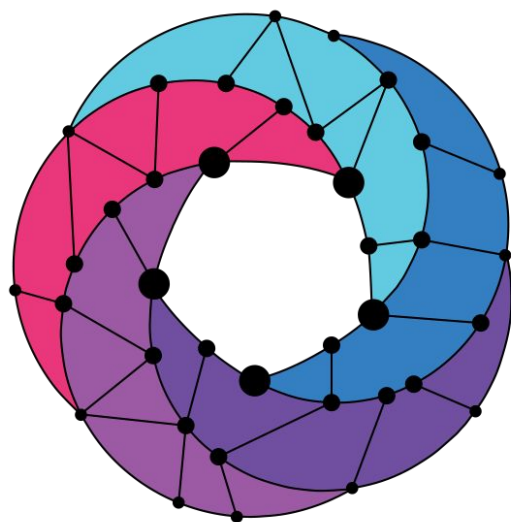




Open Source MANO

OSM Hackfest – Session 5
Adding day-0 configuration to VNFs

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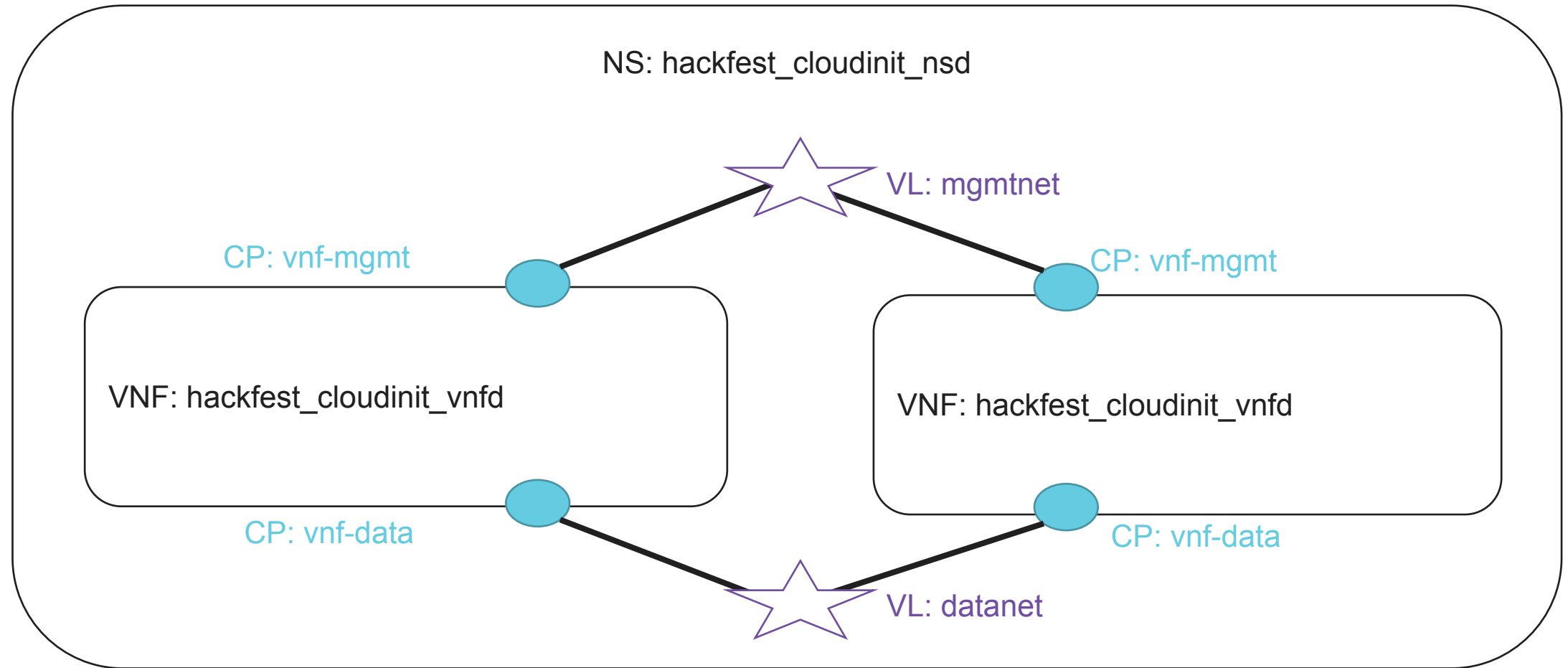


What is cloud-init and what can it be used for?

