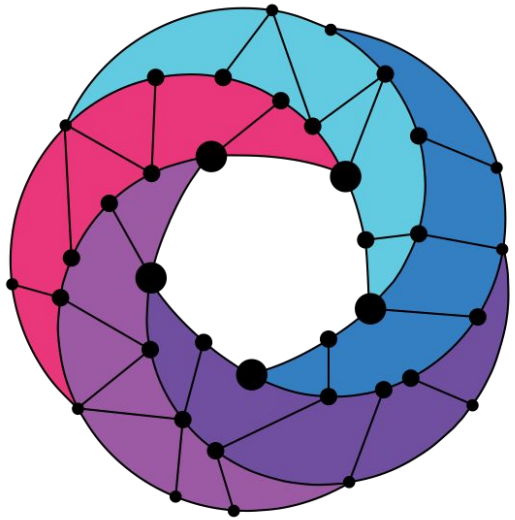


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OSM#9 Hackfest - HD3.1 - Slicing our Network Services

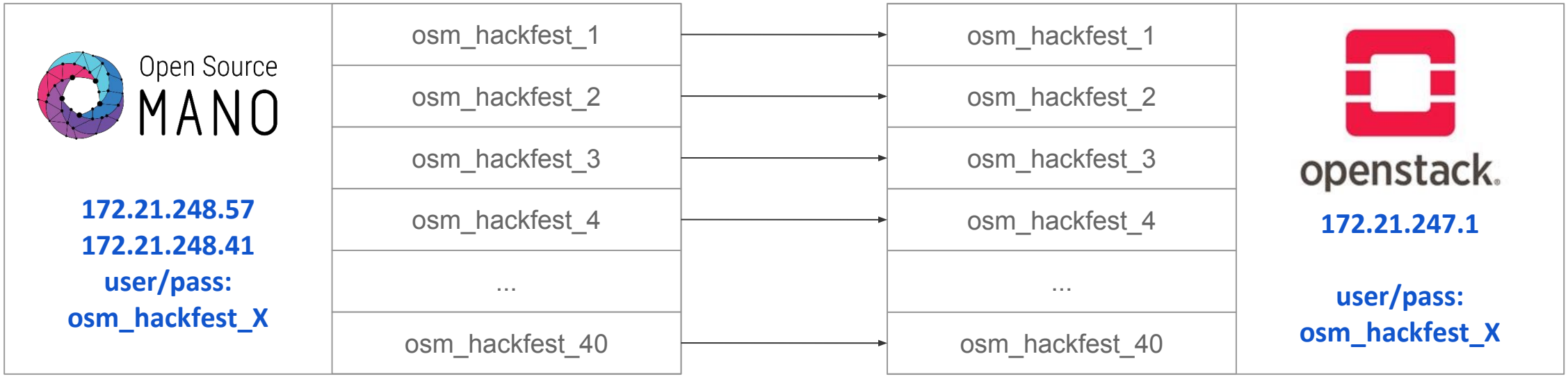
Felipe Vicens (Atos)

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ETSI

New OSM instance!

This time, we will use a shared OSM instance, leveraging the OSM RBAC capabilities. Don’t forget to create your VIM.




```
osm vim-create --name openstack-site-hackfest-x --user osm_hackfest_x --password
osm_hackfest_x --auth_url http://172.21.247.1:5000/v3 --tenant osm_hackfest_x
--account_type openstack
```

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Presentation & Hands-on: Slicing our Network Services



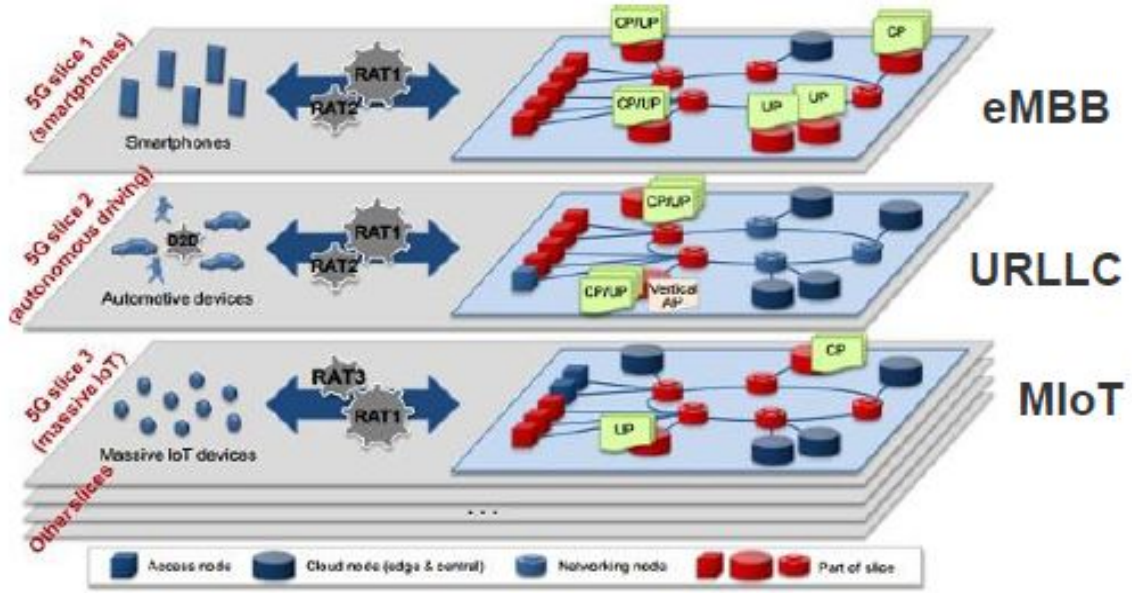


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Network Slicing Overview

In the scope of 5G, network slicing allows the network operator to deploy independent PLMNs with different capabilities

Different network slices addressing different types of usage requiring different levels of functionality, performance and reliability.



