

Open Source
MANO
by ETSI

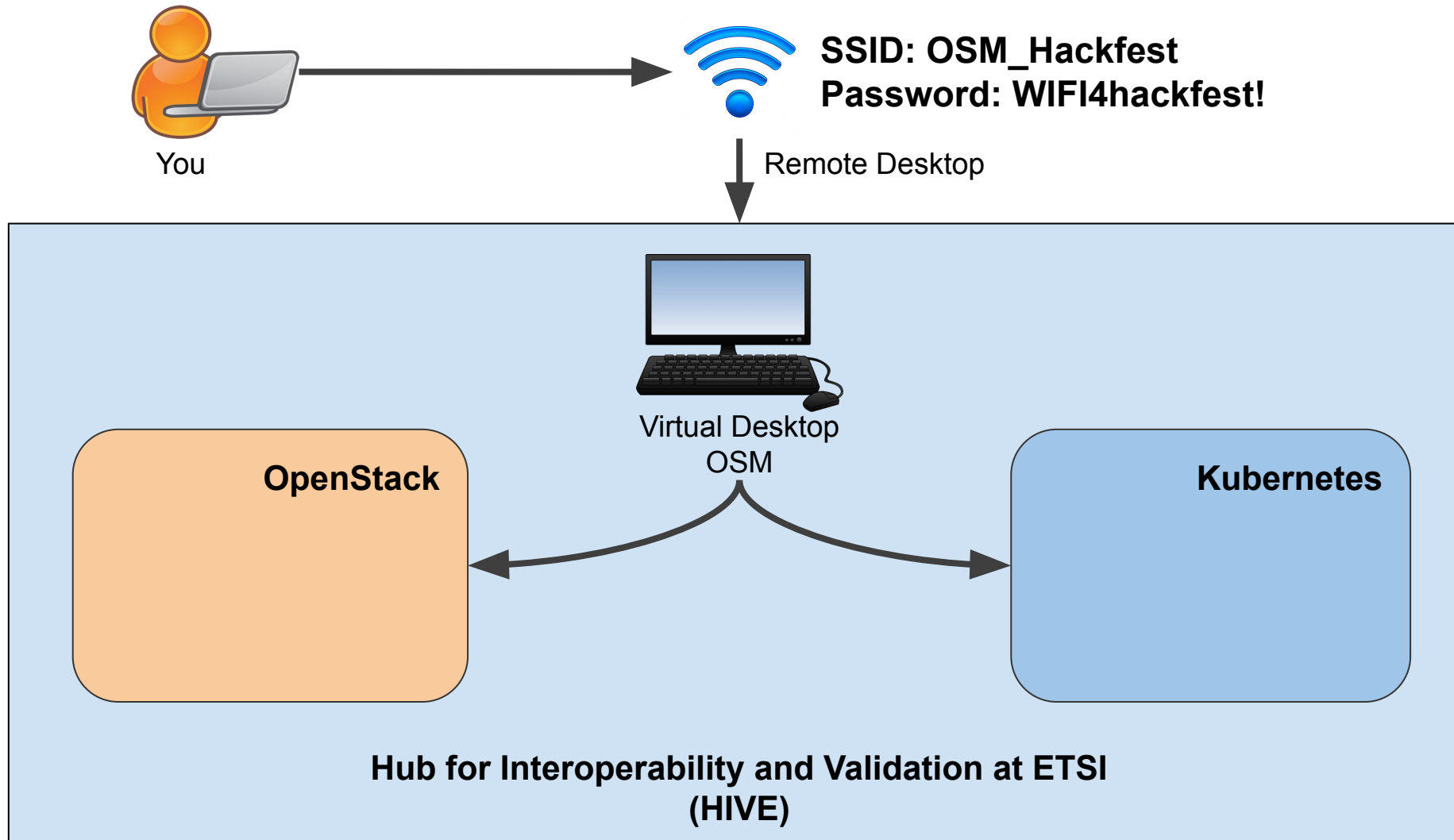
PNF Orchestration: Working in Brownfields

