagram

NST: magma_slice_hackfest_nst



Network Slice Template Requirements

VNFD:

- fb_magma_knf
- hackfest_magma-agw-enb_vnfd
- hackfest_gateway_vnfd

NSD:

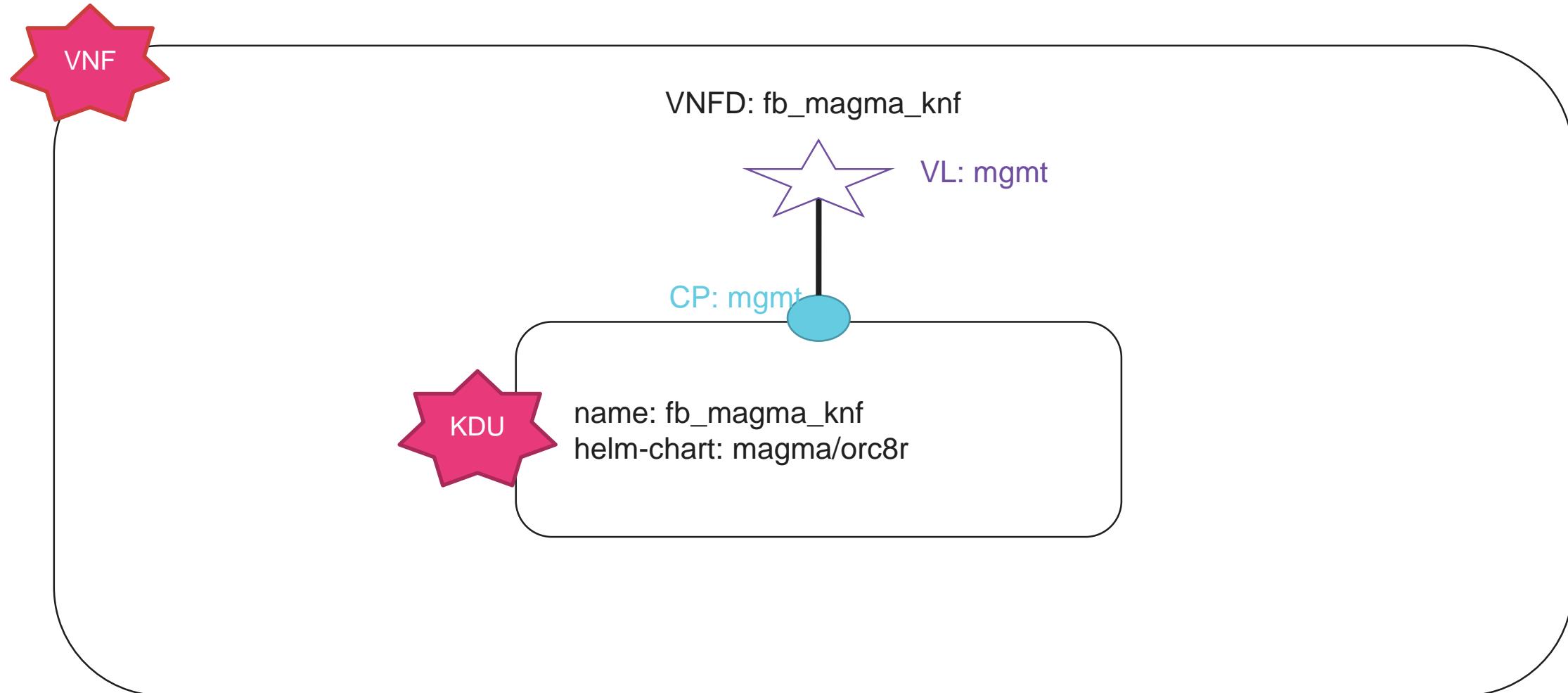
- fb_magma_nsd
- hackfest_magma-agw-enb_nsd

NST:

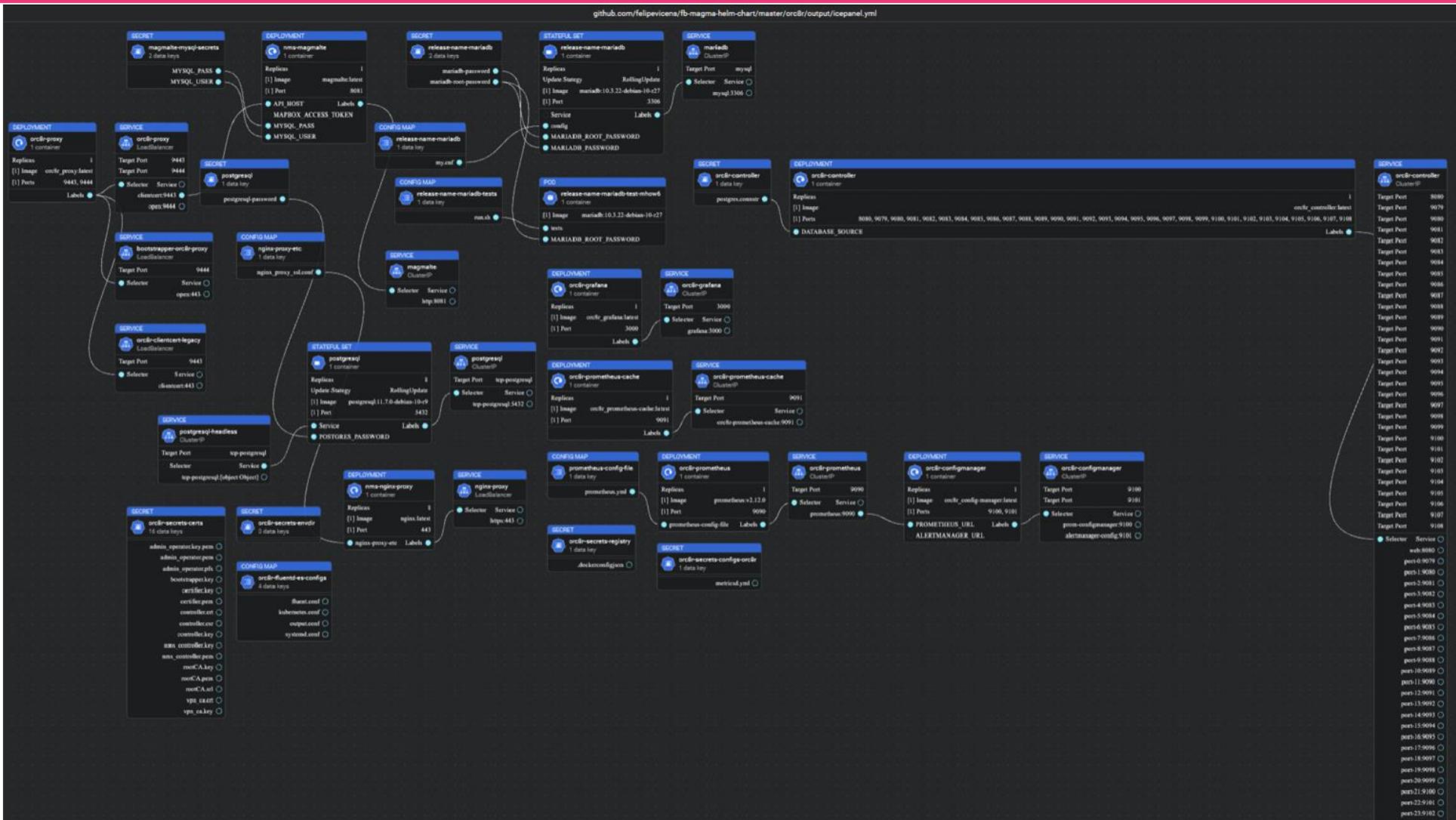
- [magma_slice.yaml](#)

- The files for the slice hackfest session are available:
 - [/home/ubuntu/examples/04-network-slicing](#)