Source: NGMN

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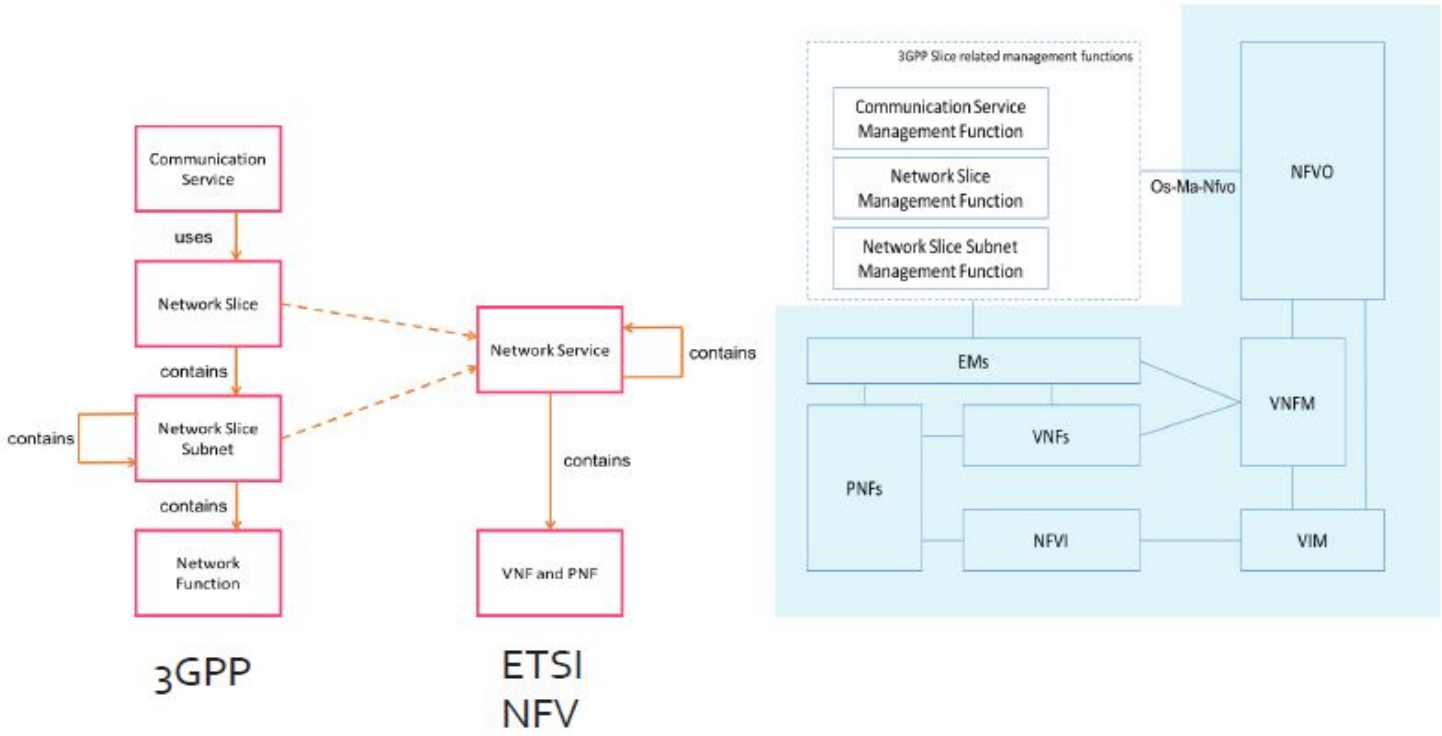
ETSI NFV Framework for Network Slicing

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.

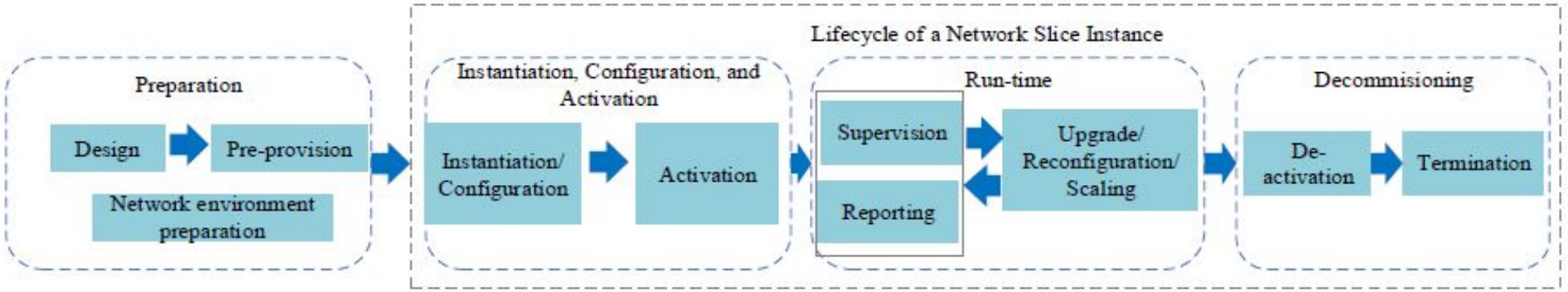
- Network Functions can be described as VNF and PNF