Mark Beierl (Canonical, OSM TSC member)

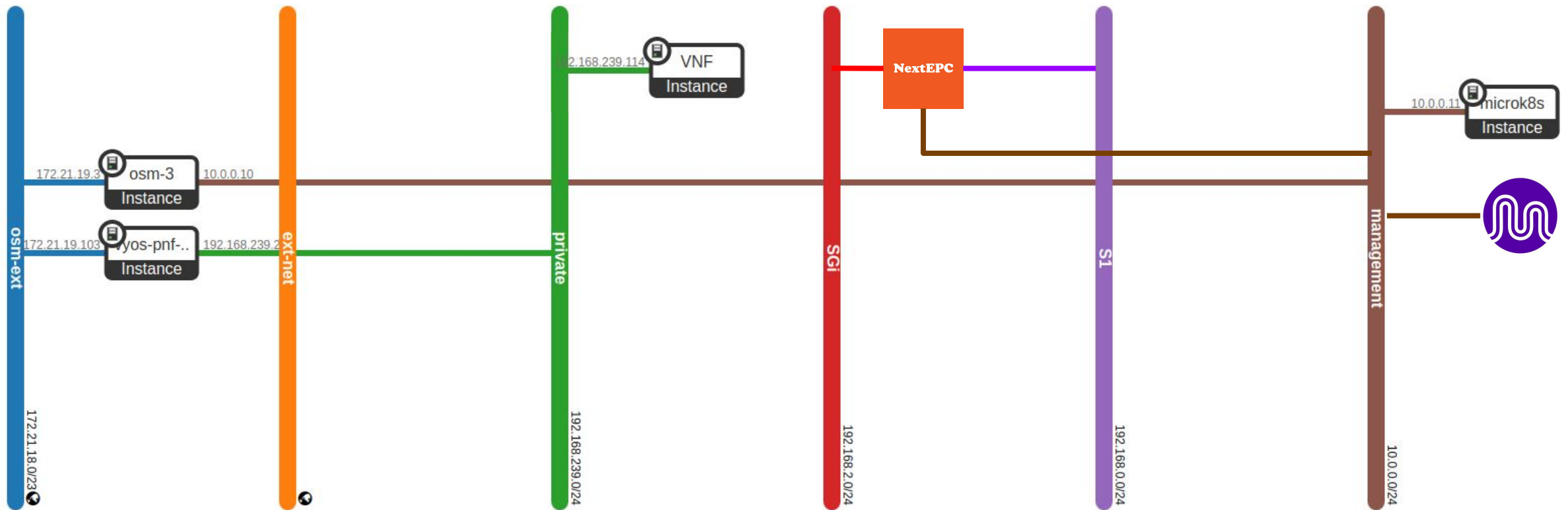
October 19, 2022 2pm

Welcome to the Hackfest

Hackfest Environment



Your Openstack Tenant



Brownfields and PNFs

Brownfield vs Greenfield



<https://www.linkedin.com/pulse/software-development-brownfield-vs-greenfield-madhavan-ekanathan/>

PNF vs VNF

PNF

Higher unit cost
Bulky
Fragile
Needs care



VNF

Low unit cost
Compact
Recyclable
Needs no care



<https://www.linkedin.com/pulse/technology-analogy-physical-virtual-network-functions-milind-kulkarni/>

PNF - Is It Bare Metal?

