



Virtual Infrastructure: VMs and Containers

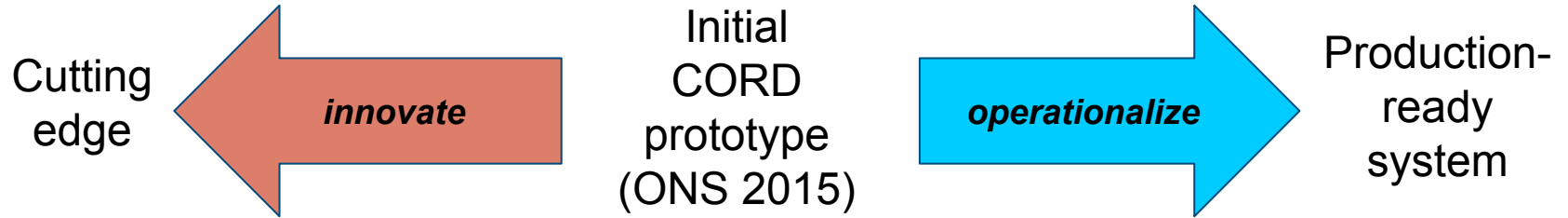
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ONF

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An Operator Led Consortium



CORD platform evolution



Container technology plays an important role

Container-based VNFs +
ONOS VTN overlay

Deploying, maintaining,
operating CORD
infrastructure services

Goals of this talk

- What containers and VMs are currently running on the CORD 4.0 head node and compute nodes?
- What plans does the community have for deploying and managing CORD infrastructure services using Kubernetes?
- What plans does the community have for using CORD to orchestrate VNFs on Kubernetes?
- How can I get involved with this work?



CORD 4.0 Management Plane

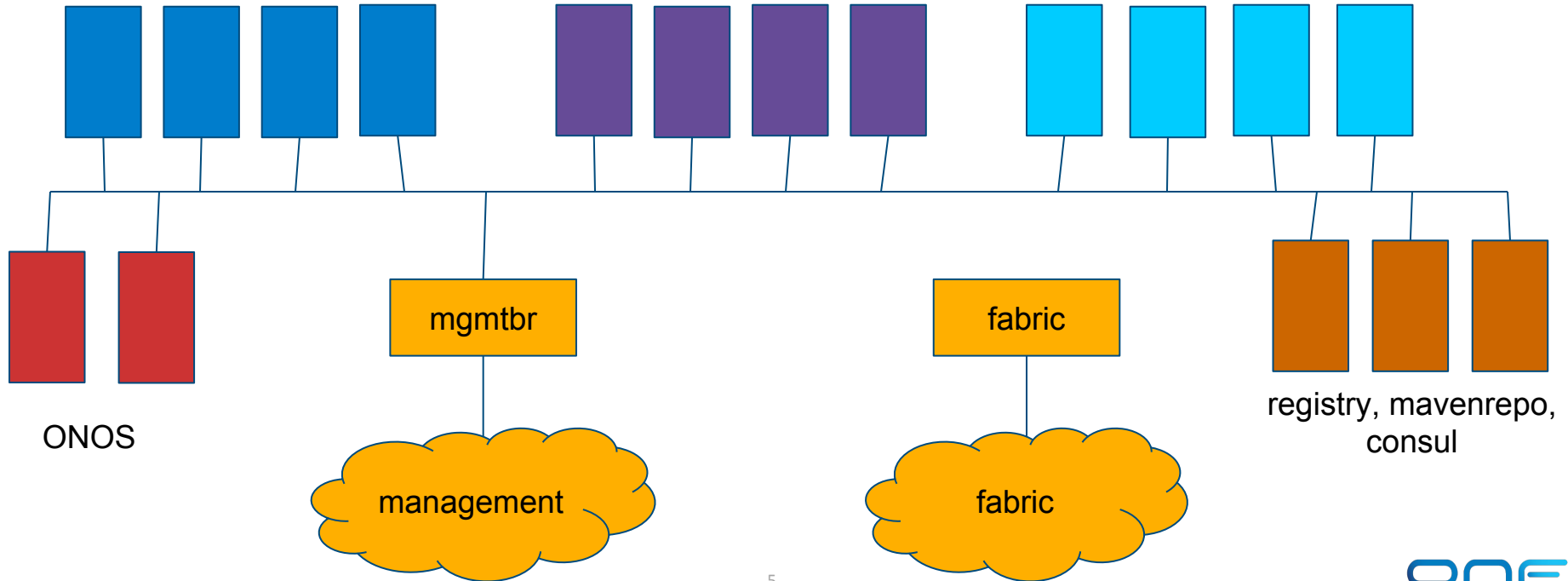
CORD 4.0 management plane

head node

XOS core and service synchronizers
~20 Docker containers (R-CORD)