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Network Slicing in OSM

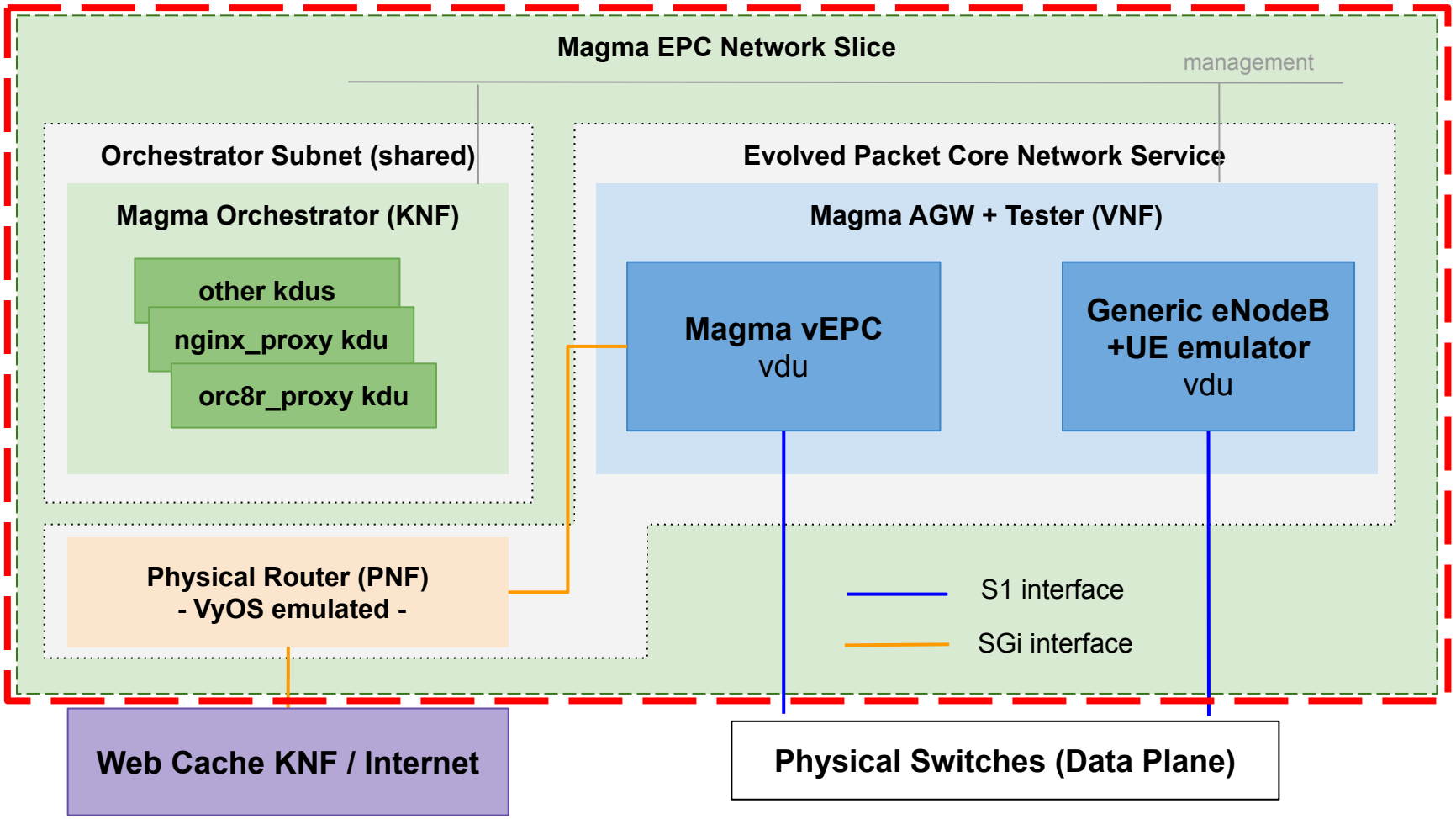
- **Network slice instance**: a set of network functions and the resources for these network functions which are arranged and configured, forming a complete logical network to meet certain network characteristics.



- The NSI contains:
  - NFs (e.g. belonging to AN and CN)
  - Information relevant to the interconnections between these NFs like topology of connections.
  - Individual link requirements (e.g. QOS attributes)
    - **The NSI is defined by a Network Slice Template.**

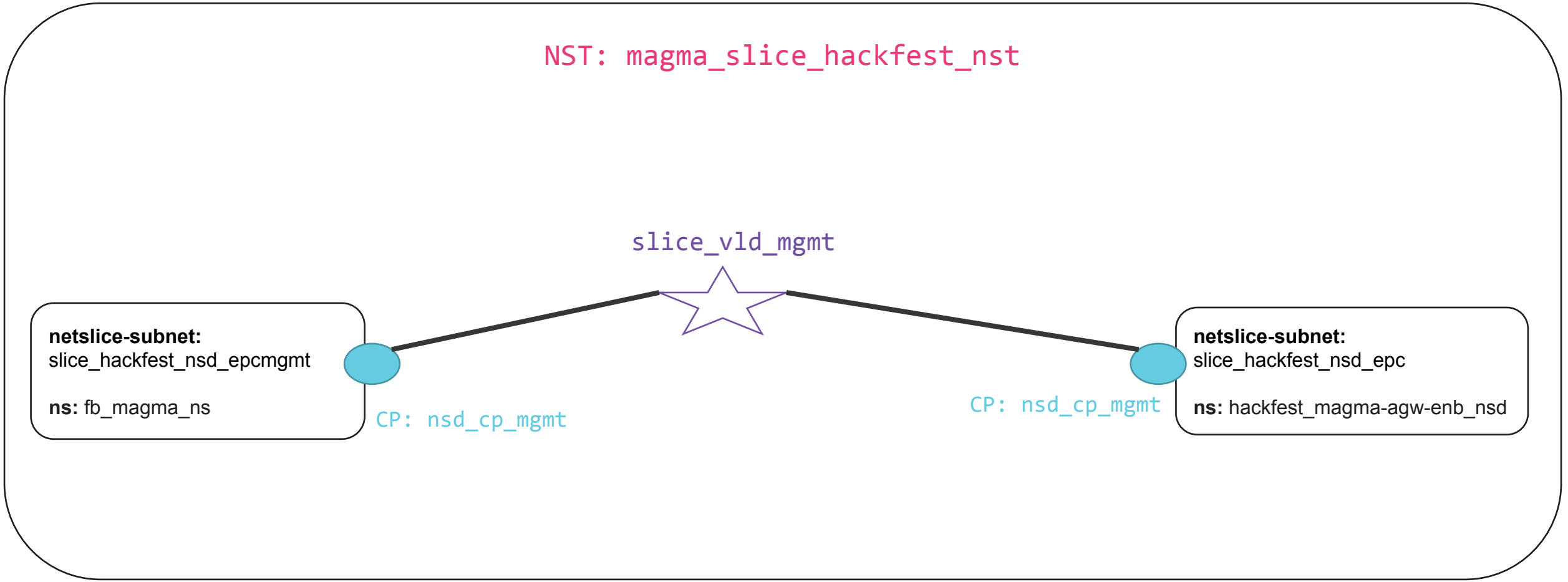
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Let’s continue with the Slice deployment