- It is a Linux package used to automate initial configuration of a VM
- VM requirements:
 - Cloud-init package
 - Cloud-init configuration (data source) via `/etc/cloud/cloud.cfg`
 - Config drive
 - Openstack metadata server
 - ...
- What can be done?
 - Setting a default locale
 - Setting an instance hostname
 - Generating instance SSH private keys
 - Adding SSH keys to a user's `.ssh/authorized_keys` so they can log in
 - Setting up ephemeral mount points
 - Configuring network devices
 - Adding users and groups
 - Adding files
- Docs: <http://cloudinit.readthedocs.io/en/latest/>

- Cloud-init is available in Linux VMs and might be supported in other OS
- Not all VIMs support cloud-init via a metadata server
- While cloud-init is supported in OSM, it is not a silver bullet

NS diagram

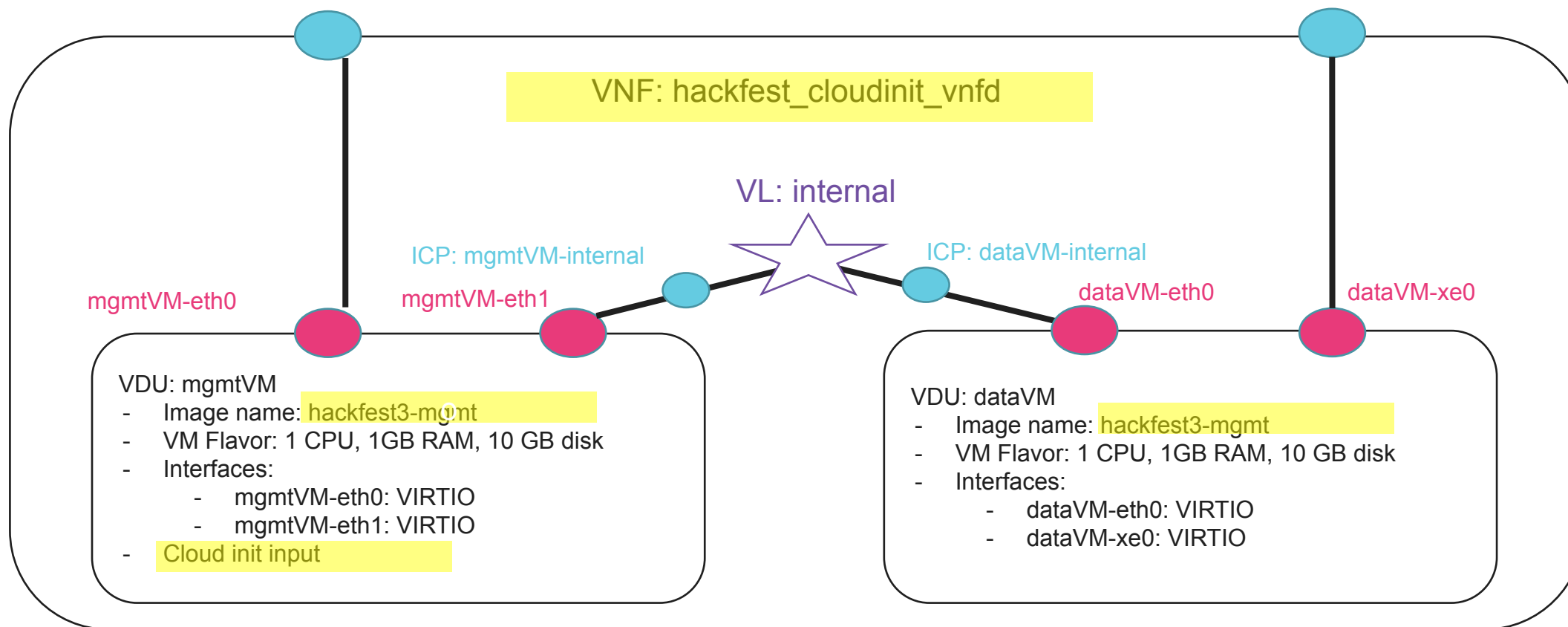


VNF diagram

Changes highlighted in yellow

External Connection point: vnf-mgmt

External Connection point: vnf-data



Prepare the environment

- Get devops tools:

git clone <https://osm.etsi.org/gerrit/osm/devops.git>

- Install python-osm-im:

```
curl "https://osm-download.etsi.org/repository/osm/debian/ReleaseSIX/OSM%20ETSI%20Release%20Key.gpg" |  
sudo apt-key add -  
sudo apt-get update && sudo add-apt-repository -y "deb [arch=amd64]  
https://osm-download.etsi.org/repository/osm/debian/ReleaseSIX stable IM osmclient devops"  
sudo apt-get update  
sudo apt-get install -y python-osm-im  
sudo -H pip install pyangbind
```

- Get reference packages:

- https://osm-download.etsi.org/ftp/osm-6.0-six/8th-hackfest/packages/hackfest_cloudinit_vnf.tar.gz