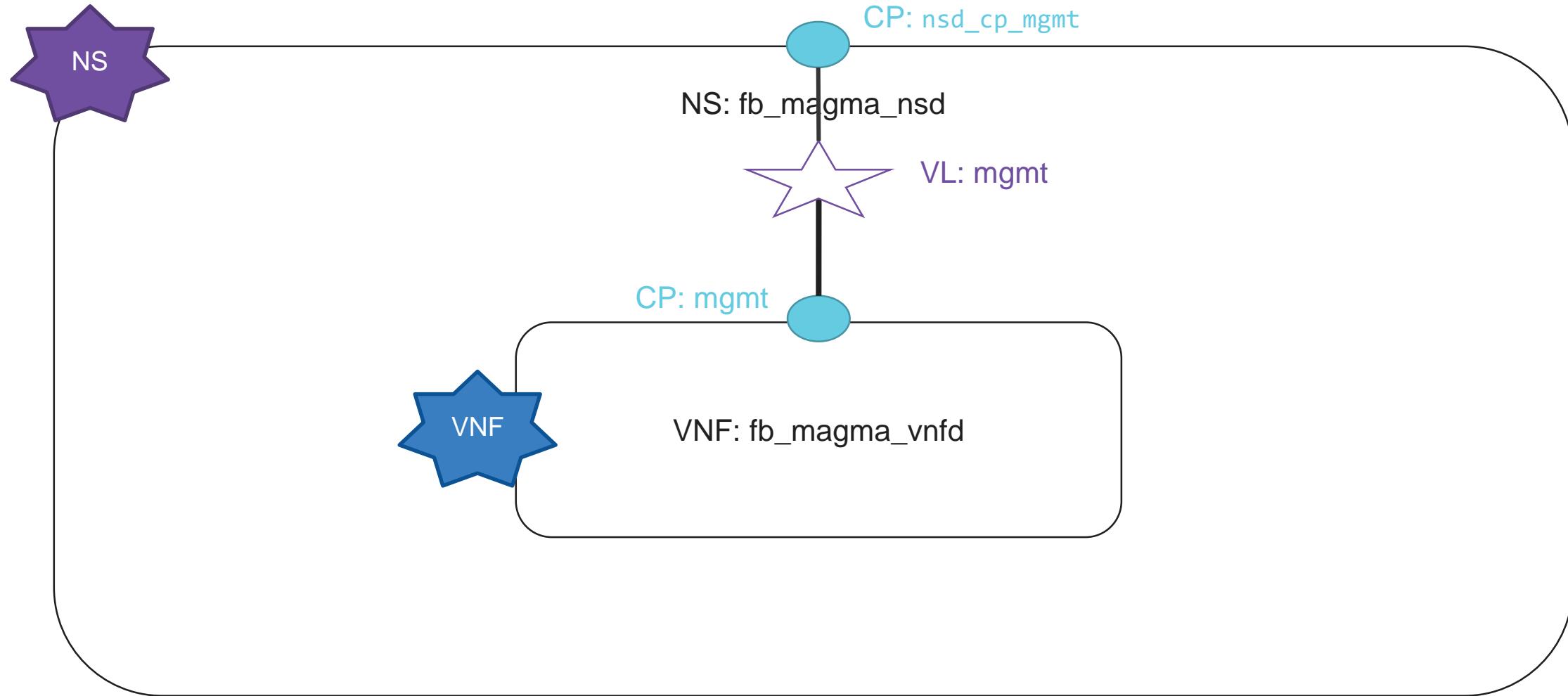
VNFD - fb_magma_knf



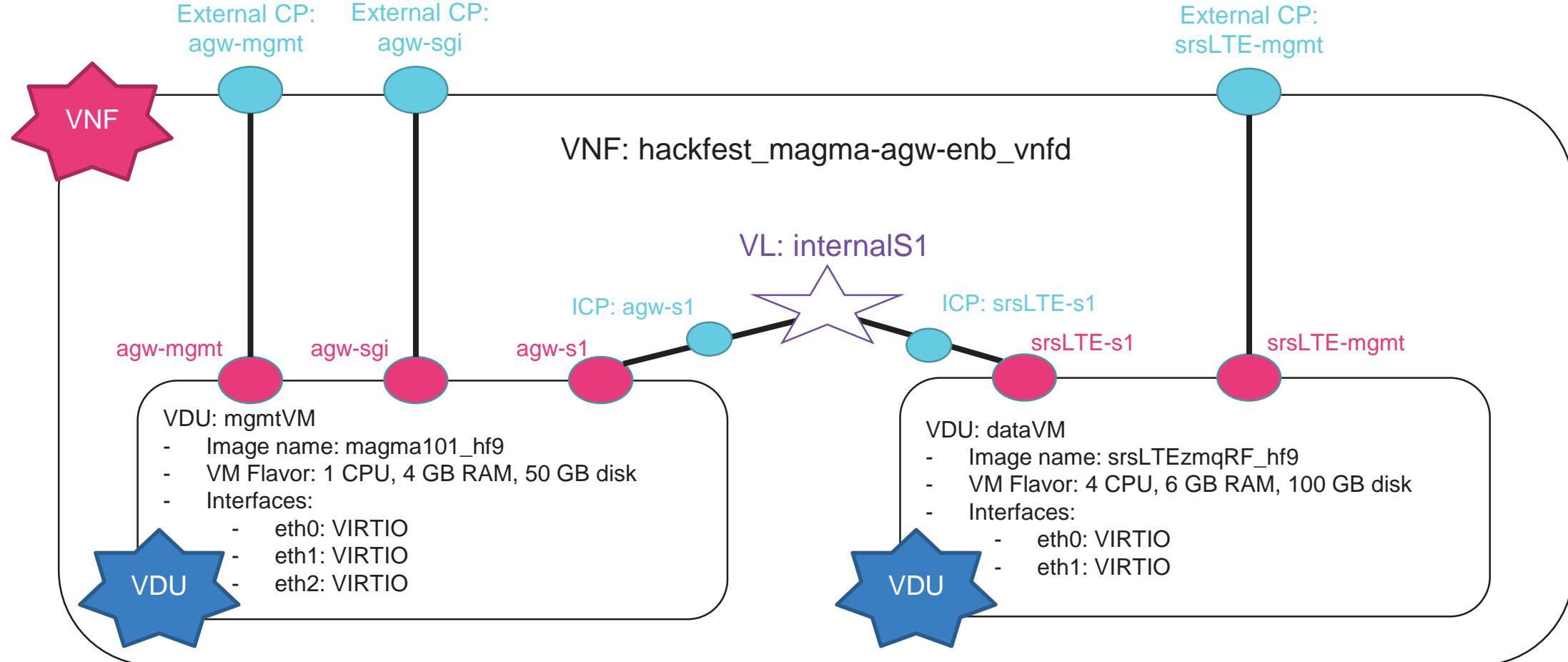
KDU - fb_magma_knf



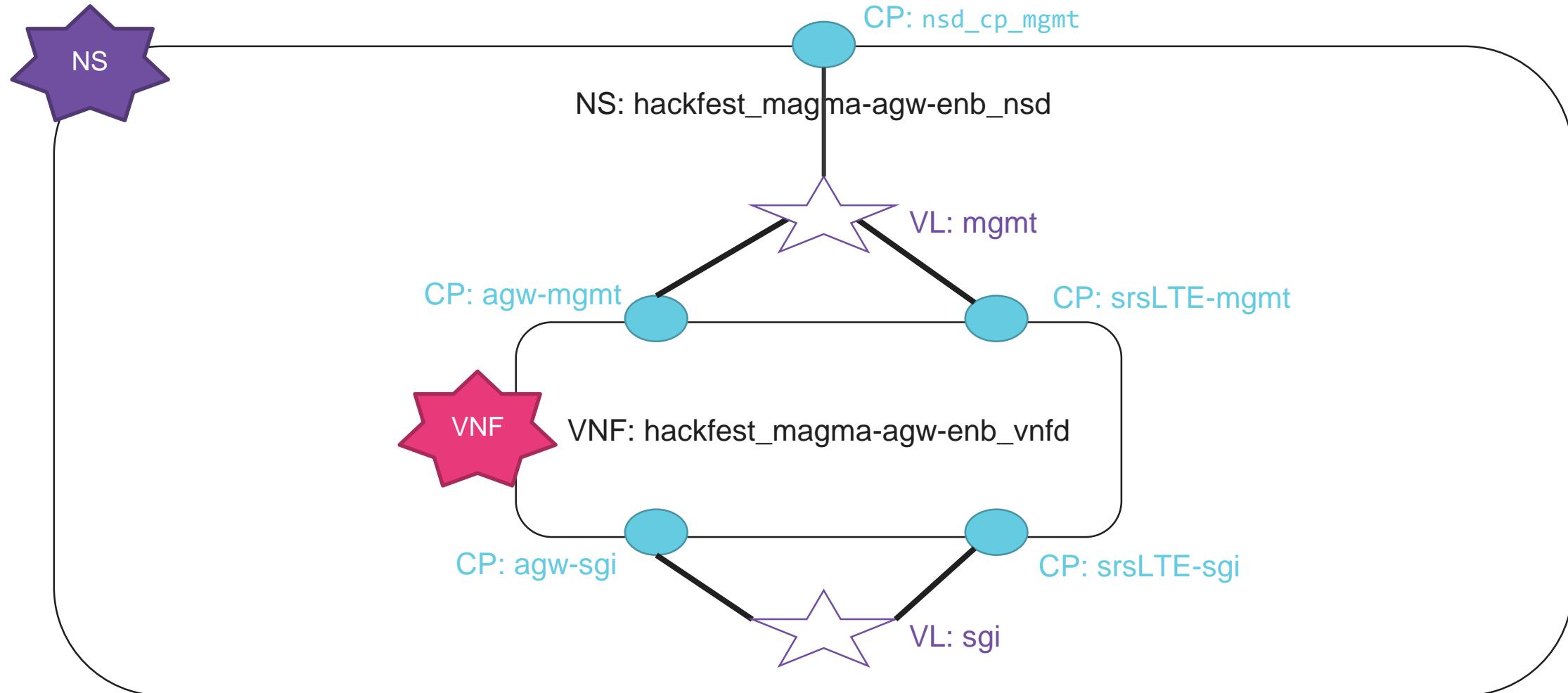
NSD - fb_magma_nsd



VNFD - hackfest_magma-agw-enb_vnfd

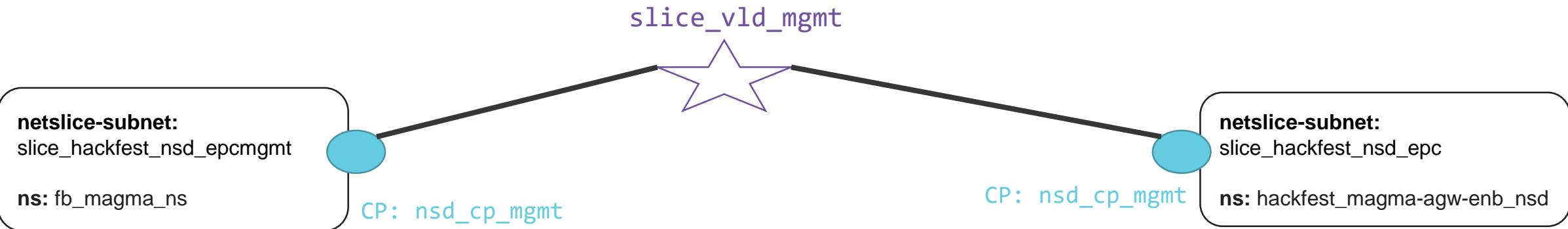


NSD - hackfest_magma-agw-enb_nsd



NST diagram

NST: magma_slice_hackfest_nst



Network Slice Template

```

nst:
- SNSSAI-identifier:
    slice-service-type: eMBB
    id: magma_slice_hackfest_nst
    name: magma_slice_hackfest_nst
    quality-of-service:
        id: 1

netslice-subnet:
- description: NetSlice Subnet (service) with magma agw
    id: slice_hackfest_nsd_epc
    is-shared-nss: false
    nsd-ref: hackfest_magma-agw-enb_nsd