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NST diagram



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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

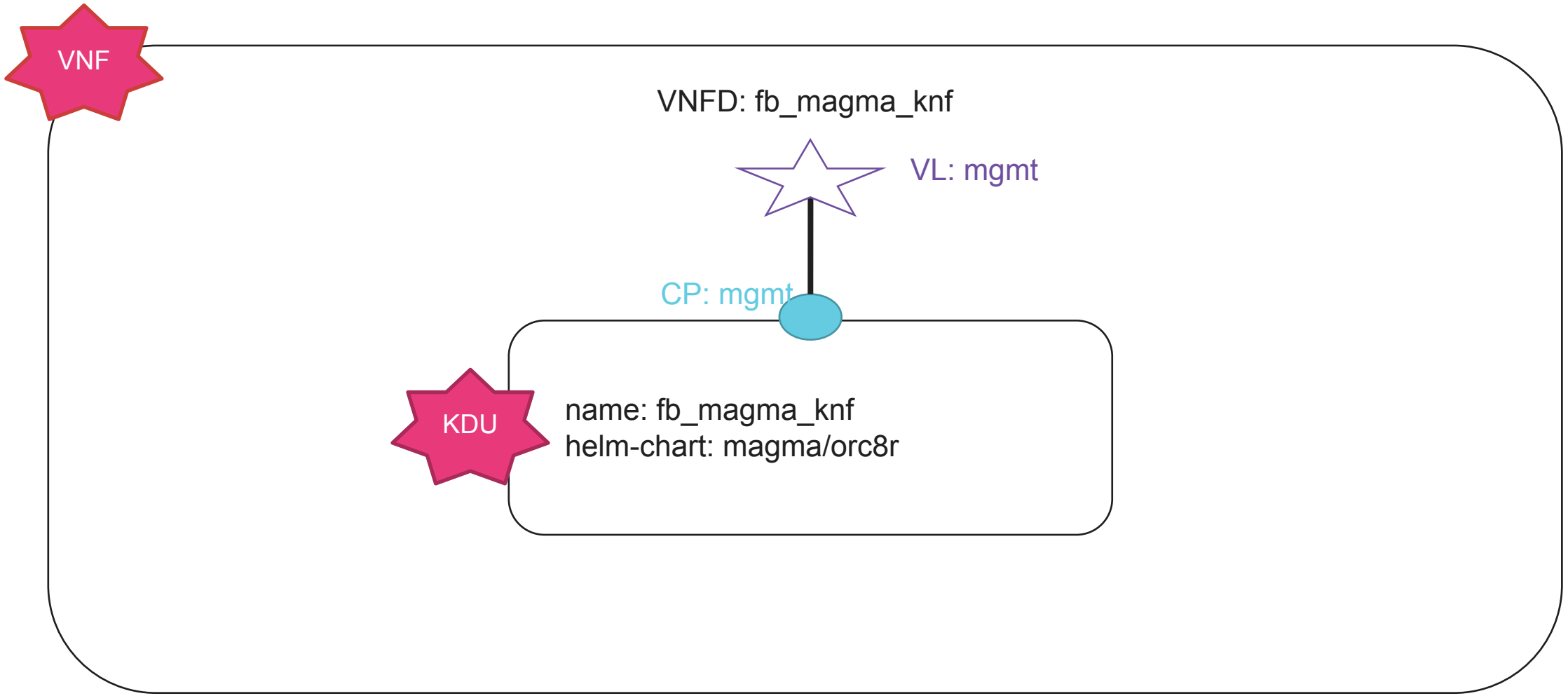
NST:

- magma_slice.yaml

- **The files for the slice hackfest session are available:**
  - **https://osm-download.etsi.org/ftp/osm-7.0-seven/OSM9-hackfest/files/**