OpenStack control services
11 LXC containers

MAAS automation services
6 Docker containers



CORD containers on the head node

Commands to inspect Docker containers on the head node:

XOS: `$ cd /opt/cord_profile; docker-compose -p rcord ps`

ONOS VTN: `$ cd /opt/onos_cord; docker-compose ps`

ONOS fabric: `$ cd /opt/onos_fabric; docker-compose ps`

MaaS: `$ cd /etc/maas; docker-compose -f automation-compose.yml ps`

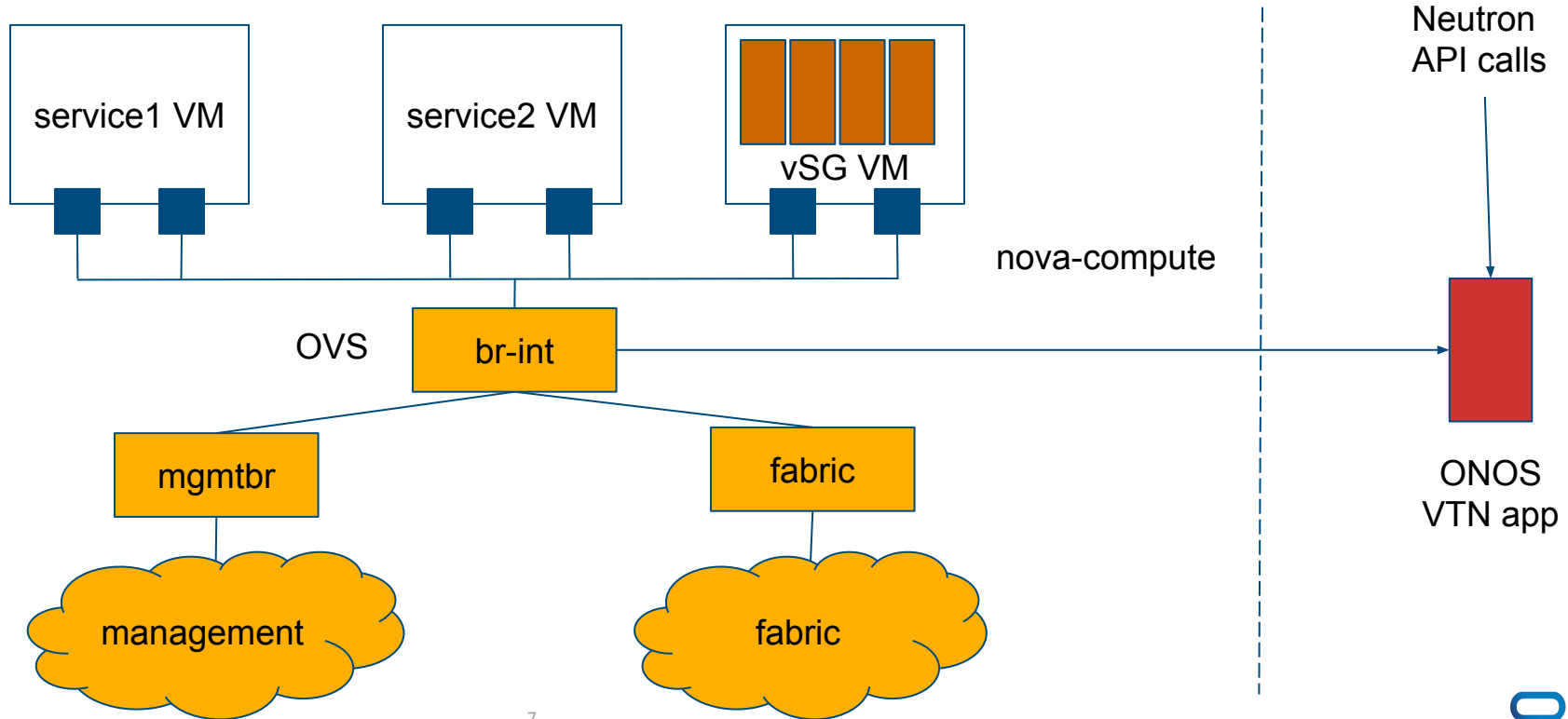
Docker registry: `$ cd /etc/maas; docker-compose -f registry-compose.yml ps`