- description: NetSlice Subnet (service) with magma orch and nms
    id: slice_hackfest_nsd_epcmgmt
    is-shared-nss: true
    nsd-ref: fb_magma_ns

netslice-vld:
- id: slice_vld_mgmt
    mgmt-network: true
    name: slice_vld_mgmt
    nss-connection-point-ref:
        - nsd-connection-point-ref: nsd_cp_mgmt
          nss-ref: slice_hackfest_nsd_epc
        - nsd-connection-point-ref: nsd_cp_mgmt
          nss-ref: slice_hackfest_nsd_epcmgmt
    type: ELAN
  
```

Creating a Network Slice Template (NST)

Information Model

```

module: nst
++-rw nst* [id]
  +-rw id
  +-rw name
  +-rw SNSSAI-identifier
    | +-rw slice-service-type
    | +-rw slice-differentiator?
  +-rw quality-of-service
    | +-rw id
    | +-rw resource-type?
    | +-rw priority-level?
    | +-rw packet-delay-budget?
    | +-rw packet-error-rate?
    | +-rw default-max-data-burst? uint16
      
```

NST - id, name, and slice parameters section



```

nst:
- SNSSAI-identifier:
  slice-service-type: eMBB
  id: magma_slice_hackfest_nst
  name: magma_slice_hackfest_nst
  quality-of-service:
    id: 1
      
```

- The Information model for the NST is available:
http://osm-download.etsi.org/repository/osm/debian/ReleaseSEVEN/docs/osm-im/osm_im_trees/nst.html

Creating a Network Slice Template (NST)

Information Model

```

++-rw netslice-subnet*
| +-rw id [id]
| +-rw description? string
| +-rw is-shared-nss? boolean
| +-rw nsd-ref -> /nsd:nsd-catalog/nsd/id
| +-rw instantiation-parameters
| +--.....