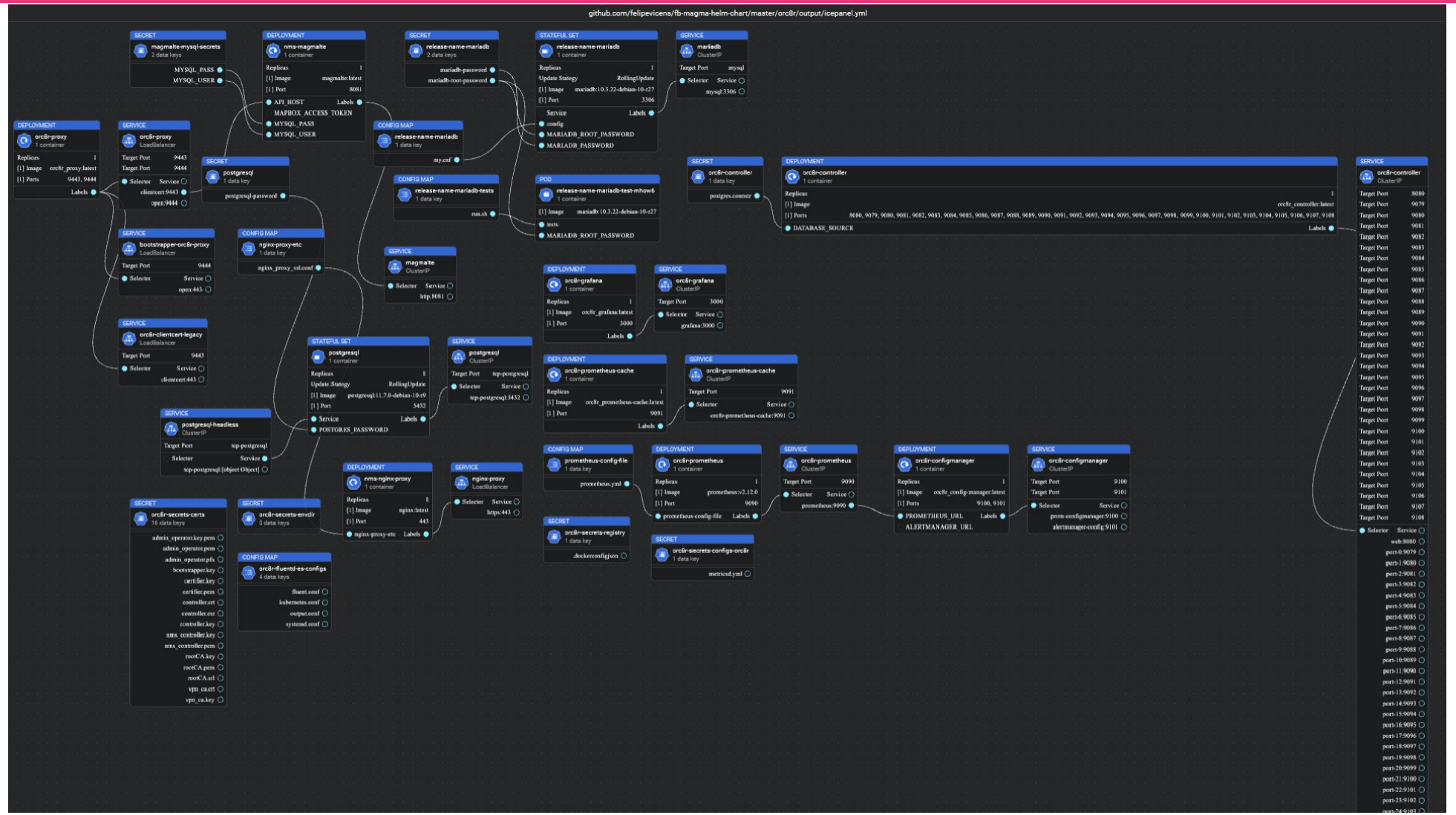
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VNFD - fb_magma_knf



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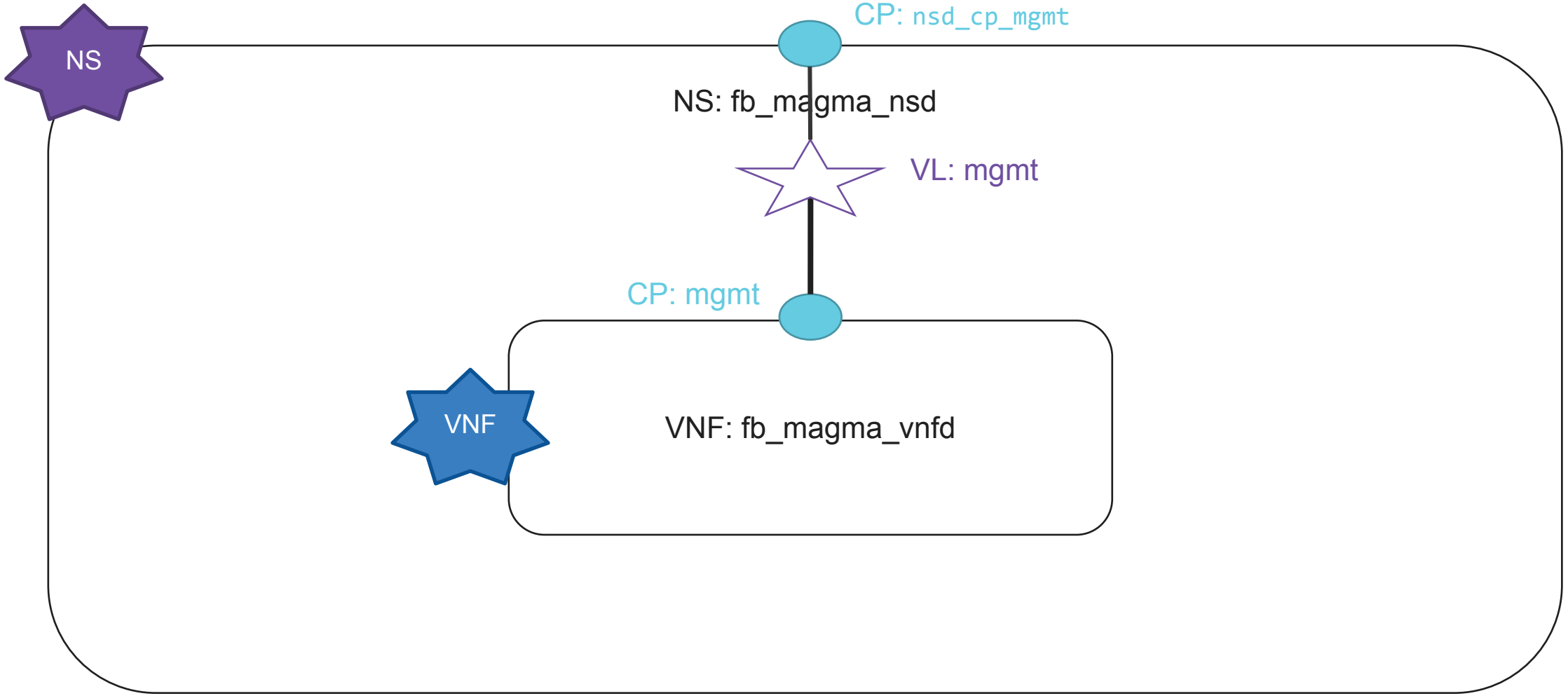
KDU - fb_magma_knf



