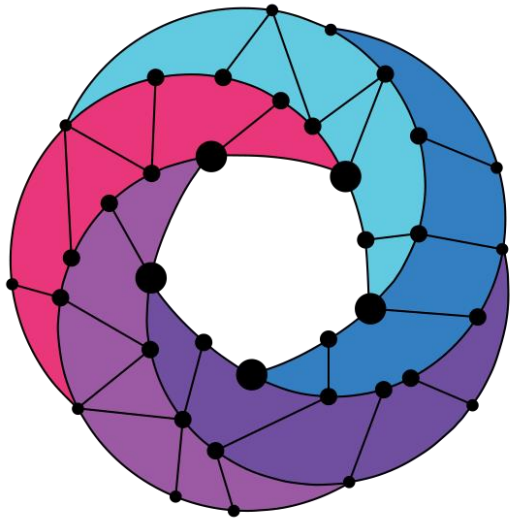


Open Source
MANO

OSM Release ELEVEN Webinar

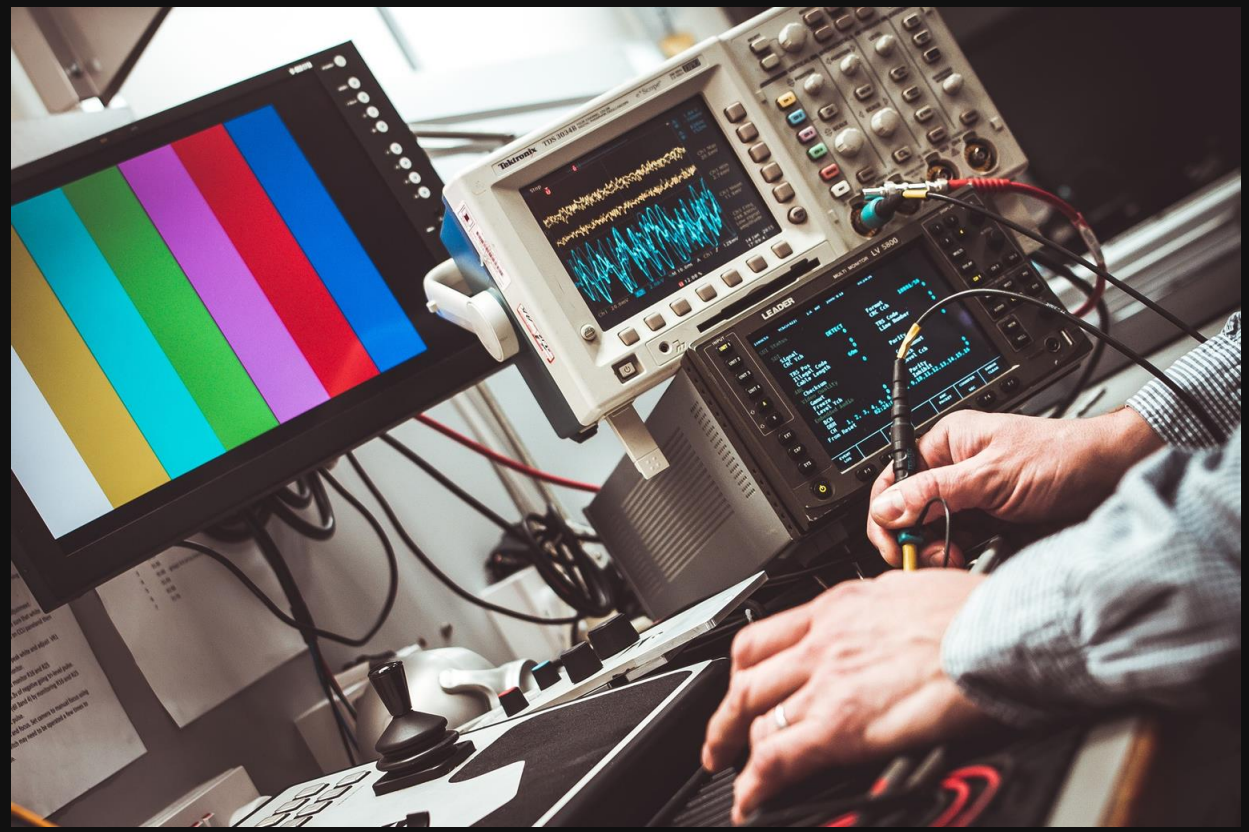
Francisco-Javier Ramón (Telefónica, ETSI OSM Chair)
Gerardo García (Telefónica, TSC Chair)
Ramesh Ramanathan (Tata Elxsi, TSC Member)
Mark Beierl (Canonical, TSC Member)

