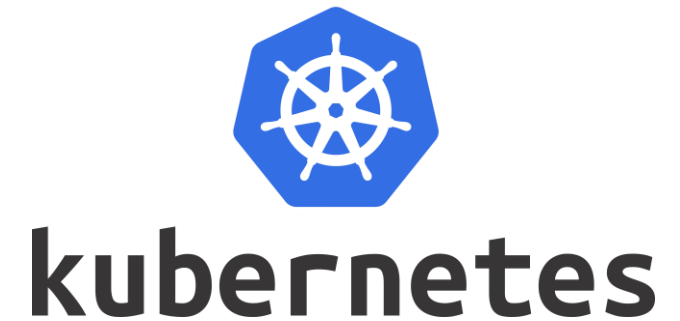# OSM-MR#10 Hackfest – Day 2
Session 3. K8s support in OSM
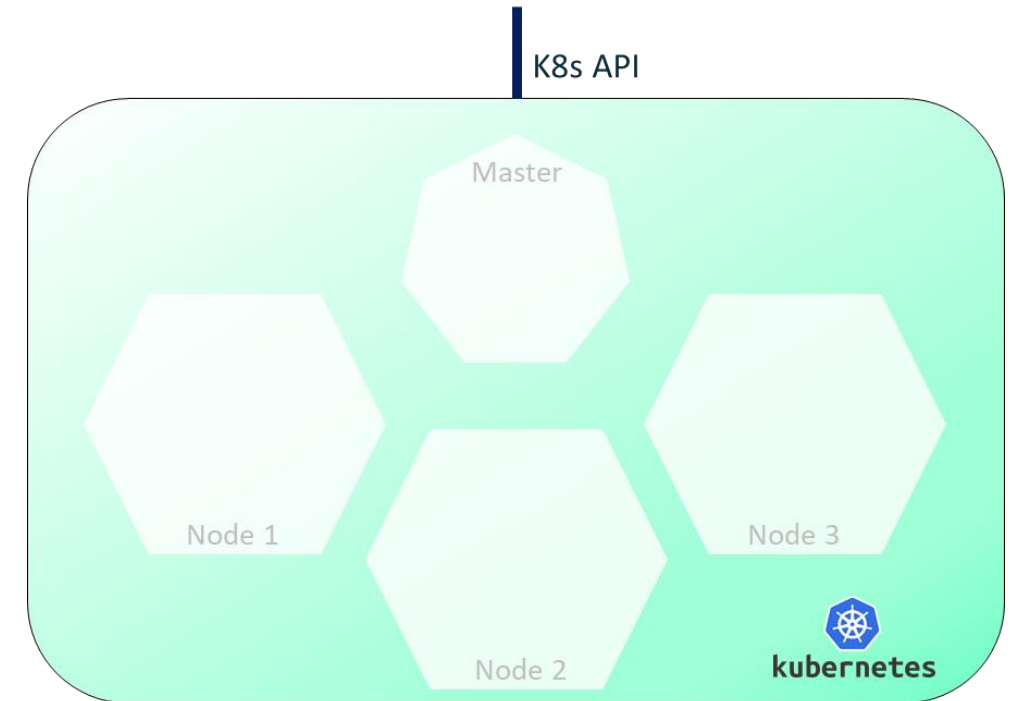
Gerardo García (Telefónica)

Why K8s in OSM?

- Applications based in micro-services
  - OSM is, in fact, already running in K8s, both [distros](#) and [community installer](#)