Physical Network Function

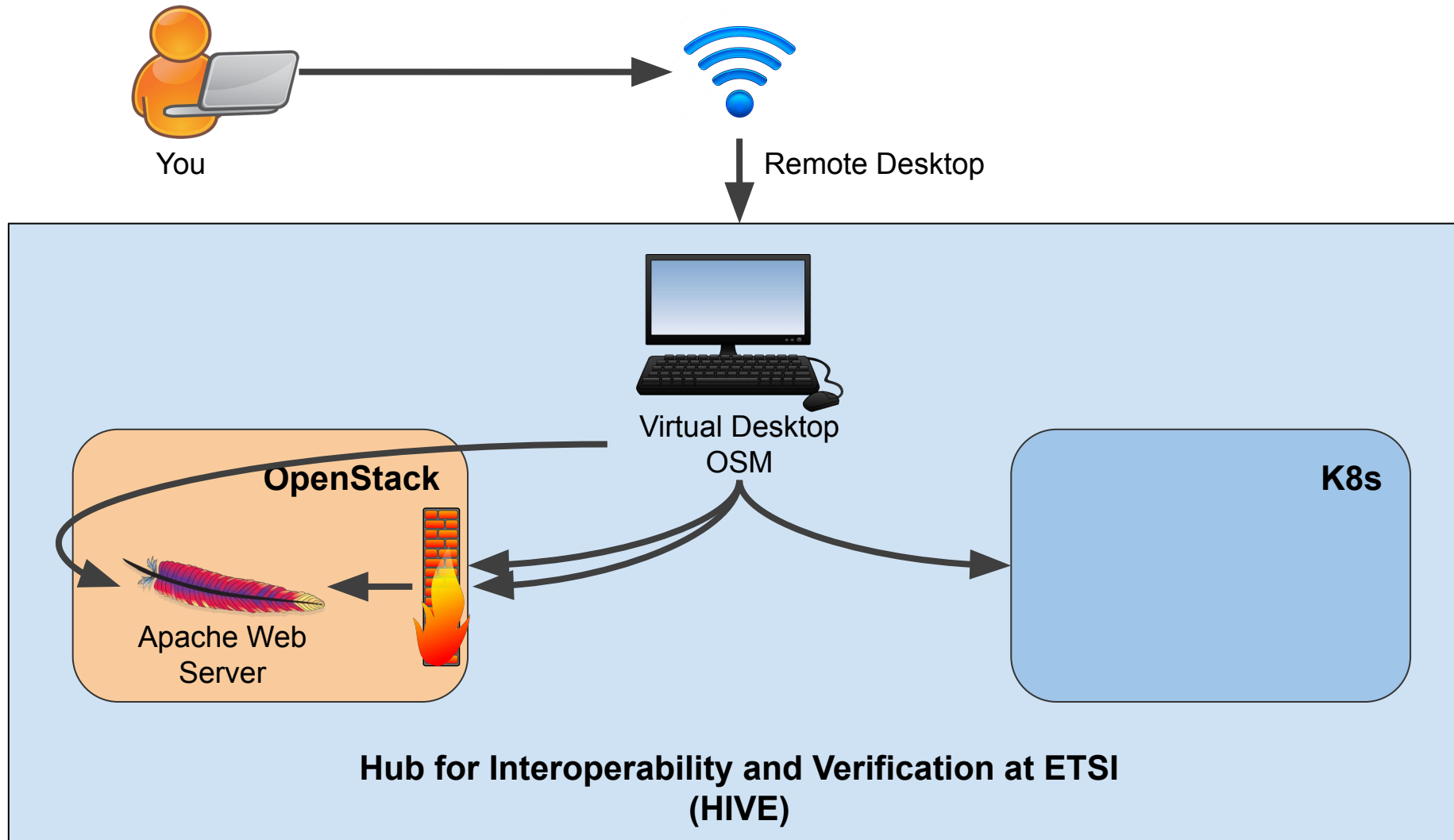
Implementation of a Network Function via a tightly coupled software and hardware system

- PNF refers to a function that is fixed
 - Purpose built to provide a specific function, a hardware appliance
- PNF does not have to mean bare metal
 - Could be unmanaged software in a VM
- VNF does not always mean running in VM or Container
 - OpenStack Ironic allows for management of bare metal like a VM

