OSM-MR#10 Hackfest – Day 2
Session 3. 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
From K8s apps to xNF
Model-driven (like everything in OSM)

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

```
+--rw kdu:kdu* [name]
   |   +--rw kdu:name      string
   |   +--rw kdu:description? string
   |   +--rw (kdu:kdu-model)?
   |       |   +--:(kdu:helm-chart)
   |       |       |   +--rw kdu:helm-chart? string
   |       |       +--:(kdu:juju-bundle)
   |       |       |   +--rw kdu:juju-bundle? string
   |   +--rw kdu:k8s-cluster
   |       |   +--rw kdu:version* string
   |       |   +--rw kdu:cni* enumeration
   |       |   +--rw kdu:nets* [id]
   |       |       +--rw kdu:id string
   |   +--rw ext-cpd* [id]
   |       |   +--rw (cp-connection)?
   |       |       |   +--:(kdu:k8s-cluster-net)
```

• K8s cluster requirements

• Linking cluster networks to external connection points
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 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
Cluster creation using OSM packages

Step 1. How to create a K8s cluster

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

PLEASE DO NOT DEPLOY A KUBERNETES CLUSTER IN ETSI VIM!
(WE ALREADY CREATED ONE FOR YOU)