- 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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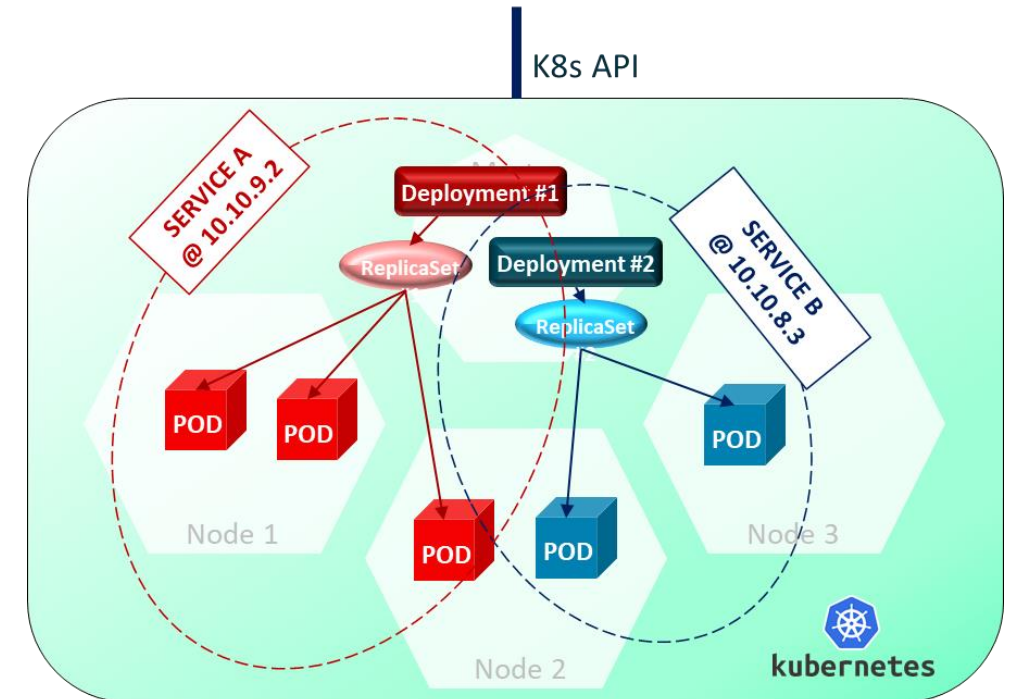
Requirements of K8s-based apps: a K8s cluster

- 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.