ETSI

Open Source MANO

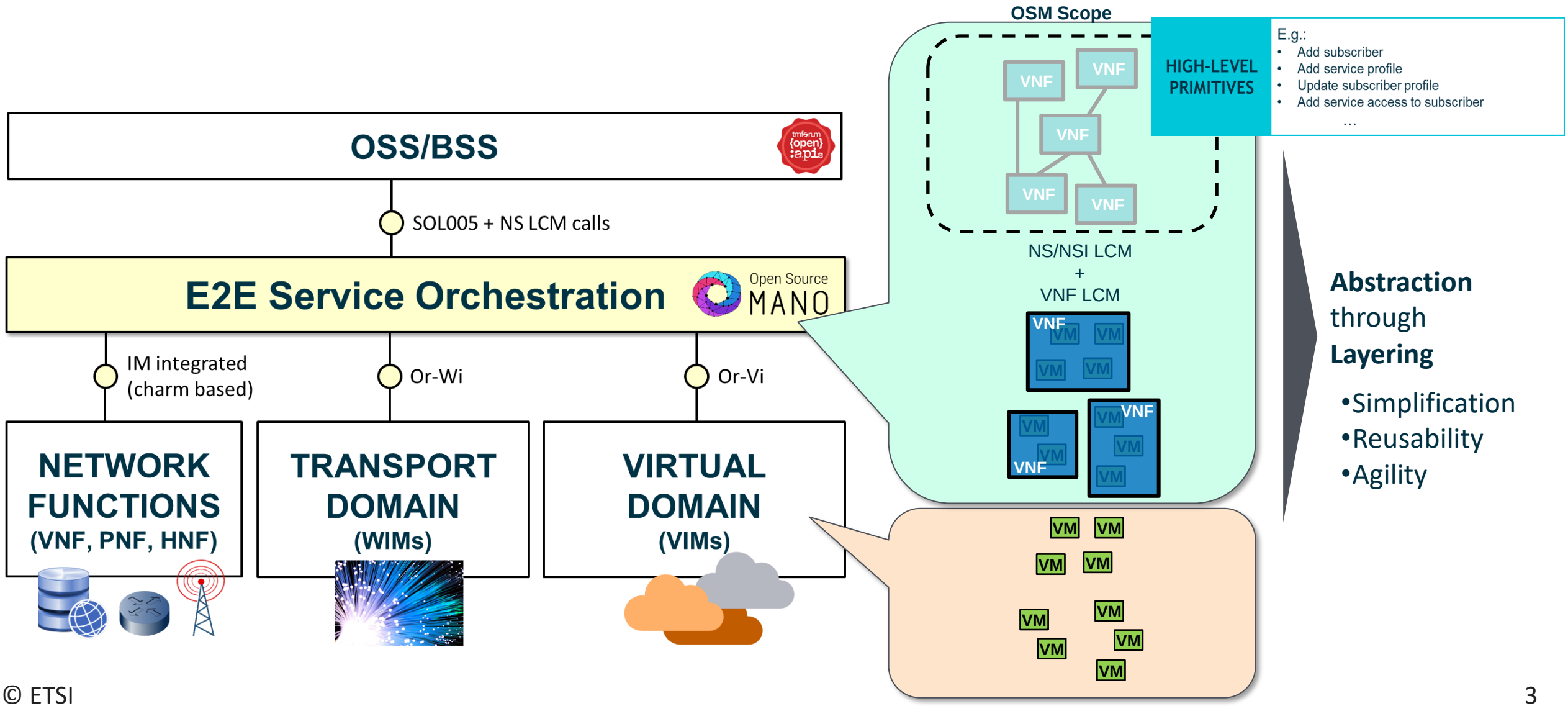
What does OSM do…

… and how?



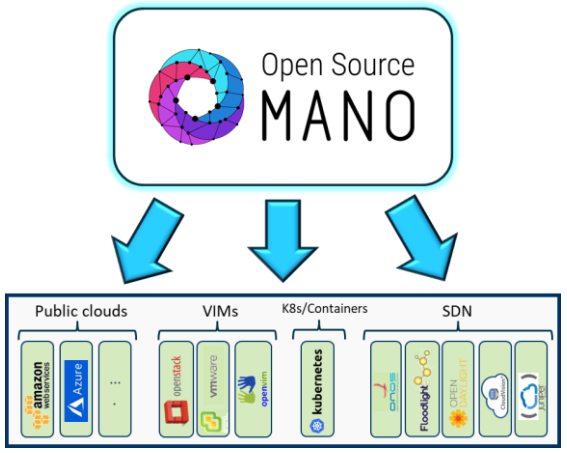
OSM provides a platform to create **Networks as a Service** and to manage them conveniently later