- https://osm-download.etsi.org/ftp/osm-6.0-six/8th-hackfest/packages/hackfest_cloudinit_ns.tar.gz

Creating the new CloudInit VNF (1/5)

- Use the tool to create a new VNFD called "hackfest_cloudinit_vnfd":
`devops/descriptor-packages/tools/generate_descriptor_pkg.sh -t vnfd --image hackfest3-mgmt -c hackfest_cloudinit`
- Descriptor located at
`hackfest_cloudinit_vnfd/hackfest_cloudinit_vnfd.yaml`
- 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 CloudInit VNF (2/5)

- Add VDU1 in the VNF
 - Name: mgmtVM
 - Image: hackfest3-mgmt
 - 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 CloudInit VNF (3/5)

- Add VDU2 in the VNF
 - Name: dataVM
 - Image: hackfest3-mgmt
 - 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-eth0
  position: '1'
  type: INTERNAL
  virtual-interface:
    type: VIRTIO
  internal-connection-point-ref: dataVM-internal
- name: dataVM-xe0
  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 CloudInit VNF (4/5)

- Download cloud-init file:
 - <https://osm-download.etsi.org/ftp/osm-6.0-six/8th-hackfest/other/cloud-config.txt>
- Modify VDU mgmtVM in VNFD:
 - cloud-init-file: cloud-config.txt
- Add cloud-init file to hackfest_cloudinit_vnfd/cloud_init folder

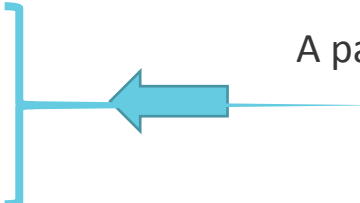
Let's explore the Cloud-init file

- Content:

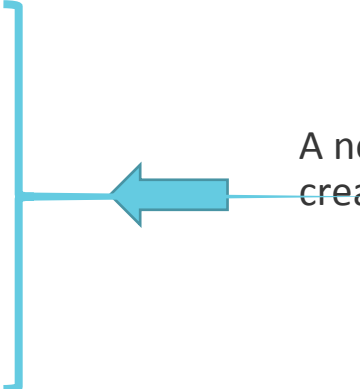
```
#cloud-config
password: osm4u
chpasswd: { expire: False }
ssh_pwauth: True
```

```
write_files:
-   content: |
        # My new helloworld file

    owner: root:root
    permissions: '0644'
    path: /root/helloworld.txt
```



A password is added for the default user ('ubuntu').