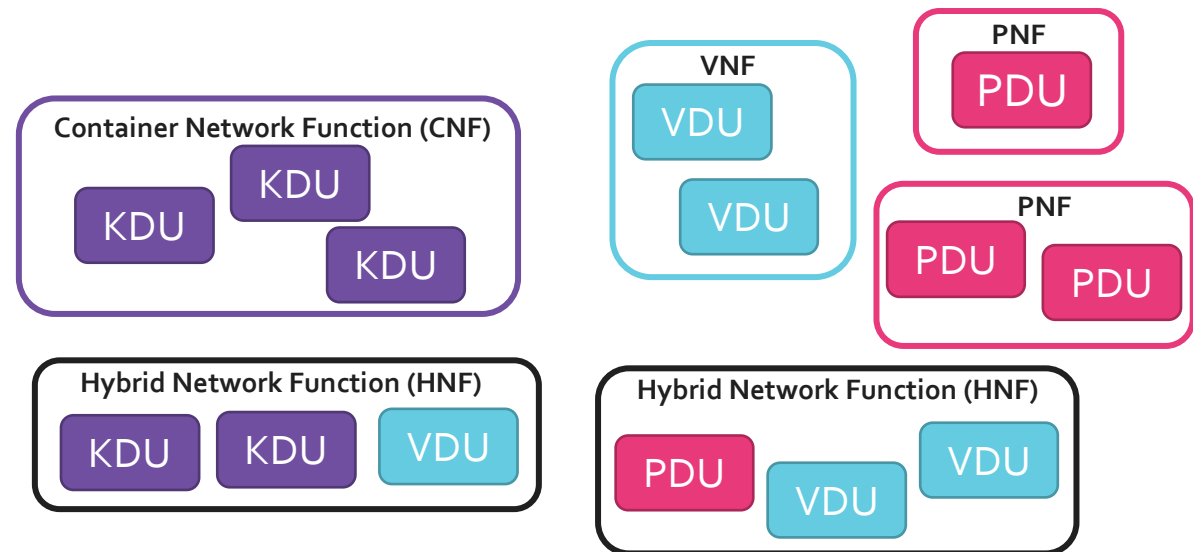- Specific versions of K8s or CNI plugins might be required
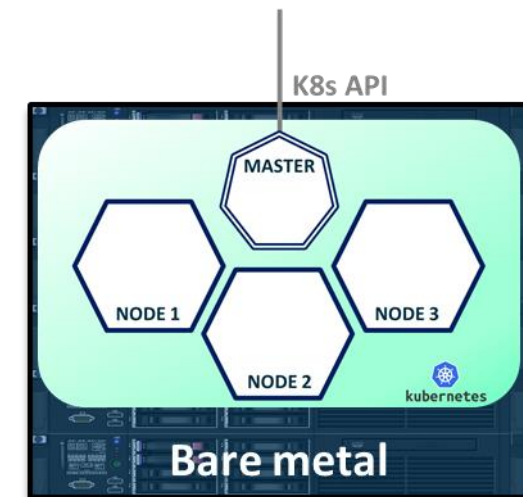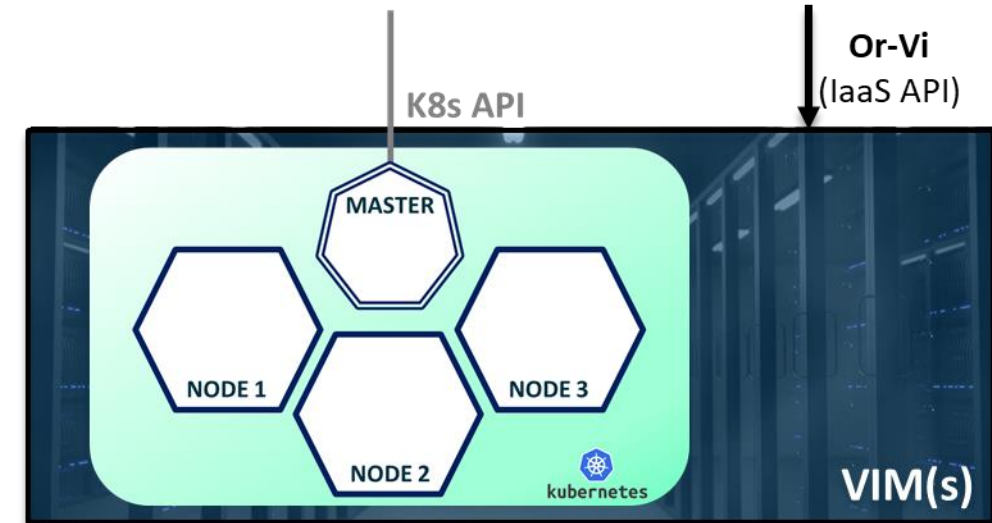
K8s support in OSM

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

```
+--rw kdu:kdu* [name]
    |  +--rw kdu:name                string
    |  +--rw kdu:description?         string
    |  +--rw (kdu:kdu-model)?
    |  |  +--:(kdu:helm-chart)
    |  |  |  +--rw kdu:helm-chart?    string
    |  |  |  +--rw kdu:helm-version?  enumeration
    |  |  +--:(kdu:juju-bundle)
    |  |     +--rw kdu:juju-bundle?   string
```

  - K8s cluster requirements

```
+--rw kdu:k8s-cluster
    |  +--rw kdu:version*   string
    |  +--rw kdu:cni*       enumeration
    |  +--rw kdu:nets* [id]
    |     +--rw kdu:id    string
```

  - Linking cluster networks to external connection points

```
+--rw ext-cpd* [id]
    |  +--rw (cp-connection)?
    |  |  +--:(kdu:k8s-cluster-net)
    |  |     +--rw kdu:k8s-cluster-net?      -> /vnfd:vnfd/kdu:k8s-cluster/nets/id
```

Two steps are considered in OSM

STEP #1. CREATION OF THE K8S CLUSTER	STEP #2. USE 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
	• ==**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!