OpenStack: `$ sudo lxc list`

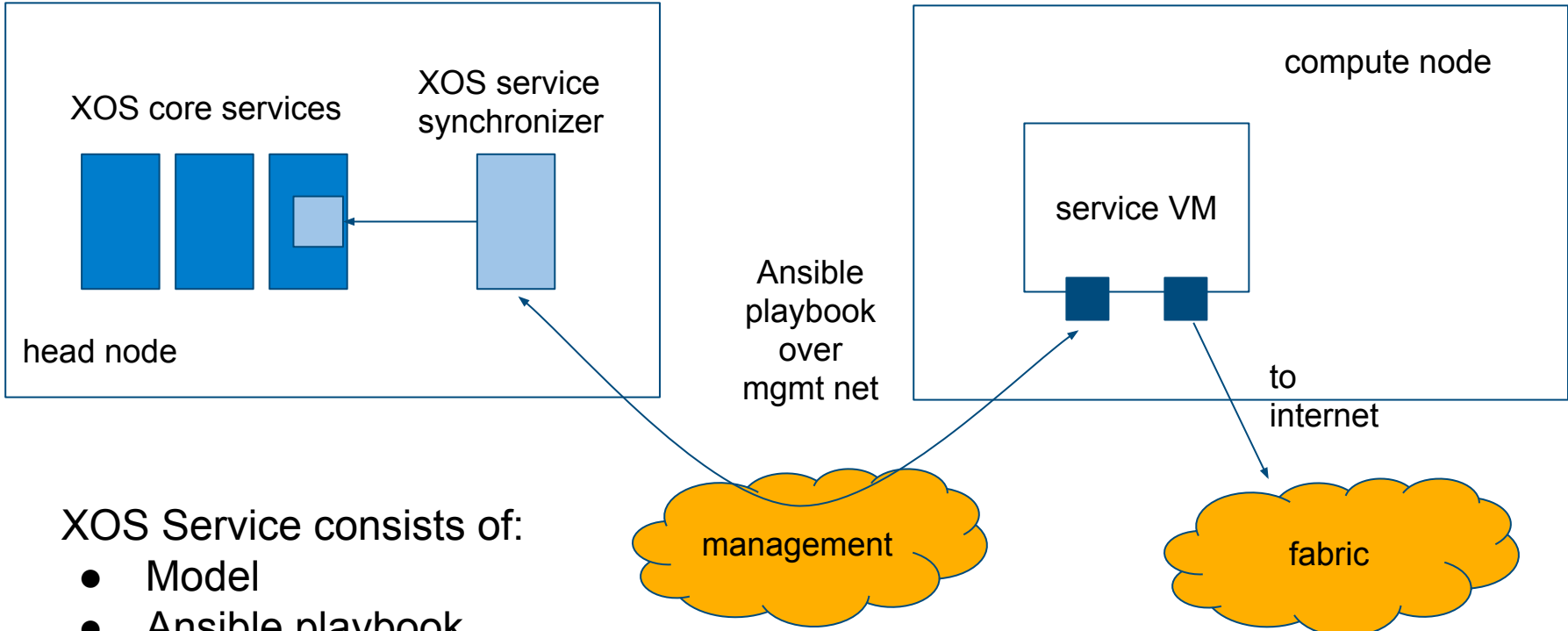
(Services not containerized: MaaS, Bind/DNS)

CORD 4.0 management plane

OpenStack compute node



CORD 4.0: XOS Service



XOS Service consists of:

- Model
- Ansible playbook

Kubernetes Container Orchestration

- Client-Server Architecture
 - Server provides, API, Controller and Scheduler
 - Client provides container management, metrics and service proxy
- Independent cluster state in ETCD key-value store
- Dynamic service composition (with Pods and services)
- Network access control (with CNI plugin)
- Distributed systems guarantees (availability, scalability, consistency)
- Lot more...