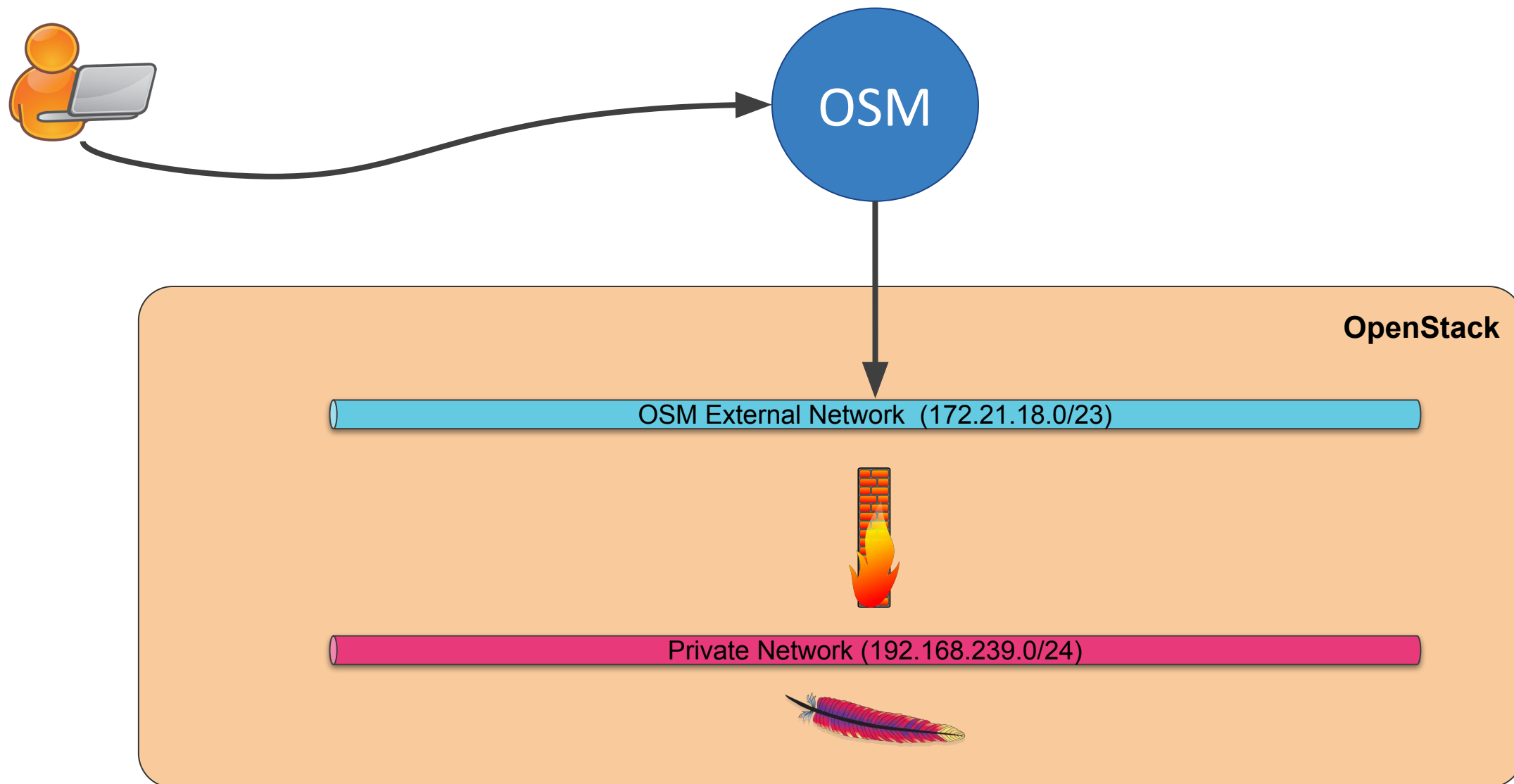


https://www.etsi.org/deliver/etsi_gs/nfv/001_099/003/01.04.01_60/gs_nfv003v010401p.pdf