NF Packages (VNF, PNF, HNF)

- Mgmt Procedures
- Resource Description
- **K8s Deployment Model(s)**
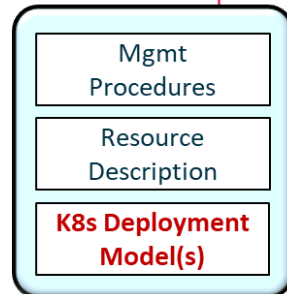
OSM NBI abstracts the operations required to manage the life cycle of KDU in the context of a NS

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

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

OSS/BSS

NF Packages (VNF, PNF, HNF)

NS Package

NBI

Mgmt Procedures

Resource Description

K8s Deployment Model(s)

Mgmt Procedures

Topology

Open S... MANU

Or-Vi (IaaS API)

K8s API

MASTER

NODE 1   NODE 2   NODE 3

kubernetes

NS instance

VIM(s)
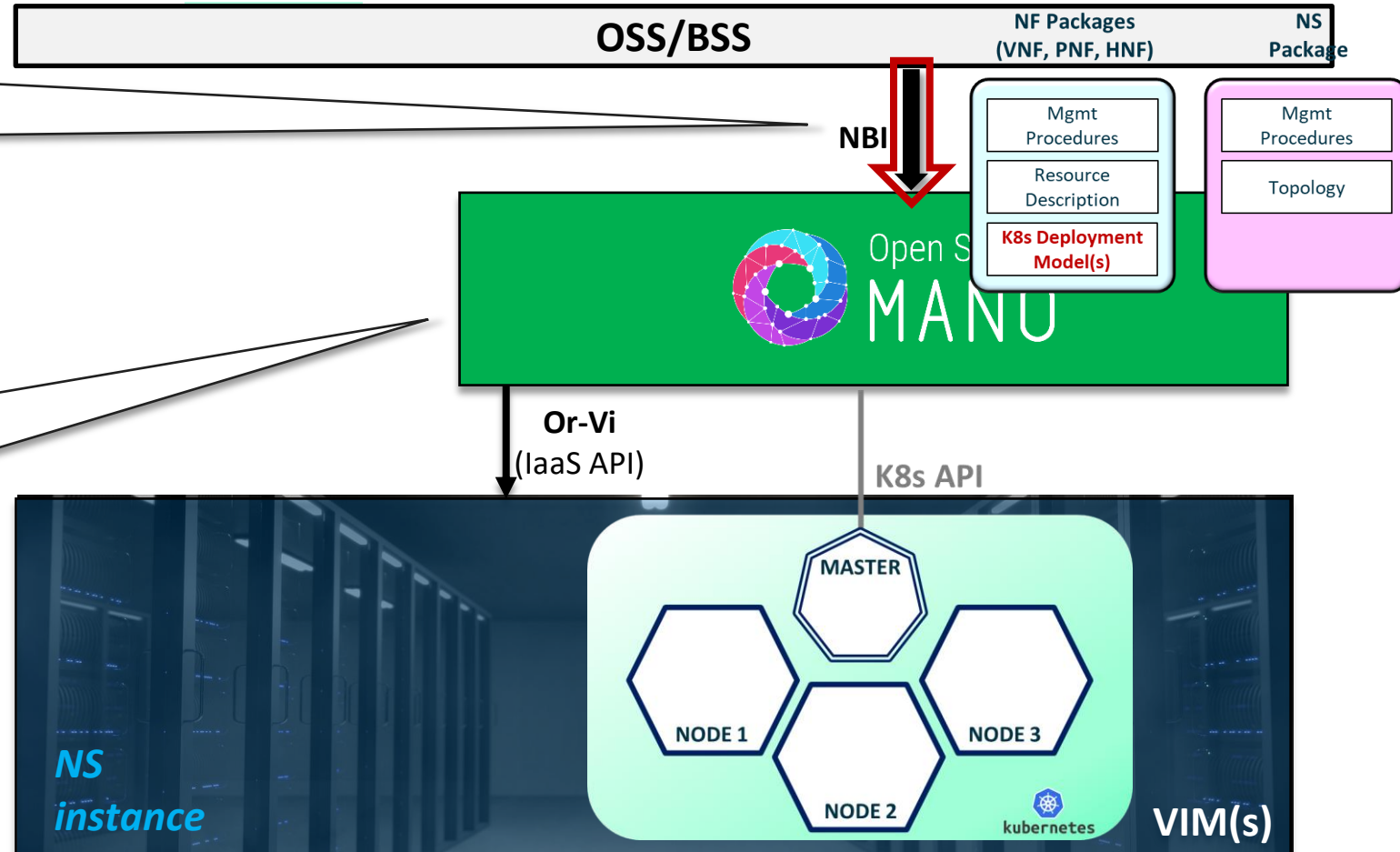
Open Source MANO

Step 1. How to create a K8s cluster
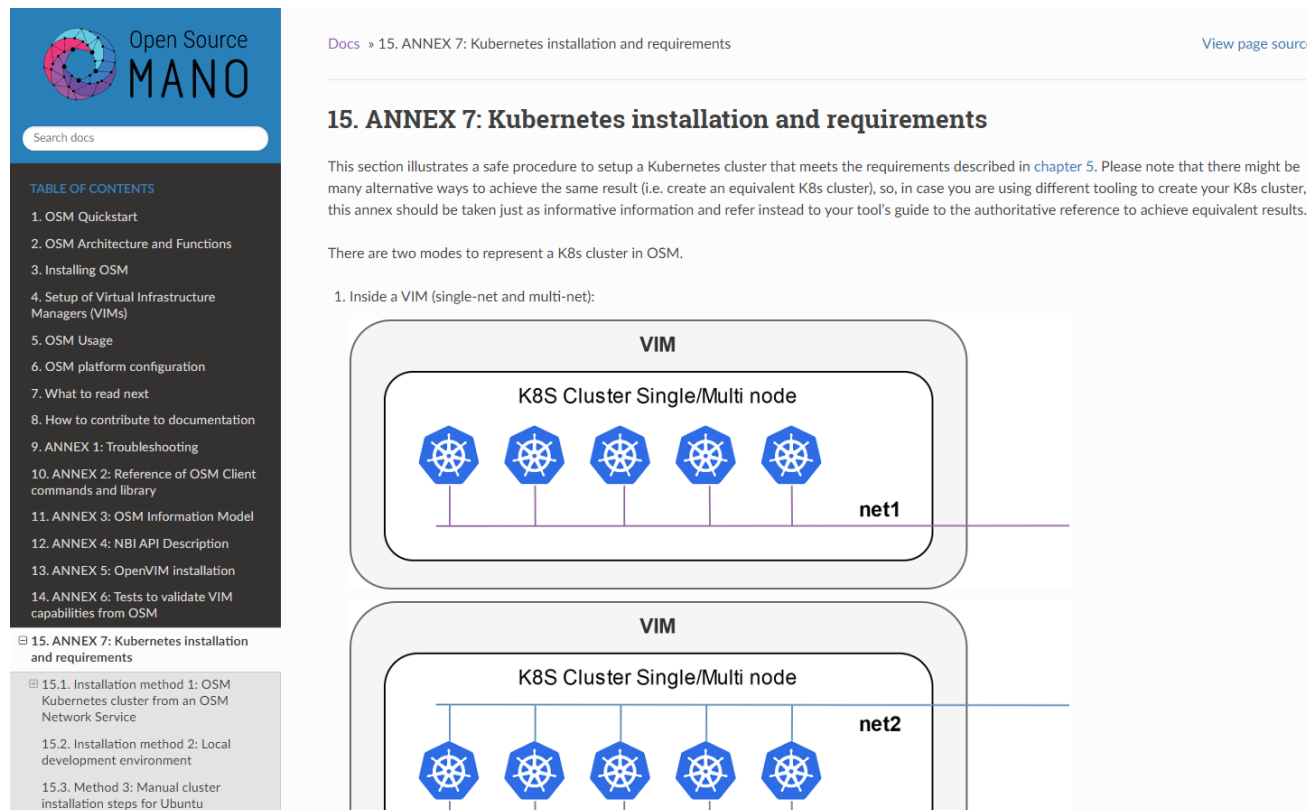
Cluster creation using OSM packages