Open Source MANO

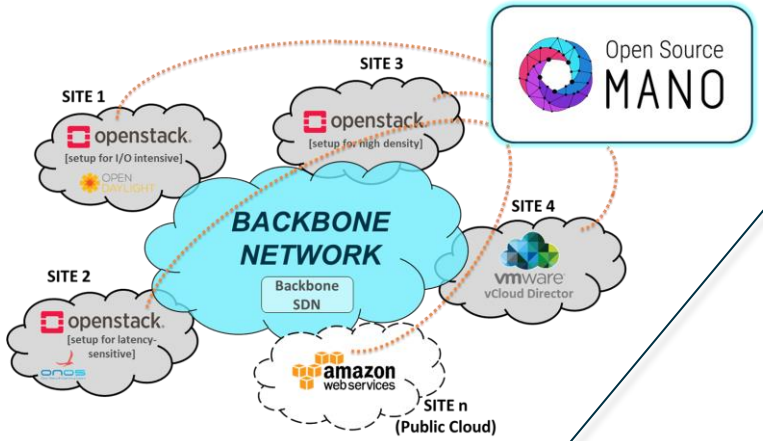


… on different types of infrastructure and across different locations…

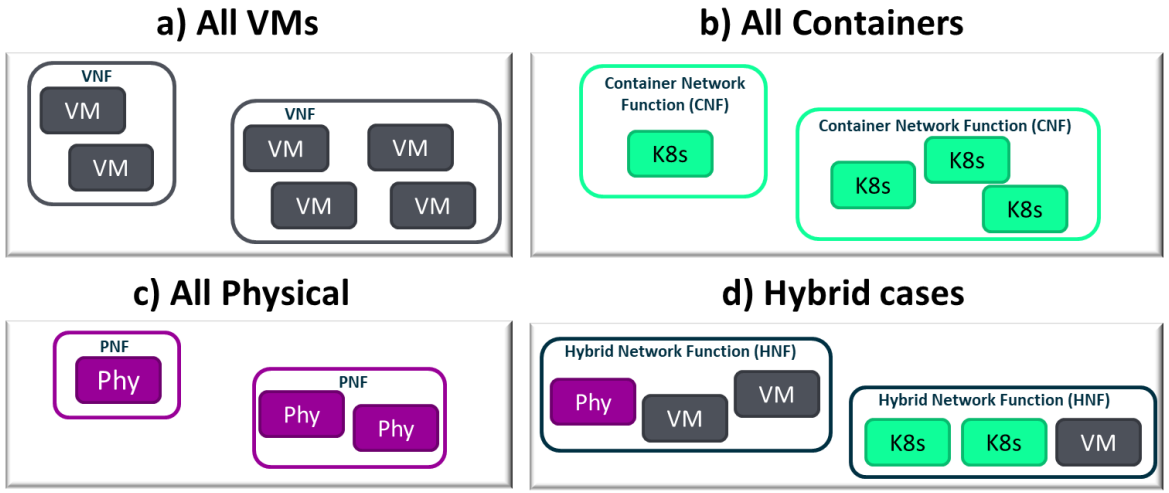
MULTI-VIM & MULTI-SDN



MULTI-SITE



… with VNFs composed of **VMs, containers** and/or **physical elements**…



… and ready for network-specific workloads whenever needed

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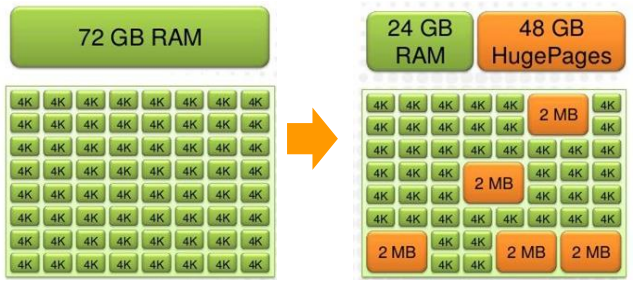
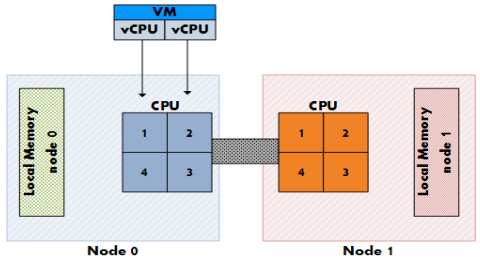
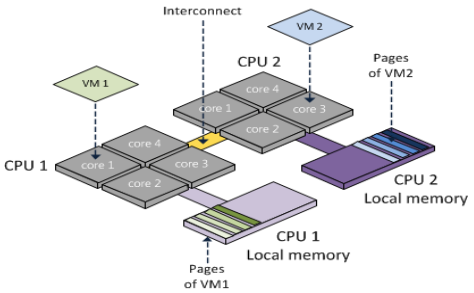
Huge Pages



