OSM#10 Hackfest – Day 4
Session 3a. Modeling CNFs with helm charts

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Session topics

- **CNF package**
  - Create a skeleton
  - Modify descriptor
  - Validate and build
  - Onboard

- **NS package**
  - Create a skeleton
  - Modify descriptor
  - Validate and build
  - Onboard

- **LCM**
  - Making OSM aware of the helm chart repo
  - Instantiate
  - Upgrade and rollback
  - Terminate
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CNF package
CNF structure
The CNF consists of a single KDU (a helm chart)

- **NF:** openldap_knf
  - **KDU:** ldap
    - Helm-chart: stable/openldap:1.2.3

**External CP:** mgmt
CNF structure
K8s cluster requirements: a single network

Net 1: mgmtnet
External CP: mgmt
NF: openldap_knf

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CNF package
Create skeleton and modify descriptor

• Our CNF: an LDAP server based on openldap helm chart
  • Stable helm chart repo: https://charts.helm.sh/stable

• Create skeleton

  osm package-create vnf openldap

• Modify descriptor (copy it from shared folder)

  cp /home/ubuntu/examples/hd4/openldap_vnfd.yaml openldap_vnf/
CNF descriptor

```yaml
vnfd-catalog:
  schema-version: '3.0'
vnfd:
  - id: openldap_knf
    name: openldap_knf
    short-name: openldap_knf
    description: KNF with single KDU using a helm-chart for openldap version 1.2.3
    vendor: Telefonica
    version: '1.0'
    mgmt-interface:
      cp: mgmt
    connection-point:
      - name: mgmt
      k8s-cluster:
        nets:
        - id: mgmtnet
          external-connection-point-ref: mgmt
      kdu:
        - name: ldap
          helm-chart: stable/openldap:1.2.3
```

K8s cluster requirements: 1 network to expose services

One KDU based on helm chart magma/orc8r (repo:magma)
CNF package
Validate, build and onboard

- **Validate**
  
  `osm package-validate openldap_vnf`

- **Build**
  
  `osm package-build openldap_vnf`

- **Onboard**
  
  `osm nfpkg-create openldap_vnf.tar.gz`
NS package
NS structure

NS: fb_magma_ns

CP: nsd_cp_mgmt

VL: mgmtnet

NF: fb_magma_knf
NS package
Create skeleton and modify descriptor

• Our NS: a simple NS with 1 CNF and 1 VLD

• Create skeleton

    osm package-create ns openldap

• Modify descriptor (copy it from shared folder)

    cp /home/ubuntu/examples/hd4/openldap_nsd.yaml openldap_ns/
NS descriptor

```yaml
nsd-catalog:
  nsd:
    - id: openldap_ns
      name: openldap_ns
      short-name: openldap_ns
      description: NS consisting of a single KNF openldap_knf connected to mgmt network
      vendor: OSM
      version: '1.0'
      logo: osm.png
  constituent-vnfd:
    - member-vnf-index: openldap
      vnfd-id-ref: openldap_knf
  vld:
    - id: mgmtnet
      name: mgmtnet
      type: ELAN
      mgmt-network: 'true'
      vnfd-connection-point-ref:
        - member-vnf-index-ref: openldap
          vnfd-id-ref: openldap_knf
          vnfd-connection-point-ref: mgmt
```

One CNF: openldap_knf

One VL where the CNF will expose its services
• Instead of using 3 commands, we will use only one

```sh
osm nspkg-create openldap_ns
```
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Life Cycle Mgmt (LCM) of the NS
Adding a helm-chart repo

• We don’t need to add a repo because the stable helm chart repo is added by default

• Example:

```bash
osm repo-add --type helm-chart \
    --description "Bitnami helm chart repo" \
    bitnami "https://charts.bitnami.com/bitnami"
```
Instantiate

- Launch the NS
  
  ```
  osm ns-create --ns_name ldap --nsd_name openldap_ns \ 
  --vim_account osm_hackfest_XX
  ```

- Check status of NS in OSM (READY)
  
  ```
  osm ns-list
  ```
Checking status of the KDU instance

- Once ready, get the details of the KDU

```bash
osm vnf-list --ns ldap
VNF_ID=`osm vnf-list --ns ldap |grep ldap |awk '{print $2}'`
osm vnf-show $VNF_ID --kdu ldap
```

- You can also check the status of the deployment in K8s (one namespace per OSM project):

```bash
osm project-list
PROJECT_ID=`osm project-list|grep $OSM_PROJECT|awk '{print $4}'`
kubectl -n $PROJECT_ID --kubeconfig ~/kube.yaml get all
```
Upgrade

- Upgrade your KDU to use 2 replicas

```
osm ns-action ldap --vnf_name openldap --kdu_name ldap \\--action_name upgrade --params '{"replicaCount": "2"}'
osm ns-op-list ldap
```
Rollback

- Rollback to the previous state

```
osm ns-action ldap --vnf_name openldap --kdu_name ldap --action_name rollback
osm ns-op-list ldap
```
Terminate

• Delete the NS

```
osm ns-delete magma_orc8r
osm ns-list```

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More information

- **User Guide - Using Kubernetes-based VNFs**
- **VNF Onboarding Guidelines - KNF walkthrough**
- **OSM Client Reference Guide - Package creation tools**

5.6. Using Kubernetes-based VNFs (KNFs)

From Release SEVEN, OSM supports Kubernetes-based Network Functions (KNFs). This feature unlocks more than 20,000 packages that can be deployed based on VNFs and KNFs. This section guides you to deploy your first KNF, from the installation of multiple ways of Kubernetes clusters until the selection of the package and deployment.

5.6.1. Kubernetes installation

KNF feature requires an operative Kubernetes cluster. There are several ways to have that Kubernetes running. From the cluster is not an isolated element, but it is a technology that enables the deployment of microservices in a cloud-native way, facilitate the connection to the infrastructure, the cluster have to be associated to a VM. There is an especial case where the backbone environment without the management of the networking part but in general, OSM consider that the Kubernetes cluster is a VM.

For OSM you can use one of these different ways to install your Kubernetes cluster:

1. OSM Kubernetes cluster Network Service
2. Self-managed Kubernetes cluster in a VM
3. Kubernetes/baremetal installation

5.6.2. OSM Kubernetes requirements

After the Kubernetes installation is completed, you need to check if you have the following components in your cluster:

1. Kubernetes LoadBalancer: to expose your KNFs to the network
2. Kubernetes default storageclass: to support persistent volumes.

5.6.3. Adding kubernetes cluster to OSM

In order to test Kubernetes-based VNF (KNF), you require a K8s cluster connected to a network in the VM (e.g., .net). If installation of Kubernetes, you will need to add a VM in order to add the Kubernetes cluster.

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