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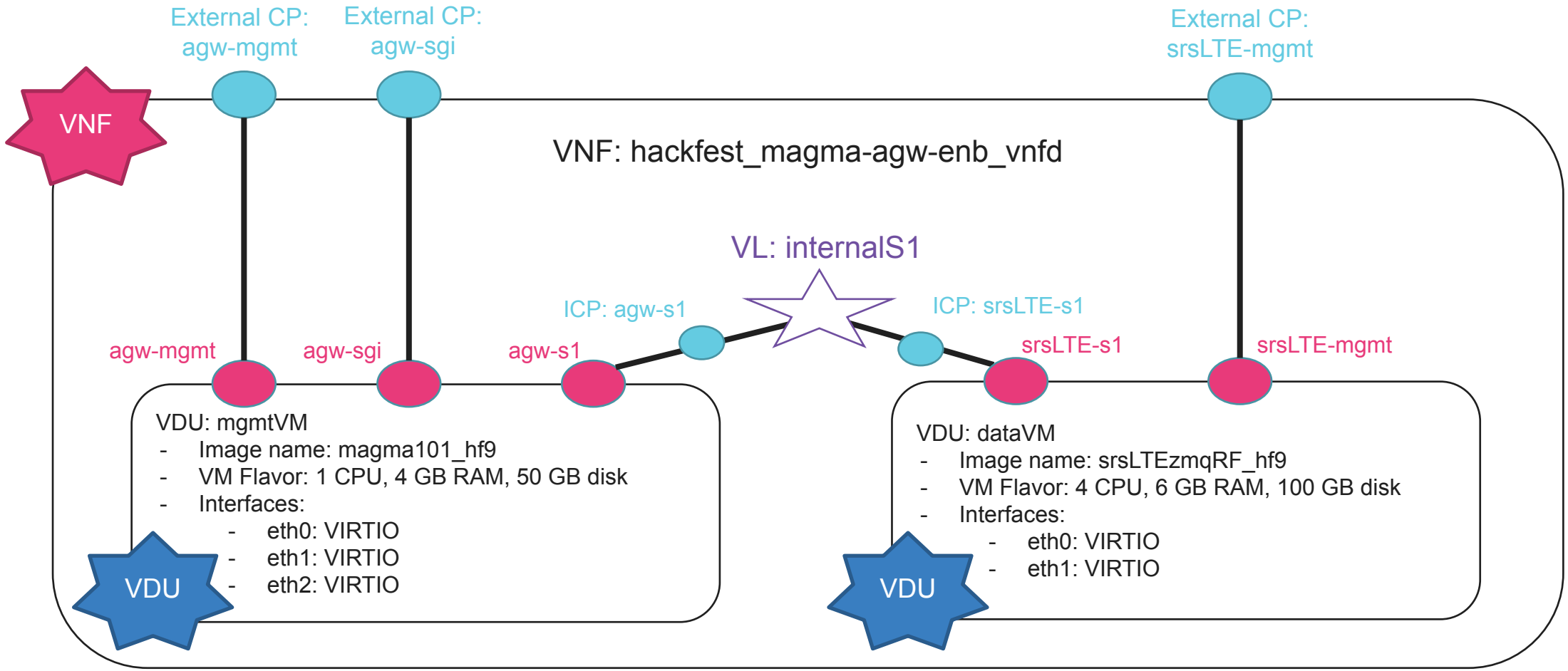
http://designer.icepanel.io/?ref=https%3A%2F%2Fraw.githubusercontent.com%2Ffelipevicens%2Ffb-magma-helm-chart%2Fmaster%2Forc8r%2Foutput%2Ficepanel.yml

NSD - fb_magma_nsd



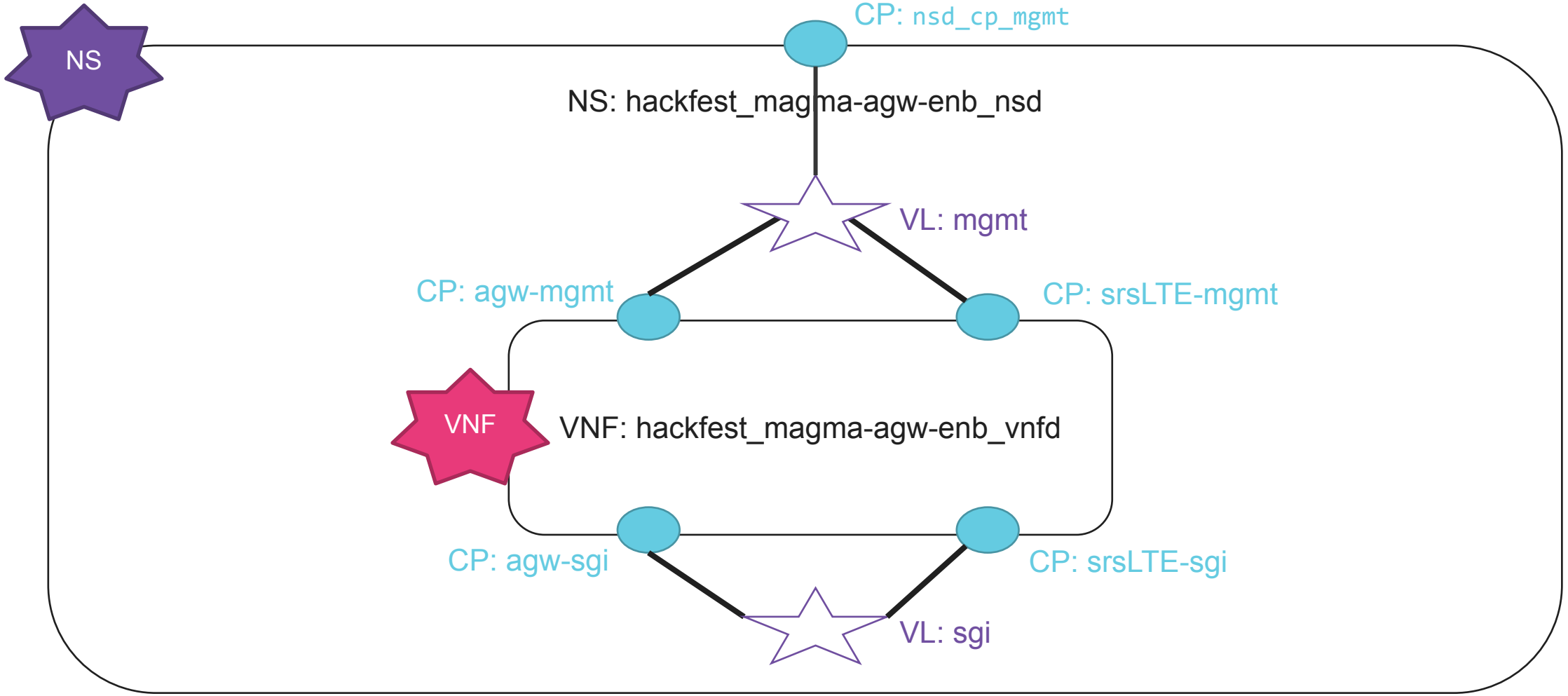
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VNFD - hackfest_magma-agw-enb_vnfd