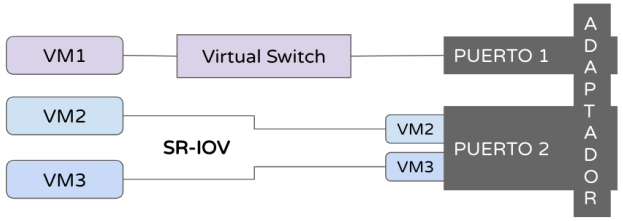
NUMA Topology Awareness

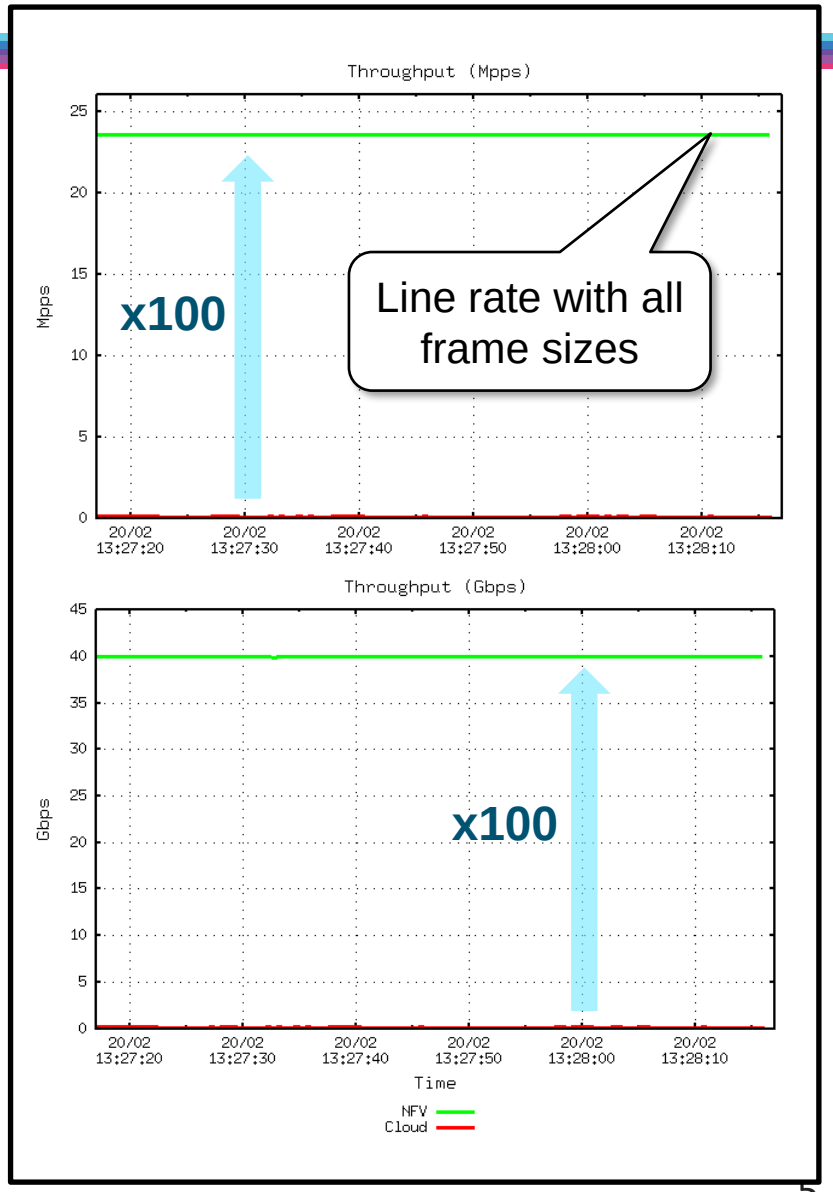


CPU Pinning



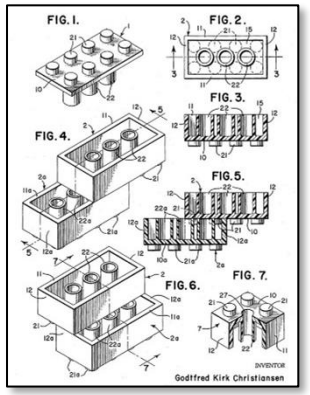
Data Plane assignment

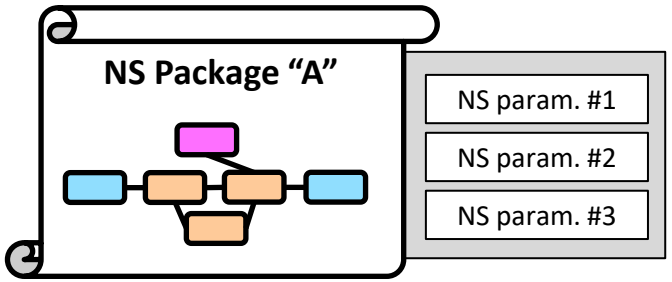




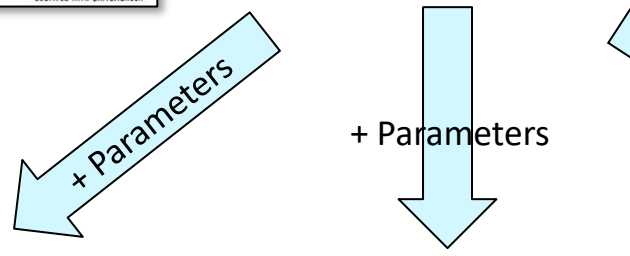
All in OSM is model-driven to make VNFs and scenarios as portable and reusable as possible

