OSM-MR#9 Hackfest – Day 2
# Agenda for today (CET)

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>10am</td>
<td></td>
</tr>
<tr>
<td>11am</td>
<td>HD2.1 K8s support in OSM (Gerardo)</td>
</tr>
<tr>
<td>11:30am</td>
<td>HD2.2 Orchestrating CNFs in K8s (Gerardo)</td>
</tr>
<tr>
<td>12pm</td>
<td></td>
</tr>
<tr>
<td>1pm</td>
<td></td>
</tr>
<tr>
<td>2pm</td>
<td>HD2.3 Intro to OSM Primitives (David)</td>
</tr>
<tr>
<td>2:30pm</td>
<td>HD2.4 OSM Primitives for VNFs (I) (David)</td>
</tr>
<tr>
<td>3pm</td>
<td></td>
</tr>
<tr>
<td>4pm</td>
<td>HD 2.5 Intro to Juju Relations (David)</td>
</tr>
<tr>
<td>5pm</td>
<td>HD2.6 OSM Primitives for VNFs (II) (David)</td>
</tr>
<tr>
<td>6pm</td>
<td></td>
</tr>
</tbody>
</table>
Recap on the logistics and way of working

• Join us every day on **G2M**
  • [https://www.gotomeet.me/OSMhackfest](https://www.gotomeet.me/OSMhackfest)
  • Please enter your name & email
  • Use a **headset** and **mute** yourself during the sessions
  • Sessions are being recorded and will be posted on YouTube

• Ask questions any time on **Slack #hackfests** channel
  • Please create a dedicated thread for each issue

• Slides are made available in the **wiki**

• Resources spreadsheet can be found in this [link](#)
Comms & Social Media

• You can follow Open Source MANO and this hackfest on:
  • https://twitter.com/OpenSourceMANO
  • https://www.linkedin.com/company/open-source-manono
  • https://www.youtube.com/c/OpenSourceMANO

• Share your thoughts, impressions, pictures or screenshots on social media, blog posts...
  • Mentions are welcome!

@OpenSourceMANO #OSMMR9hackfest
Warning

• If you are an advanced user or you are reading this presentation in advance...

PLEASE DO NOT DEPLOY
A KUBERNETES CLUSTER IN THE VIM!
(WE WILL USE AN EXISTING ONE)
OSM-MR#9 Hackfest – Day 2
Session 1. K8s support in OSM

Gerardo García (Telefónica)
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 (+replicaset), statefulset
  • 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
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 (+replicaset), 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
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)?  
        +--helix-chart? string
        +--juju-bundle?  string
```

- K8s cluster requirements:

```
+--rw k8s-cluster
    +--rw version*  string
    +--rw cnl*      enumeration
    +--rw nets* [id]
        +--rw id string
        +--rw external-connection-point-ref? 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 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
How to create a K8s cluster

Cluster creation using OSM packages
PLEASE DO NOT DEPLOY
A KUBERNETES CLUSTER IN THE VIM!
(WE WILL USE AN EXISTING ONE)
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

Jujucontroller VNF
K8s installer based on Juju

NS

Jujumachine VNF
K8s machine

Jujumachine VNF
K8s machine

Jujumachine VNF
K8s machine

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

```bash
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!

PLEASE DO NOT DEPLOY A KUBERNETES CLUSTER IN THE VIM!

(WE WILL USE AN EXISTING ONE)
Open Source MANO

Find us at:

osm.etsi.org
osm.etsi.org/docs
osm.etsi.org/wikipub

© ETSI 2020