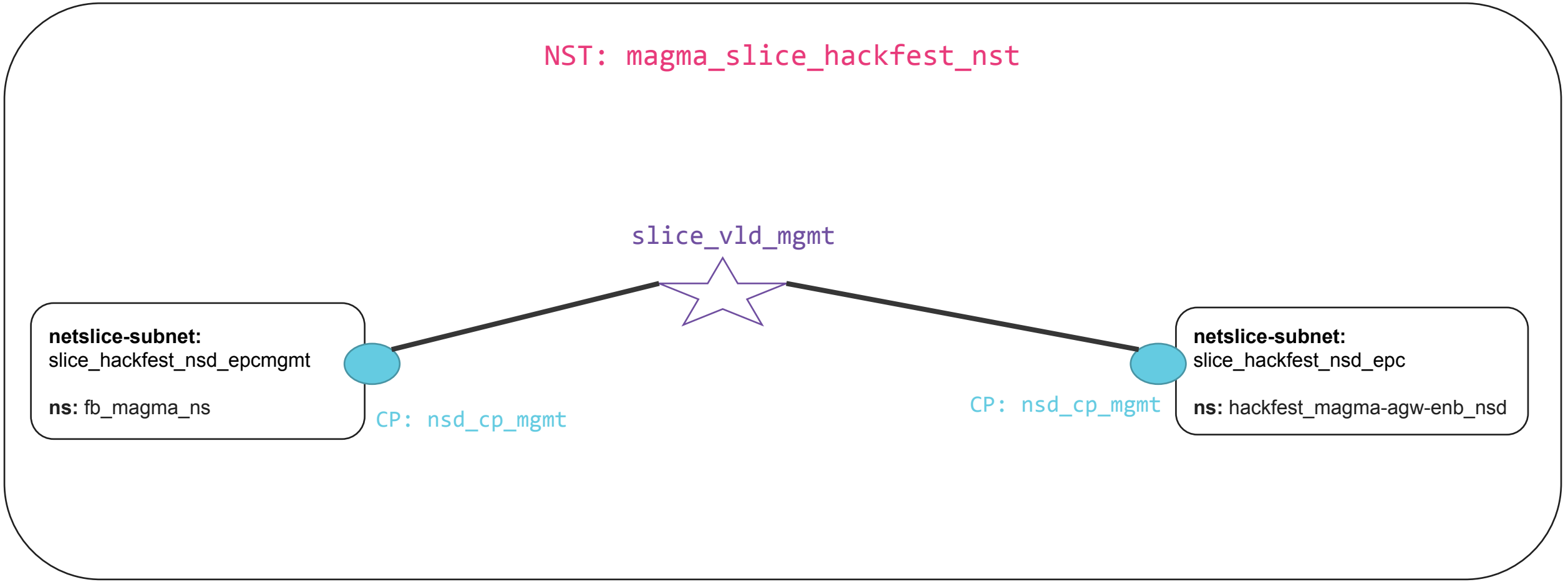
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NSD - hackfest_magma-agw-enb_nsd



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NST diagram



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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
```

https://osm-download.etsi.org/ftp/osm-7.0-seven/OSM9-hackfest/files/magma_slice.yaml

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Creating a Network Slice Template (NST)

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Information Model

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

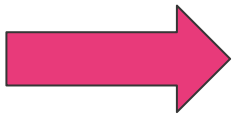
- The Information model for the NST is available:
  http://osm-download.etsi.org/repository/osm/debian/ReleaseSEVEN/docs/osm-im/osm_im_trees/nst.html

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Creating a Network Slice Template (NST)

Information Model

```
+--rw netslice-subnet*                [id]
 |  +--rw id                          string
 |  +--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

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Creating a Network Slice Template (NST)

Open Source MANO

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

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Before the netslice instantiation, Adding VNF, NS packages and NST

- VNF package:
  - `osm nfpkg-repo-list`
  - `osm nfpkg-create --repo vnfrepo fb_magma_knf`
  - `osm nfpkg-create --repo vnfrepo hackfest_magma-agw-enb_vnfd`
  - `osm nfpkg-create --repo vnfrepo hackfest_gateway_vnfd`
  - `osm nfpkg-list`
- NS package:
  - `osm nspkg-repo-list`
  - `osm nspkg-create --repo vnfrepo fb_magma_ns`
  - `osm nspkg-create --repo vnfrepo hackfest_magma-agw-enb_nsd`
  - `osm nspkg-list`
- NST:
  - `osm nst-list`
  - `osm nst-create magma_slice.yaml`
  - `osm nst-show magma_slice_hackfest_nst`

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Creating a Network Slice Instance (CLI)

- `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.
```

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Creating a Network Slice Instance (CLI)

params_slices.yaml