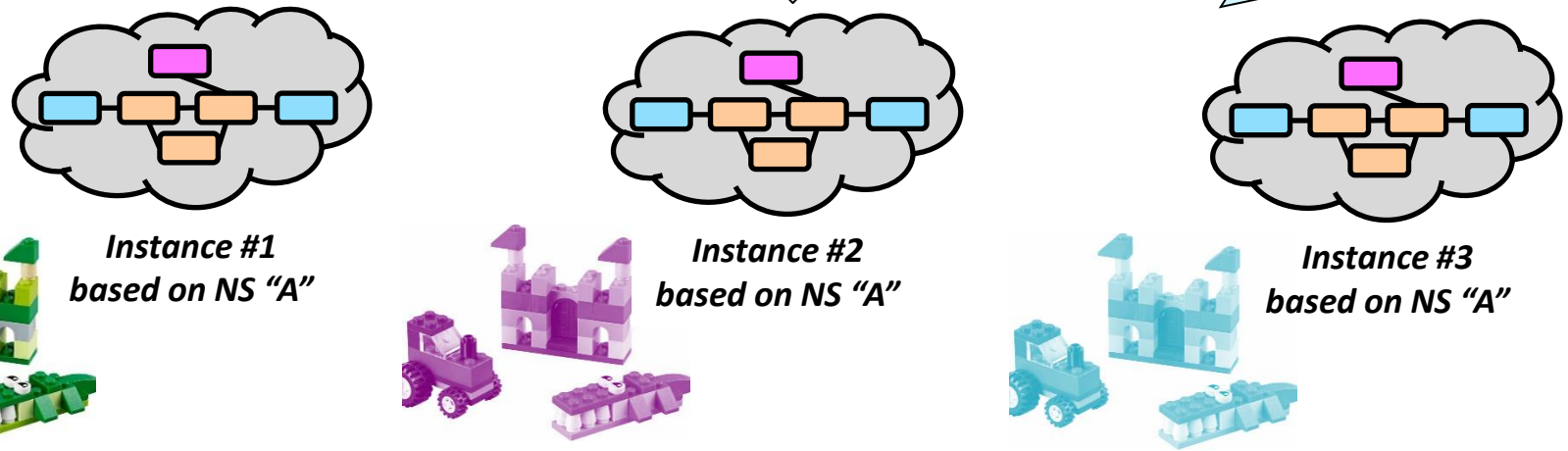
NS PACKAGES / SLICE PACKAGES:





DEPLOYED INSTANCES:

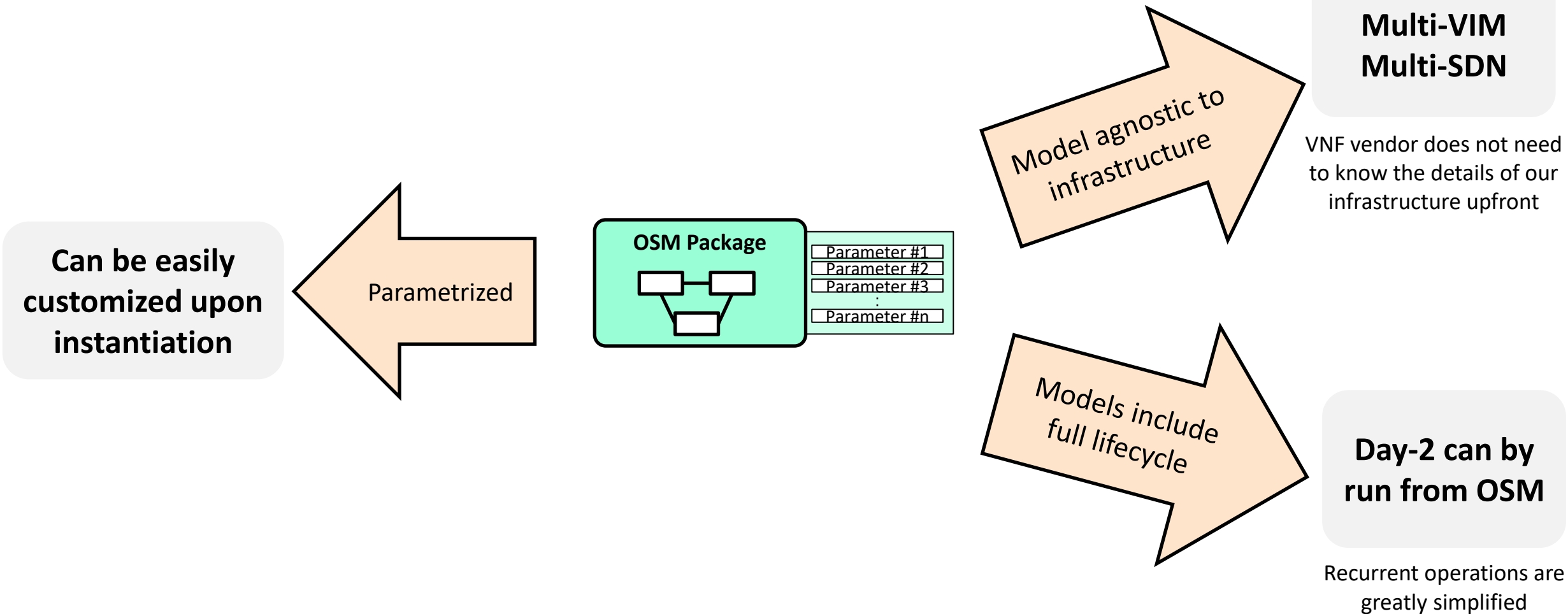




Upon instantiation, you just need to decide:

- The target VIM (or VIMs)
- Values for the parameters (IP addresses, keys, etc.)

