OSM#10 Hackfest – Day 2
Session 5. K8s support in OSM

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Why K8s in OSM?

- Applications based in micro-services
  - OSM is, in fact, already running in K8s, both distros and community installer

- NFV use cases: 5G Core, uCPE/SD-WAN...

- K8s apps and clusters are essential ingredients for many Edge use cases
How K8s-based apps are modelled today

- K8s provides a huge number of high-level service objects, which are the core of its functionality:
  - Pod sets: deployments (+replicasets), statefulsets
  - Services: clusterIP, NodePort, LoadBalancer
  - Storage: persistent volumes, persistent volume claims
- Those high-level objects are modelled with K8s manifest files in YAML format
- TWO packaged formats to deploy a K8s app:
  - **Helm charts**: indirect call to the K8s API via helm
  - **Juju charms and bundles**: indirect call to the K8s API via Juju
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Requirements of K8s-based apps: a K8s cluster

• The K8s cluster:
  • Can be created in different ways:
    • Standalone: Openshift, Charmed K8s, Ericsson CCD, etc.
    • As part of a VIM: VMware Cloud PKS, AWS, etc.
  • Can run on Bare Metal or on VMs running in a VIM
  • Once created, each cluster provides a K8s API, irrespective of the way it was created.

• Specific versions of K8s or CNI plugins might be required
K8s support in OSM
From K8s apps to xNF
Model-driven (like everything in OSM)

• NF composition specified in the VNF descriptor
  • Deployment Units:
    • Virtual (VDU) = VM
    • Physical (PDU) = Physical Node
    • Kubernetes (KDU) = K8s app

• Modelling in the VNF descriptor:
  • KDU based on helm charts or juju bundles

```yaml
---
  kdu: name
    description: string
    kdu-model:
      helm-chart: string
      juju-bundle: string
```

• K8s cluster requirements:

```yaml
---
  k8s-cluster:
    version: string
    cni: enumeration
    networks:
      id: string
      external-connection-point-ref: "../connection-point/name"
```
Two steps are considered in OSM

**STEP #1. CREATION OF THE K8S CLUSTER**

**OPTIONS:**

1. **By an external platform, static**
   - Cluster is then registered into OSM administratively

2. **By using an external platform API either in public cloud (Azure, Google, AWS) or in the private cloud**

3. **Created by OSM as a regular NS**
   
   Not yet part of OSM

**STEP #2. USE OF THE K8S CLUSTER**

- **The full catalog of K8s objects is entirely incorporated in a future-proof manner:**
  - **Helm charts:** +20,000 stable applications are already available for production
  - **Juju bundles:** fairly powerful for inter-object configurations

- **OSM also supports hybrid cases,** which are required for real VNFs (e.g. 5G Core)

Ready since Release SEVEN!
OSM NBI abstracts the operations required to manage the life cycle of KDU in the context of a NS

OSM operations:
- NS instantiate
- NS primitive
- NS termination

Full K8s app lifecycle operations:
- install
- upgrade
- rollback
- delete
Step 1. How to create a K8s cluster

Cluster creation using OSM packages
Friendly reminder: not a hands-on session

PLEASE DO NOT DEPLOY A KUBERNETES CLUSTER IN ETSI VIM!
(WE ALREADY CREATED ONE FOR YOU)
How to install a K8s cluster

You can follow this guide: https://osm.etsi.org/docs/user-guide/15-k8s-installation.html
How to install a K8s cluster using OSM packages

Jujumachine VNF
K8s machine
K8s installer based on Juju

NS

Jujumachine VNF
K8s machine
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Jujumachine VNF
K8s machine
How to install a K8s cluster using OSM packages

```
osm nfpkg-create k8s_jujumachine_vnf.tar.gz
osm nfpkg-create k8s_jujucontroller_vnf.tar.gz
osm nspkg-create k8s_juju_ns.tar.gz
osm ns-create --ns_name k8s-cluster \
  --nsd_name k8s_juju \
  --vim_account <VIM_ID> \
  --config_file config.yaml \
  --ssh_keys ${HOME}/.ssh/id_rsa.pub
```
Final warning!

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