```



NST - netslice-subnet section

```

netslice-subnet:
- description: NetSlice Subnet (service) with magma agw
  id: slice_hackfest_nsd_epc
  is-shared-nss: false
  nsd-ref: hackfest_magma-agw-enb_nsd
- description: NetSlice Subnet (service) with magma orch and nms
  id: slice_hackfest_nsd_epcmgmt
  is-shared-nss: true
  nsd-ref: fb_magma_ns

```

- The Information model for the NST is available:
http://osm-download.etsi.org/repository/osm/debian/ReleaseSEVEN/docs/osm-im/osm_im_trees/nst.html

Creating a Network Slice Template (NST)

Information Model

```

++-rw netslice-vld* [id]
| +-rw id
| | string
| +-rw name?
| | string
| +-rw short-name?
| | string
| +-rw vendor?
| | string
| +-rw description?
| | string
| +-rw version?
| | string
| +-rw type?
| | manotypes:virtual-link-type
| +-rw root-bandwidth?
| | uint64
| +-rw leaf-bandwidth?
| | uint64
| +-rw provider-network
| | +-rw physical-network?
| | | string
| | +-rw segmentation_id?
| | | uint32
| +-rw mgmt-network?
| | boolean
| +-rw nss-connection-point-ref* [nss-ref nsd-connection-point-ref]
| | +-rw nss-ref
| | | -> /nst/netslice-subnet/id
| | +-rw nsd-connection-point-ref -> /nsd:nsd-catalog/
| | | nsd/connection-point/name
| +-rw ip-address?
| | inet:ip-address
  
```



NST - netslice-vld section

```

netslice-vld:
- id: slice_vld_mgmt
  mgmt-network: true
  name: slice_vld_mgmt
  nss-connection-point-ref:
  - nsd-connection-point-ref: nsd_cp_mgmt
    nss-ref: slice_hackfest_nsd_epc
  - nsd-connection-point-ref: nsd_cp_mgmt
    nss-ref: slice_hackfest_nsd_epcmgmt
  type: ELAN
  
```

- The Information model for the NST is available:
http://osm-download.etsi.org/repository/osm/debian/ReleaseSEVEN/docs/osm-im/osm_im_trees/nst.html

Before the netslice instantiation:

*For those who want to use their already onboarded descriptors



- Make sure that there are no services deployed:

```
osm ns-list
```

- Modify the `hackfest_magma-agw-enb_ns/hackfest_magma-agw-enb_nsd.yaml`:

- Delete the nsd from OSM:

```
osm nsd-delete hackfest_magma-agw-enb_nsd
```

- Change 'MagmaAGW+srsLTE' by 'MagmaAGWsrsLTE' (Erase the '+')

Before the netslice instantiation:

*For those who want to use their already onboarded descriptors



- Modify the file `hackfest_magma-agw-enb_vnfd` / `magma-agw-enb_vnfd.yaml`:
 - Delete the vnfd from OSM:

```
osm vnfd-delete hackfest_magma-agw-enb_vnfd
```

- Comment the following lines:

```
execution-environment-list:  
  - id: monitor  
    helm-chart: eechart  
    metric-service: snmpexporter  
    connection-point-ref: agw-mgmt  
initial-config-primitive:  
  - seq: 1  
    name: generate_snmp  
    execution-environment-ref: monitor  
config-primitive:  
  - name: generate_snmp  
    execution-environment-ref: monitor
```

- Onboard vnfd and nsd:

```
osm nfpkg-create hackfest_magma-agw-enb_vnfd/  
osm ns pkg-create hackfest_magma-agw-enb_nsd/
```

Before the netslice instantiation, *From the beginning: Onboarding VIM, VNFD, NSD packages



- **VIM onboarding:**

```
osm vim-create --name etsi-openstack-${HACKFEST_TENANT} \
--user osm_hackfest_${HACKFEST_TENANT} \
--password osm_hackfest_${HACKFEST_TENANT} \
--auth_url http://172.21.247.1:5000/v3 \
--tenant osm_hackfest_${HACKFEST_TENANT} --account_type openstack \
--config '{management_network_name: osm-ext, dataplane_physical_net: physnet2, microversion: 2.32}'
```

- **K8s cluster onboarding :**

```
osm k8scluster-add --creds ~/kube.yaml \
--version '1.15' \
--vim etsi-openstack-${HACKFEST_TENANT} \
--description "K8s cluster for user ${HACKFEST_TENANT}" \
--k8s-nets '{"net1": "osm-ext"}' \
etsi-cluster-${HACKFEST_TENANT}
```