All these OSM packages are oriented to maximize reusability for multiple scenarios



Open Source
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A vibrant and thriving community

OSM community is really **LARGE AND DIVERSE**, with 150 members today, but always **OPEN** to new participants

Open Source MANO

- **15 Global Service Providers**
- **Leading IT/Cloud players**
- **VNF providers**

(*) Names & brands may be claimed as the property of others

OSM Ecosystem

Open Source MANO

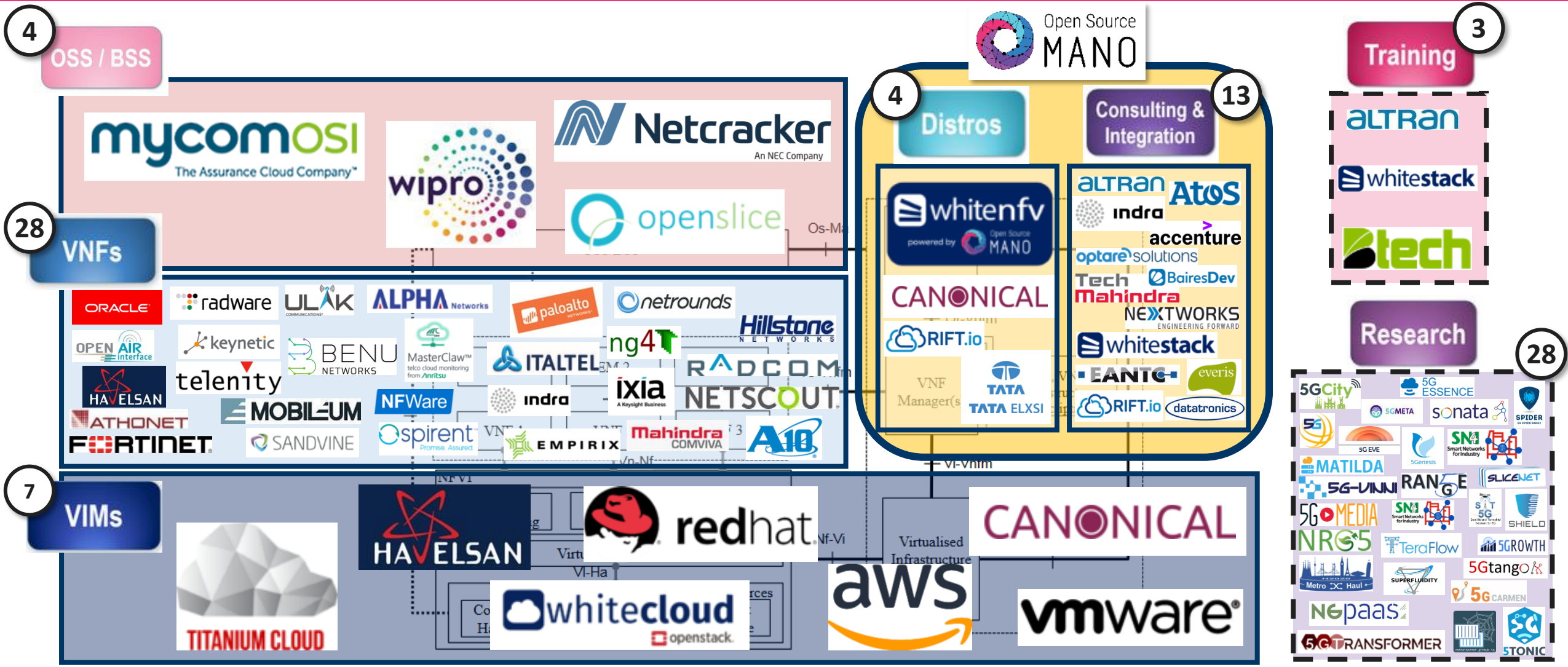
Companies listing their products and offers related to OSM (like “OSM Yellow pages”)

- Searchable by potential customers looking for OSM-related products
- Only with demonstrable OSM-related products/offers
- Opt-in process, continuously open

https://osm.etsi.org/wikipub/index.php/OSM_Ecosystem

OSM Ecosystem
(as of today)

https://osm.etsi.org/wikipub/index.php/OSM_Ecosystem



Open Source MANO

… and the new release!

Release ELEVEN brings new features to foster current and new deployments

Open Source MANO

Open Source MANO

Release ELEVEN

Available at: osm.etsi.org

SOL004 and SOL007 package formats

ETSI

Brand-new support for Google Cloud

- Completing the infrastructure support for 3 largest public clouds

Google Cloud

Fine-grained operations in CNFs

- Start and stop services
- Run one-shot commands
- Files API

kubernetes

Better coordination across PNFs, VNFs, and CNFs

- Enhanced data exchange between NFs in the NS.

CNF monitoring from Kubernetes metrics

- Metrics collection from K8s clusters in centralized Grafana dashboard.

Enhanced installation process

- Support of Ubuntu 20.04 and better tracking of the installation process.

