OSM#9 Hackfest – Day 2
Part 1. 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

• Upcoming 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
  - ...

- TWO ways to deploy a K8s app:
  - **Helm charts**: packaged format + indirect call to the K8s API via helm
  - **Juju charms and bundles**: packaged format + indirect call to the K8s API via Juju

(*) The concept “pod set” is not part of K8s terminology, but has been used here for convenience
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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

```
---ro kdu [name]
  | ---ro name     string
  | ---ro description? string
  | ---ro (kdu-model):
  |   | ---ro helm-chart? string
  |   | ---ro juju-bundle? string
```

- K8s cluster requirements:

```
+++ro k8s-cluster
  | +++ro version? string
  | +++ro cni? enumeration
  | +++ro nets? [id]
  |   | +++ro id string
  |   | +++ro 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 external standalone platform API**
   - Covered by plugin model (Rel EIGHT)
3. **By using “enriched” APIs in some VIMs**
   - Covered by plugin model (Rel EIGHT)
4. **Created by OSM as a regular NS**

### 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 in Release SEVEN!
Life cycle management of KDU is managed through OSM NBI

Full K8s app lifecycle operations:
- install
- upgrade
- rollback
- delete
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

```
osl nfpkg-create k8s_jujumachine_vnf.tar.gz
osl nfpkg-create k8s_jujucontroller_vnf.tar.gz
osl nspkg-create k8s_juju_ns.tar.gz
osl 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
```
How to install a K8s cluster using OSM packages

Jujumachine
VNF
K8s installer based on Juju

NS

Jujumachine VNF
K8s machine

Jujumachine VNF
K8s machine

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K8s machine

Jujumachine VNF
K8s machine