Kubernetes in CORD

- Infrastructure Orchestration (Eg: Openstack)
- VNF Orchestration
- Service Abstraction
- Hybrid Container-VM environment

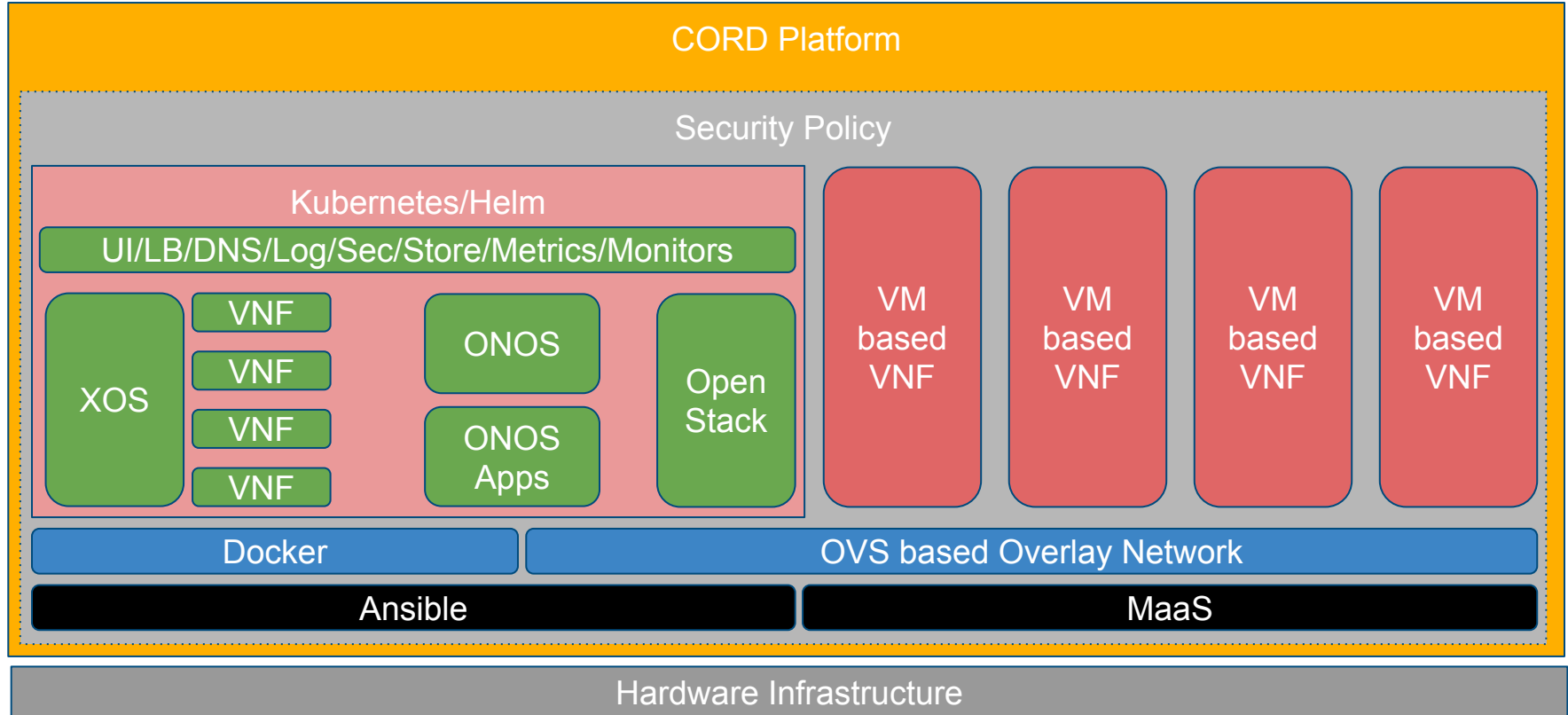


Infrastructure Orchestration

Infrastructure Orchestration update

- Collaboration with 99Cloud
- Ubuntu 16.04 with 4.4 kernel or later
- Kubernetes as an infrastructure component of CORD
- Openstack as containers orchestrated by kubernetes
- Using Kolla framework: <https://wiki.openstack.org/wiki/Kolla>

Deployment Architecture (in the near future)



Challenges

- Complex dependencies (OS, Kernel, Component versions)
- Complex integration (several infrastructure pieces)