… and other improvements in usability and stability derived from the learnings of latest OSM production deployments

… which are added on top of an already long set of features…

Open Source MANO

Release ZERO

- Simplified on-boarding process
- Human-readab
- Multi-VIM supp
- EPA Support, as
- Underlay config
- Web interface
- Comprehensive
  - Installation gu
  - How-to guides
  - Data Model co
  - Minimal infras
  - Videos
  - …

Open Source

© ETSI 2019

Release ONE

Multi-VIM

vmware

Mul

Releases TWO & THREE

Plug

Mul

Ope

… ar

© ETSI 2019

Releases TWO & THREE

Multi-VIM

amazon

Multi-SDN

Network Serv
scaling

Monitoring
Plugin Model, N
App metrics, no

Full Day 0 & D
operations

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Release FOUR

MODEL-DRIVEN NORTHBOUND INTERFACE

- SOL005 aligned
- OpenAPI model

MONITORING IM

- On-demand conf
- Push notification
- Policy support

IMPROVED MOD

- Full support of I
- Consistency che
- MAC address se
- Support of alter

© ETSI 2019

Release FIVE

NETWORK SLICING FOR 5G

- Integrated Slice Manager
- IM extended to support NST and NSI

MULTI-SITE EXTENSIONS

- Dynamic inter-DC connections
- WIM plugin model
- Multi-VIM Enhancements

MONITORING IMPROVEMENTS

- Extended interop capabilities
- Policy support
- VNF + VIM Metrics Collection

© ETSI 2019

Release SIX

Open Source MANO

NBI and operation

- RBAC improvem
- Re-enable NS pr

EPA and physical

- Support of mult
- Support for add

New enablers fo

- Allow instantiati
  non cloud-nativ
- Adding relations
- Ansible proxy Ch

User interfaces (

- Users and proje
- Support of WIM
- Ability to provid

Monitoring

Open Source

© ETSI 2019

Release SEVEN

Open Source MANO

Improved lifecycle and feedback

- Improved VNF configur
- Real-time feedback upd

Fault Management &
Management

- Fault and performance
  of OSM modules
- Automated dashboards

VNF Onboarding

- Improved validation of

100% Python 3

- RO migration to Python
- OSM client migration to

Kubernetes and

Open Source

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Release EIGHT

Open Source MANO

Open Source MANO

Catalogue of VNF/NS Packages

- VNF repositories

Improved usab

- New angular-ba

Improved onbo

- Simplified packa
  over Git.
- On the fly transl

Readiness for H

- VCA readiness f
- HA proxy charm

Improved lifecycle and

© ETSI 2019

Release NINE

Open Source MANO

Open Source MANO

Modelling ex

- SOL006 align
- Full integrati
  declarative R
- Simple strate
  address pairs

VNF lifecycle

- Distributed P
- Support of H
- Kubernetes V
- Centralized V

IMPROVED MODEL

- Service Function
- Physical Deploym
- Multi-VDU relations in VNF

USER EXPERIENCE & OPTIMIZATION

- GUI based NS composer
- Faster startup and responsiveness
- Better event and log visualization
- Docker, Vagrant and VM image install

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6

Release TEN

Open Source MANO

Open Source MANO

Release TEN

Soon available at:
osm.etsi.org

Brand-new support for Azure clouds

- Support of latest IaaS developments
- Improved networking
- Better coherence with OpenStack's behaviour

Better access to OSM's subscription API

- OSM client extension

Support of distributed VCA

- VCA can run in multiple remote locations
- Useful to secure special clouds and edge deployments

Monitoring of availability of VIM resources

- OSM's portal now provides visibility on available resources

… and other improvements in usability and stability derived from the learnings of latest OSM production deployments

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At this point, it is becoming easier explaining OSM features in practice

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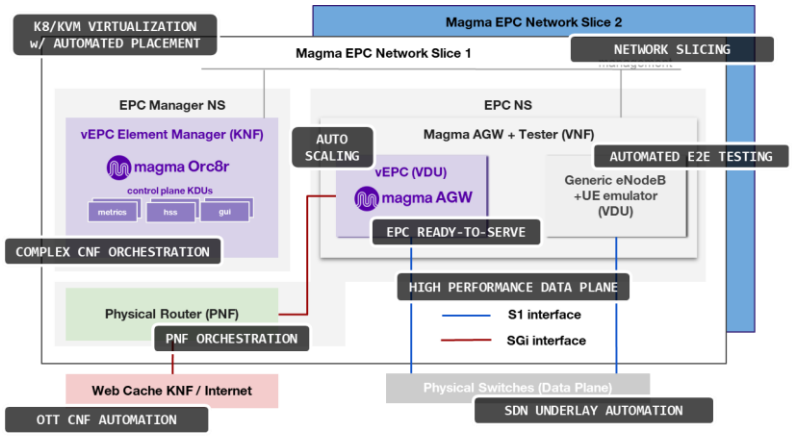
MAGMA EPC DEMO (2020)



https://osm.etsi.org/gitlab/vnf-onboarding/osm-packages/tree/master/magma

OSM#11 Hackfest

11 teams onboarding 8 NFs in just one week!