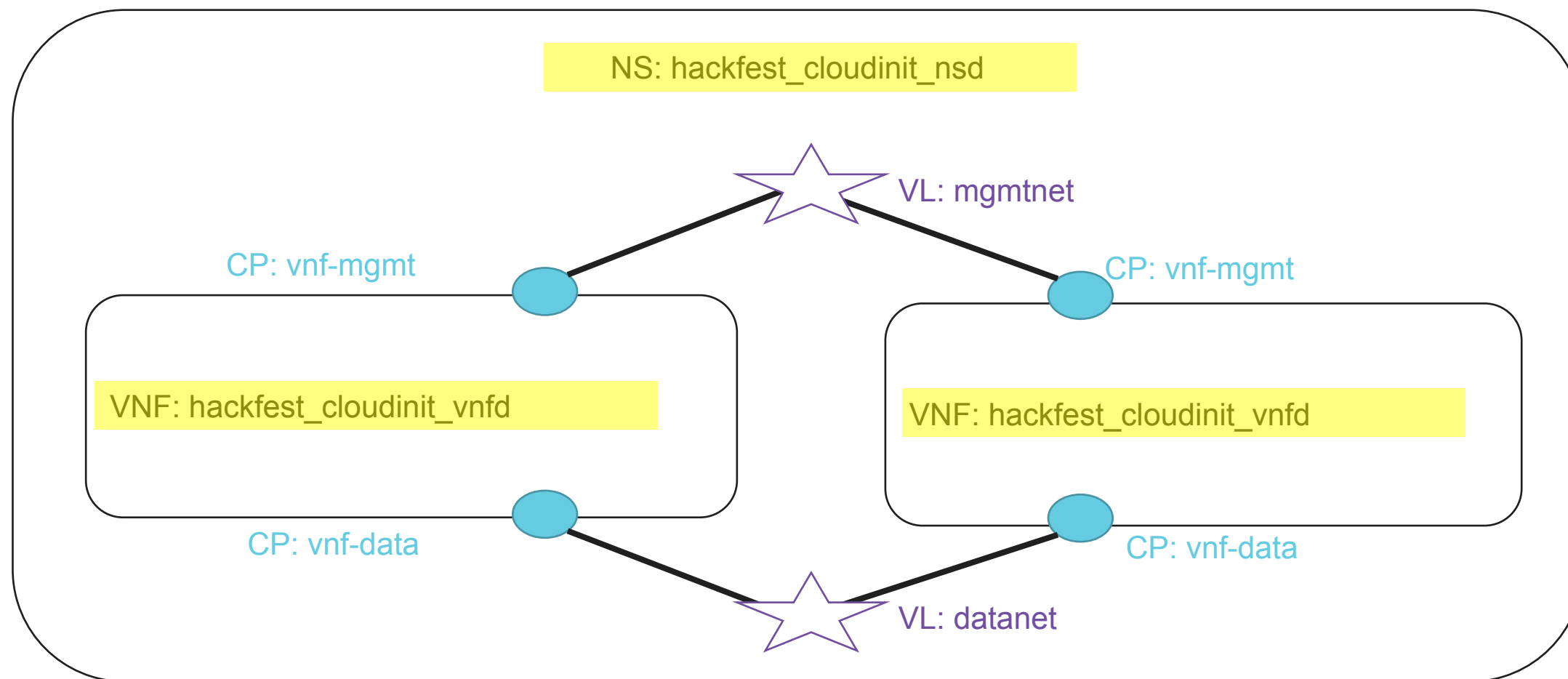
A new file '/root/helloworld.txt' will be created at VM creation to illustrate the way this feature works.