Before the netslice instantiation,

*From the beginning: Onboarding VIM, VNFD, NSD packages

- PDU:
 - cp -r /home/ubuntu/examples/04-network-slicing/pdu.yaml ~/.magma/
 - osm pdu-create --descriptor_file pdu.yaml
- VNF packages:
 - cp -r /home/ubuntu/examples/04-network-slicing/fb_magma_vnf/ ~/.magma/
 - cp -r /home/ubuntu/examples/04-network-slicing/hackfest_gateway_vnfd/ ~/.magma/
 - cp -r /home/ubuntu/examples/04-network-slicing/hackfest_magma-agw-enb_vnfd/ ~/.magma/
 - osm nfpkg-create fb_magma_vnf
 - osm nfpkg-create hackfest_gateway_vnfd
 - osm nfpkg-create hackfest_magma-agw-enb_vnfd
- NS packages:
 - cp -r /home/ubuntu/examples/04-network-slicing/fb_magma_ns/ ~/.magma/
 - cp -r /home/ubuntu/examples/04-network-slicing/hackfest_magma-agw-enb_nsd/ ~/.magma/
 - osm ns pkg-create fb_magma_ns
 - osm ns pkg-create hackfest_magma-agw-enb_nsd

With your vim-id

Before the netslice instantiation, Create the NST

- **NST:**
 - `osm nst-list`
 - `osm nst-create magma_slice.yaml`
 - `osm nst-show magma_slice_hackfest_nst`

Creating a Network Slice Instance

- `osm nsi-create --help`

```
Usage: osm nsi-create [OPTIONS]
creates a new Network Slice Instance (NSI)
```

Options:

```
--nsi_name TEXT name of the Network Slice Instance
--nst_name TEXT name of the Network Slice Template
--vim_account TEXT default VIM account id or name for the deployment
--ssh_keys TEXT comma separated list of keys to inject to vnfs
--config TEXT Netslice specific yaml configuration:
            netslice_subnet: [
                id: TEXT, vim_account: TEXT,
                vnf: [member-vnf-index:
                      TEXT, vim_account: TEXT]
                vld: [name: TEXT, vim-network-
                      name: TEXT or DICT with vim_account, vim_net entries]],
                netslice-vld: [name: TEXT, vim-network-name: TEXT or
                               DICT with vim_account, vim_net entries]
--config_file TEXT nsi specific yaml configuration file
--help           Show this message and exit.
```

Creating a Network Slice Instance

/home/ubuntu/examples/04-network-slicing/params_slices.yaml

```
netslice-subnet:  
- id: slice_hackfest_nsd_epc  
  additionalParamsForVnf:  
    - member-vnf-index: 'MagmaAGWsrsLTE'  
      additionalParams:  
        agw_id: 'agw_100'  
        agw_name: 'AGW100'  
        orch_ip: '172.21.251.XX'  
        orch_net: 'osmnet'  
  
- id: slice_hackfest_nsd_epcmgmt  
  additionalParamsForVnf:  
    - member-vnf-index: 'orc8r'  
      additionalParamsForKdu:  
        - kdu_name: orc8r  
      additionalParams:  
        proxyserviceLoadBalancerIP: '172.21.251.XX'
```

With the ip assigned for you
in the sheet

With the ip assigned for you
in the sheet

Creating, Listing and Deleting a Network Slice Instance



- NSI instantiation

```
osm nsi-create --nsi_name magma_slice_${HACKFEST_TENANT} \  
--nst_name magma_slice_hackfest_nst \  
--vim_account etsi-openstack-${HACKFEST_TENANT} \  
--config_file params_slices.yaml
```

- List Network Slice Instances

- osm nsi-list

- Delete Network Slice Instance

- osm nsi-delete <nsi_name> or <nsi_id>

Managing Network Slice Templates (via CLI)