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
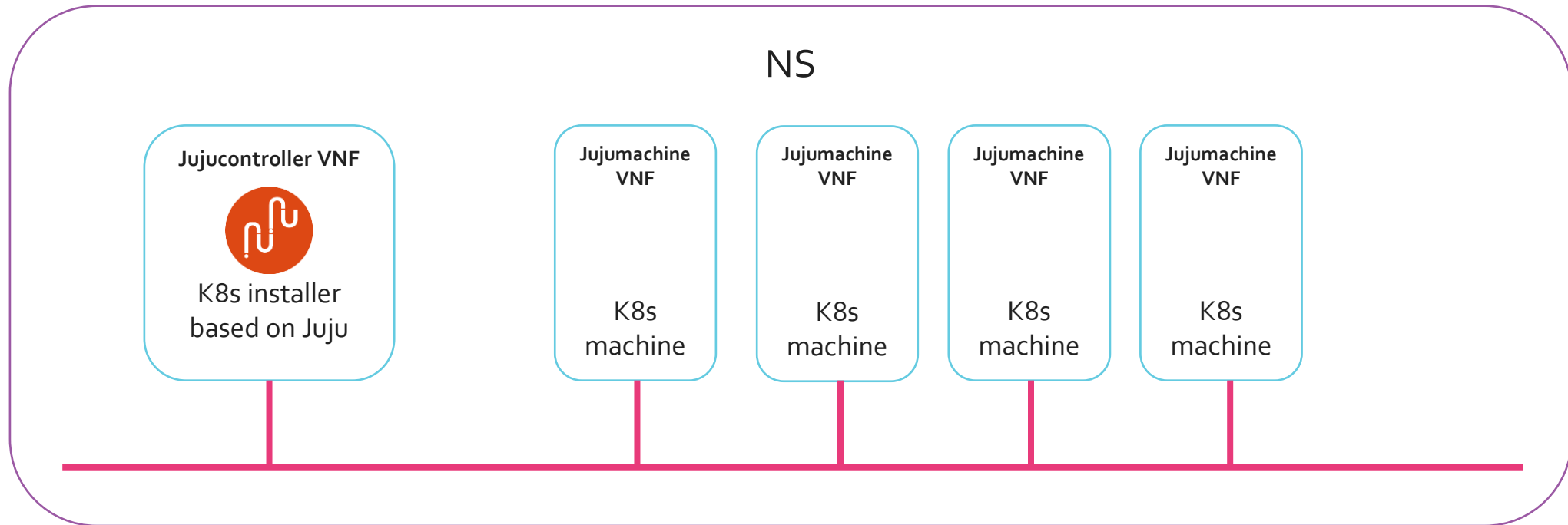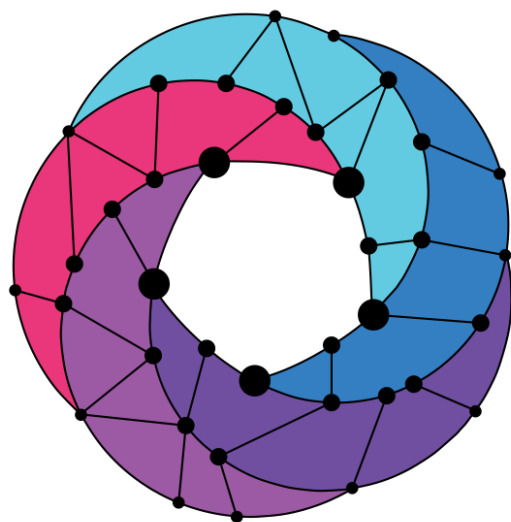
Friendly reminder: not a hands-on session

PLEASE DO NOT DEPLOY
A KUBERNETES CLUSTER IN ETSI VIM!

(WE ALREADY CREATED ONE FOR YOU)

Find us at:

osm.etsi.org
osm.etsi.org/docs/user-guide
opensourcemano.slack.com