Hackfest Environment

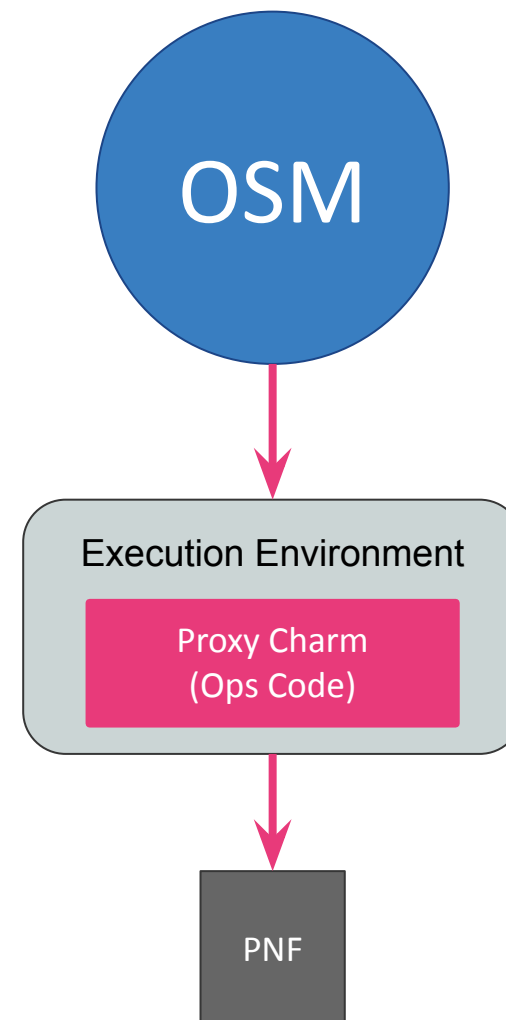


What Does This Look Like?



How do we Manage a PNF?

- OSM must be given information about the PNF
 - Register a PNF as a logical entity with IP and other info
- Use in standard network function package descriptors
 - Network service and virtual network function descriptors
 - Templates that tell OSM about the PNF
- On Network Service deployment
 - OSM does not launch any VM or Container
 - OSM creates an execution environment for the PNF
 - All actions execute in this environment



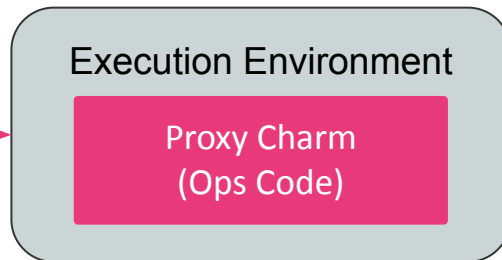
<https://www.vyos.io/products/>



- Runs on physical and virtual platforms alike: small x86 boards, big servers, KVM, Xen, VMware, Hyper-V, and more
- Completely free and open source, with documented internal APIs and build procedures
- Scriptable CLI
- Ansible playbooks for configuration

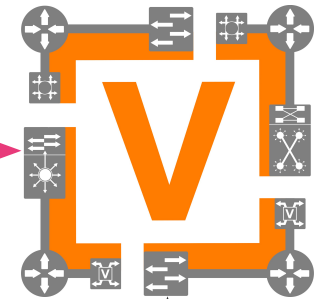
How a Primitive Runs

1. Execute action



2. Run VyOS ansible playbook task

3. Ansible network commands via ssh



Breaking it down: Creating Packages

```
./1.Build_Firewall_PNFD.sh
```

Telling OSM About the PDU

- Need to tell OSM some information

- Name
- Type
- Interfaces with IP addresses

```
osm pdu-create \  
  --descriptor_file \  
    firewall-pdu.yaml \  
  --vim_account openstack
```

```
name: router01  
description: VyOS Router  
type: gateway  
shared: false  
interfaces:  
  - name: gateway_public  
    ip-address: 172.21.19.195  
    mgmt: true  
    vim-network-name: osm-ext  
  - name: vnf_internal  
    ip-address:  
192.168.239.250  
    mgmt: false  
    vim-network-name: private
```

Launch Service

2.Launch_Network_Service.sh

```
=====
Launching network service with VIMID bf5f184c-8ce0-4959-99d9-598582483b80
=====
dd336fb8-283d-4ae6-9d36-bb3d370d6399
=====
Done
=====
```


What is Happening?