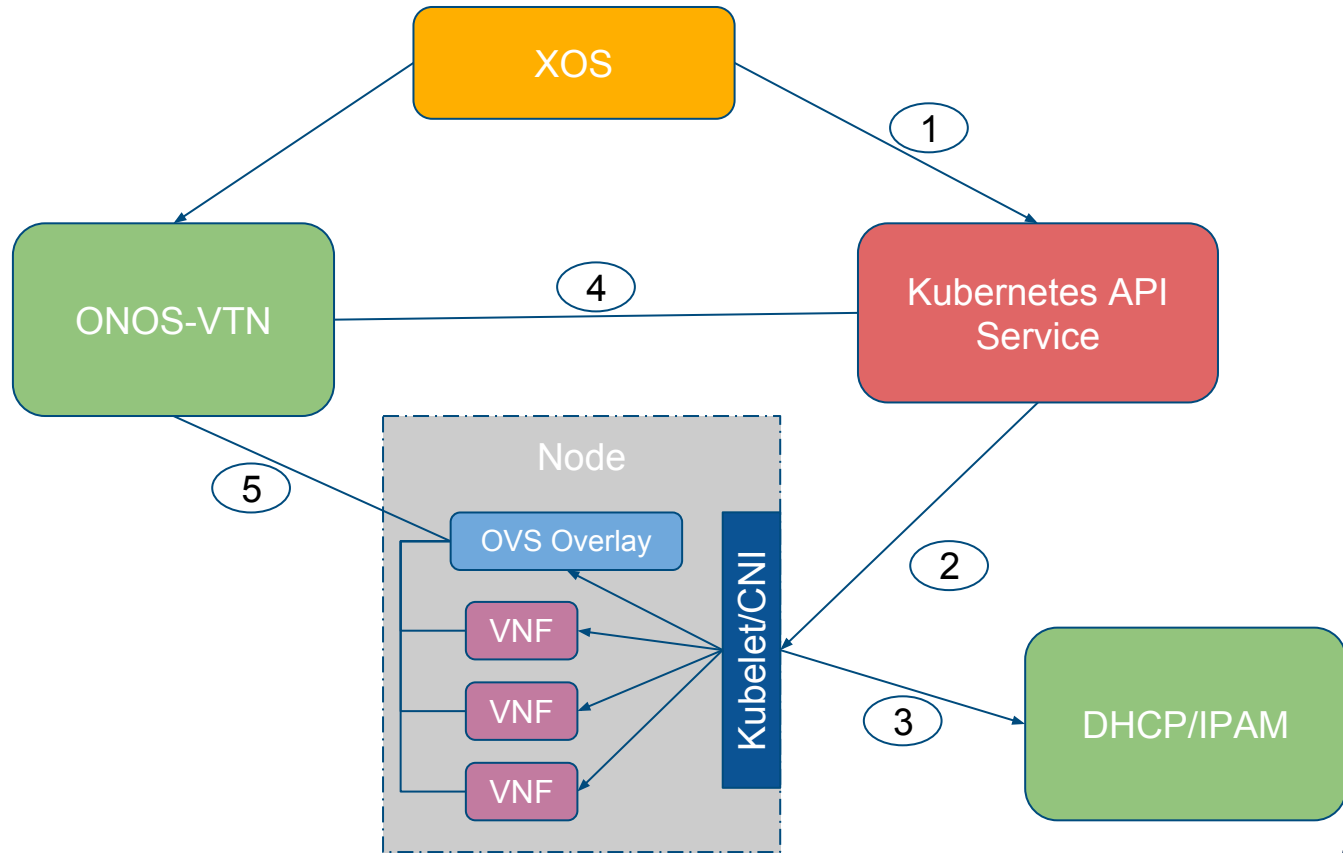


VNF Orchestration

VNF Orchestration status

- Collaboration with Linker Networks
- Pure OVS based Overlay network implementation
- ONOS-VTN control of Kubernetes OVS Overlay network

Overlay Network Architecture



Challenges

- Subnet distribution
- Independent IPAM and DHCP service
- Modifications to ONOS-VTN (use K8S API and delink with Neutron to use independent DHCP and IPAM services)
- Multiple OVS networks attached to PODS

Call to Arms!

- ISTIO based service abstraction and load balancing
- Kubernetes based orchestration of ONOS Apps and XOS
- Other openflow based networks for Kubernetes overlays and ONOS Overlays