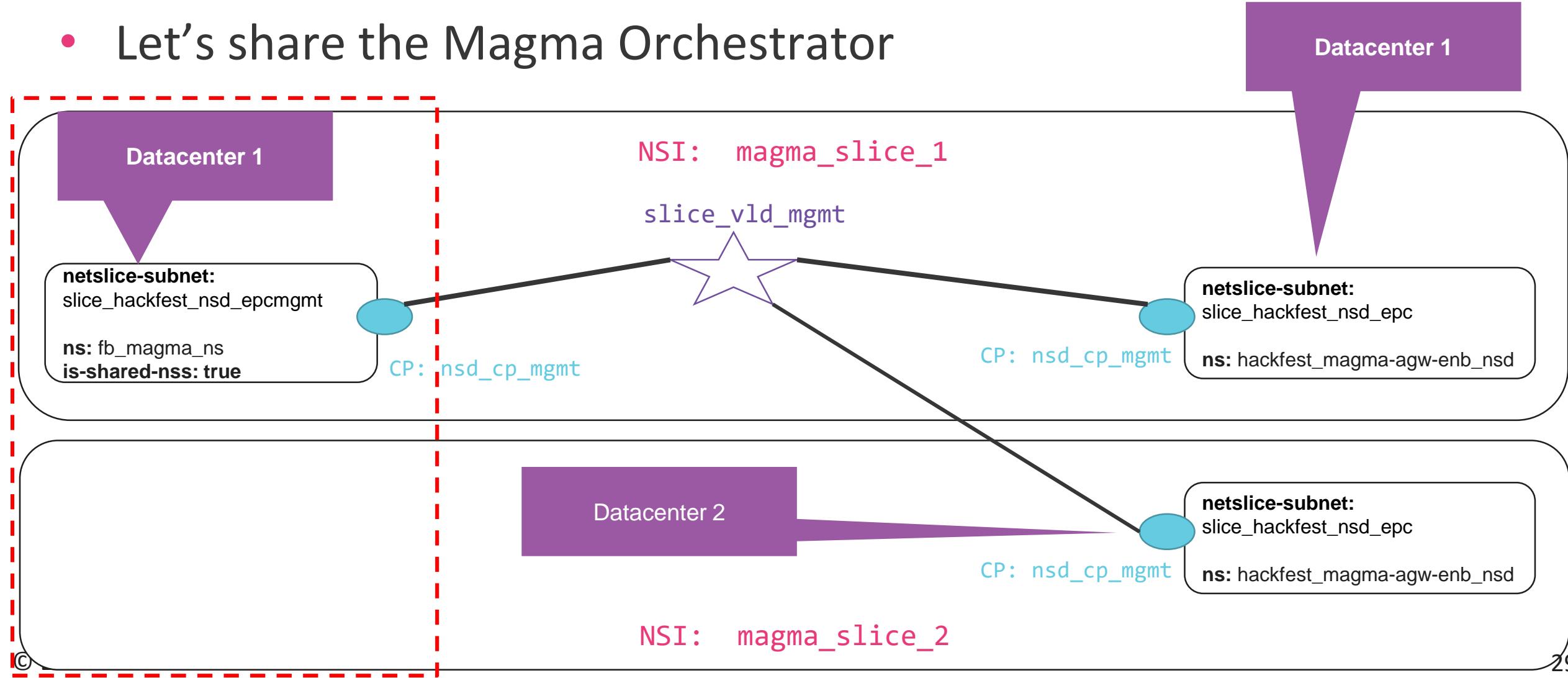
- Creates a new Network Slice Template
 - `netslice-template-create` / `nst-create`
- Deletes a Network Slice Template
 - `netslice-template-delete` / `nst-delete`
- List all Network Slice Templates
 - `netslice-template-list` / `nst-list`
- Shows the content of a Network Slice Template
 - `netslice-template-show` / `nst-show`
- Updates a Network Slice Template
 - `netslice-template-update` / `nst-update`

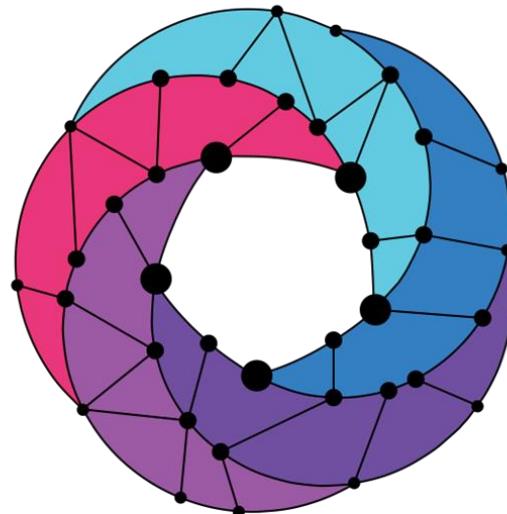
Managing Network Slice Instances (via CLI)

- Creates a new Network Slice Instance
 - `netslice-instance-create / nsi-create`
- Deletes a Network Slice Instance
 - `netslice-instance-delete / nsi-delete`
- List all Network Slice Instances (NSI)
 - `netslice-instance-list / nsi-list`
- Shows the history of operations over a
 - `netslice-instance-op-list / nsi-op-list`
- Shows the info of an operation over a Network Slice Instance(NSI)
 - `netslice-instance-op-show / nsi-op-show`
- Shows the content of a Network Slice Instance (NSI)
 - `netslice-instance-show / nsi-show`

Shared Network Slices

- Let's share the Magma Orchestrator





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