```
netslice-subnet:
- id: slice_hackfest_nsd_epc
  #placement-engine: PLA
  #wimAccountId: False
  additionalParamsForVnf:
  - member-vnf-index: '1'
     additionalParams:
     agw_id: 'agw_100'
     agw_name: 'AGW100'
     orch_ip: '172.21.250.199'  ## change this to the MetalLB IP address of your orc8r_proxy service.
     orch_net: 'osmnet'

- id: slice_hackfest_nsd_epcmgmt
  additionalParamsForVnf:
  - member-vnf-index: 'orc8r'
     additionalParamsForKdu:
     - kdu_name: orc8r
     additionalParams:
     proxyserviceloadBalancerIP: '172.21.250.199' # MetalLB IP Address
```

- osm nsi-create --nsi_name magma_slice<hackfest_tenant> --nst_name magma_slice_hackfest_nst --vim_account <replace_vim_account_name> --config_file params_slices.yaml

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Listing and Deleting a Network Slice Instance (CLI)



- List Network Slice Instances
  - `osm nsi-list`
- Delete Network Slice Instance
  - `osm nsi-delete <nsi_name> or <nsi_id>`

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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`

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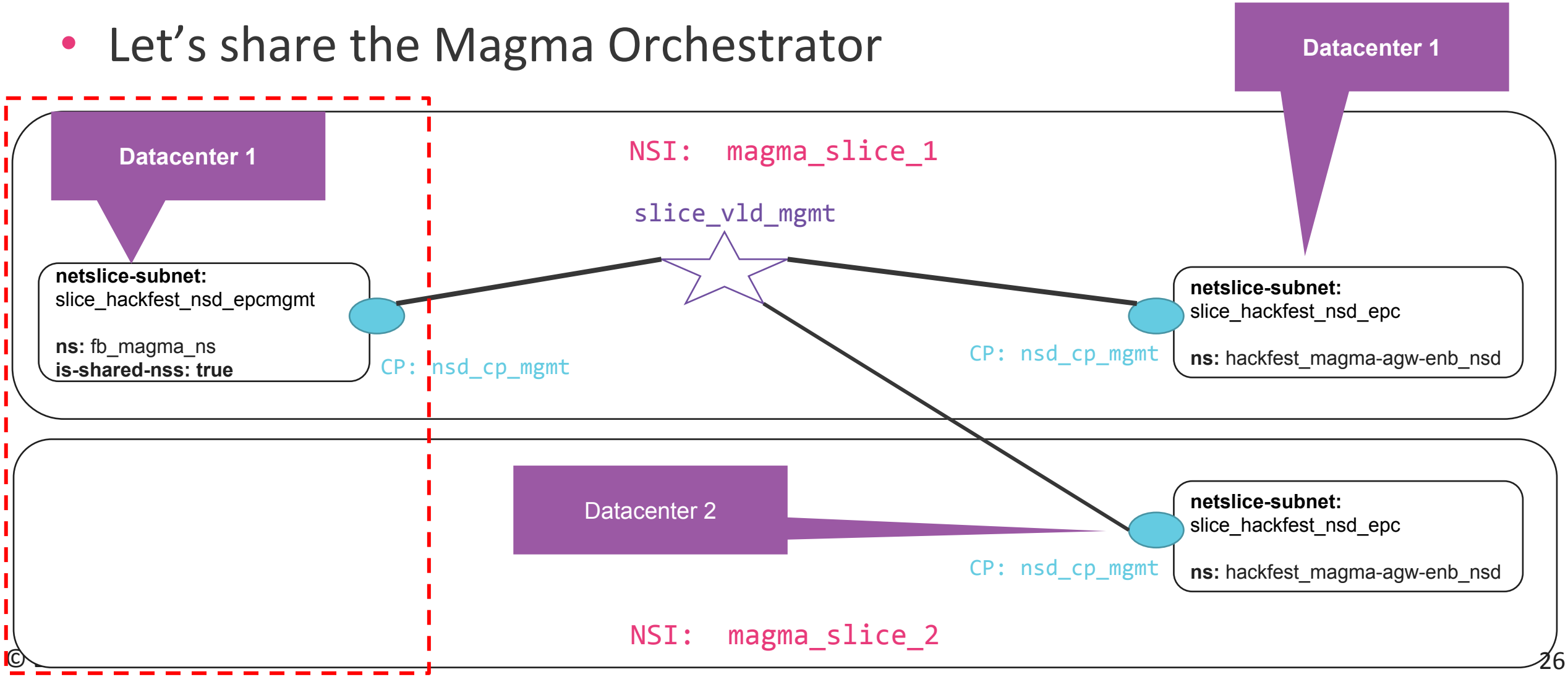
Managing Network Slice Instances (via CLI)

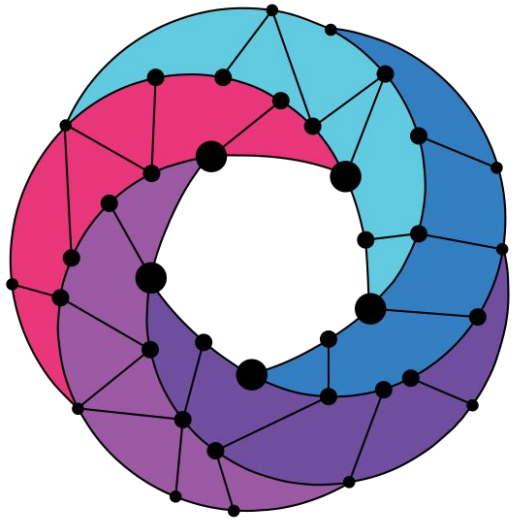
- Creates a new Network Slice Instance
  - `netslice-instance-create / nsi-create`
- Deletes a Network Slice Instance
  - `netslice-instance-delete  / nsi-delete`
- List all Network Slice Instances (NSI)
  - `netslice-instance-list / nsi-list`
- Shows the history of operations over a
  - `netslice-instance-op-list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

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Shared Network Slices

- Let's share the Magma Orchestrator





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