- OSM
 - Creates an entry for this network service
 - Creates an environment for operations to run

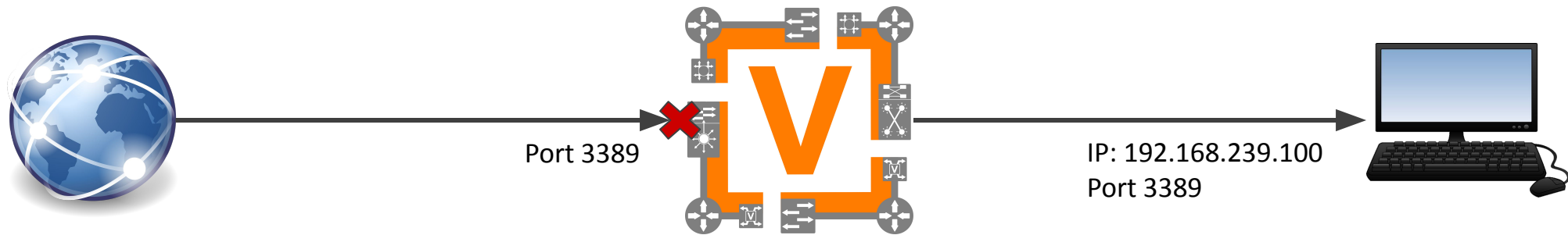
NS Instances

🕒 Init 🟢 running / configured 🛑 failed

Entries 10 ↕ 🔄

Name	Identifier	Nsd name	Operational Status	Config Status	Detailed Status	Actions
<input type="text" value="Name"/>	<input type="text" value="Identifier"/>	<input type="text" value="Nsd name"/>	<input type="text" value="Select"/>	<input type="text" value="Select"/>	<input type="text" value="Detailed Status"/>	
firewall	1901efc0-d62f-4ae2-adb0-003ee99d29b3	hackfest_firewall_pnf_ns	🟢	🟢	Done	Action ▾

Operations: Add Port Forward



Ansible Playbook

```
- hosts: vyos-routers
gather_facts: false
connection: local
tasks:
  - name: backup switch (vyos)
    vyos_config:
      lines:
        - nat destination rule {{ ruleNumber }} destination port "{{ sourcePort
        }}"
        - nat destination rule {{ ruleNumber }} inbound-interface "eth0"
        - nat destination rule {{ ruleNumber }} protocol "tcp"
        - nat destination rule {{ ruleNumber }} translation port
          "{{ destinationPort }}"
        - nat destination rule {{ ruleNumber }} translation address
          "{{ destinationAddress }}"
      save: yes
```

Try OSM...

Community installer

```
wget  
https://osm-download.etsi.org/ftp/osm-12.0-twelve/install_osm.sh  
chmod +x install_osm.sh  
./install_osm.sh
```

Charmed installer

```
wget  
https://osm-download.etsi.org/ftp/osm-12.0-twelve/install_osm.sh  
chmod +x install_osm.sh  
./install_osm.sh --charmed
```

Join us!

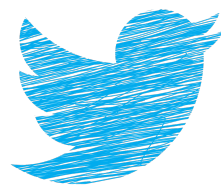


ETSI members, non-members,
individual developers and users.

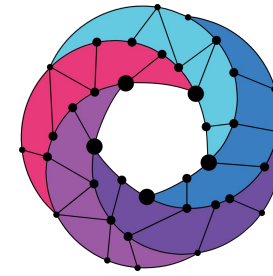
Learn [how to join](#)



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Thank You!