Creating the new CloudInit VNF (5/5)

- Validate your descriptor using the tool:
`devops/descriptor-packages/tools/validate_descriptor.py`
`hackfest_cloudinit_vnfd/hackfest_cloudinit_vnfd.yaml`
- Generate VNF package:
`devops/descriptor-packages/tools/generate_descriptor_pkg.sh -t vnfd -N`
`hackfest_cloudinit_vnfd`

NS diagram

Changes highlighted in yellow



Creating the NS (1/3)

- Use the tool to create a new NSD called "hackfest_cloudinit_nsd":
`devops/descriptor-packages/tools/generate_descriptor_pkg.sh -t nsd -c hackfest_cloudinit`
- The descriptor is located at
`hackfest_cloudinit_nsd/hackfest_cloudinit_nsd.yaml`
- Specify constituent VNFs:
 constituent-vnfd:
 - vnfd-id-ref: hackfest_cloudinit-vnf
 member-vnf-index: '1'
 - vnfd-id-ref: hackfest_cloudinit-vnf
 member-vnf-index: '2'

Creating the NS (1/3)

- Add first VLD:
 - id: mgmtnet
 - name: mgmtnet
 - short-name: mgmtnet
 - type: ELAN
 - mgmt-network: 'true'
 - vim-network-name: **PUBLIC**
 - vnfd-connection-point-ref:
 - vnfd-id-ref: hackfest_cloudinit-vnf
 - member-vnf-index-ref: '1'
 - vnfd-connection-point-ref: vnf-mgmt
 - vnfd-id-ref: hackfest_cloudinit-vnf
 - member-vnf-index-ref: '2'
 - vnfd-connection-point-ref: vnf-mgmt

Creating the NS (2/3)

- Add second VLD:
 - id: datanet
 - name: datanet
 - short-name: datanet
 - type: ELAN
 - vnfd-connection-point-ref:
 - vnfd-id-ref: hackfest_cloudinit-vnf
 - member-vnf-index-ref: '1'
 - vnfd-connection-point-ref: vnf-data
 - vnfd-id-ref: hackfest_cloudinit-vnf
 - member-vnf-index-ref: '2'
 - vnfd-connection-point-ref: vnf-data

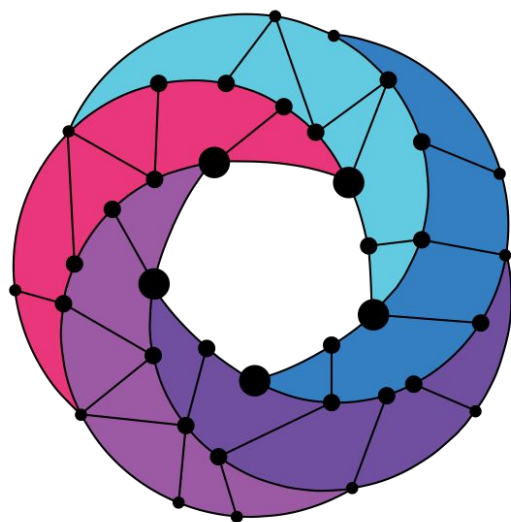
Creating the NSD (3/3)

- Validate your descriptor using the tool:
`devops/descriptor-packages/tools/validate_descriptor.py`
`hackfest_cloudinit_nsd/hackfest_cloudinit_nsd.yaml`
- Generate NS package:
`devops/descriptor-packages/tools/generate_descriptor_pkg.sh -t nsd -N`
`hackfest_cloudinit_nsd`

Deploying NS in the UI

- Onboard the VNFD and NSD
- Select hackfest_cloudinit_nsd and instantiate it
- Complete the form
 - Add a name to the NS
 - Select the Datacenter where the NS will be deployed
 - Add SSH key
- Go to the dashboard to see the instance and get the mgmt IP address of the VNF
- Connect to each VNF:
 - `ssh ubuntu@<IP>`
- Check that the cloud-config file was executed

- Get reference packages:
 - https://osm-download.etsi.org/ftp/osm-6.0-six/8th-hackfest/packages/hackfest_cloudinit_vnf.tar.gz
 - https://osm-download.etsi.org/ftp/osm-6.0-six/8th-hackfest/packages/hackfest_cloudinit_ns.tar.gz



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