Asterisk

freeRADIUS

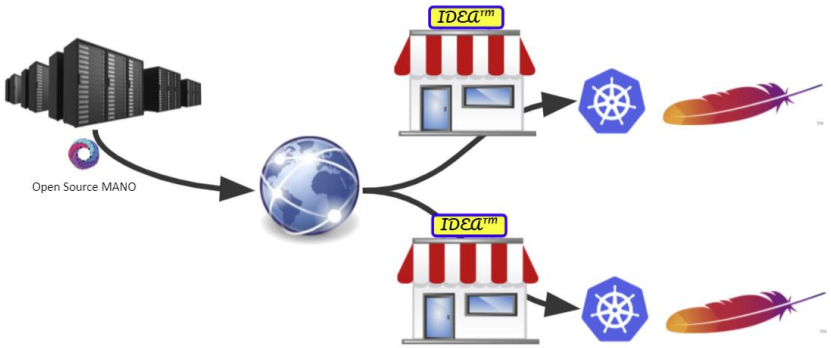
PowerDNS

OPC UA

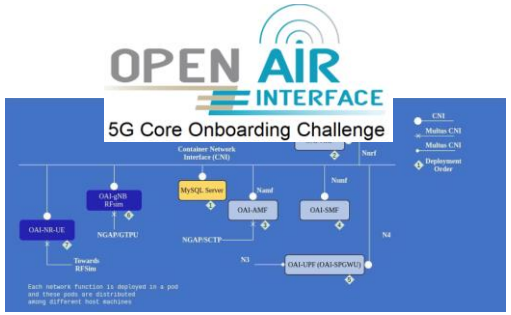
NetNumber

Release TEN Webinar

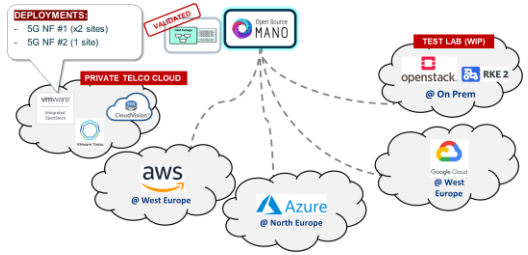
Edge orchestration with OSM



OSM-MR#11 Hackfest



Multi-Cloud Deployments



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Frictionless Multi-Cloud Deployments

Gerardo García de Blas (Telefónica, OSM TSC Chair)

openstack

aws

Google Cloud

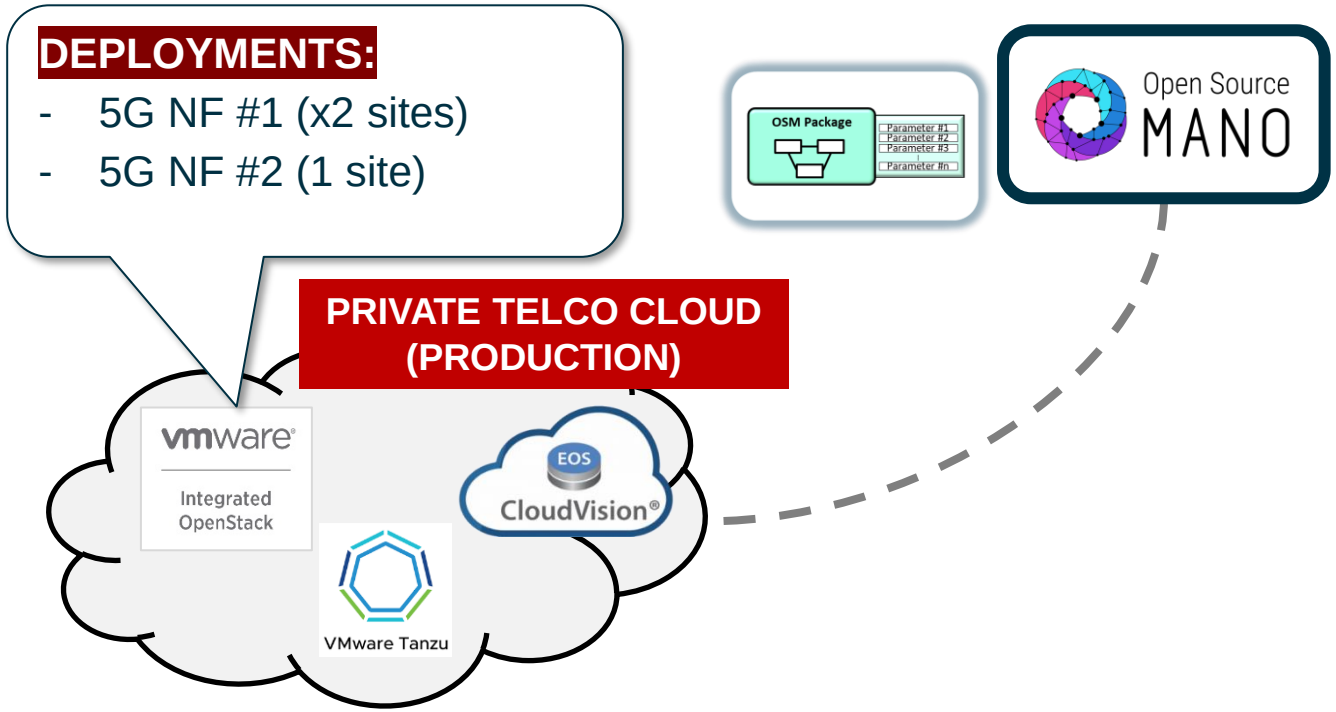
vmware

Azure

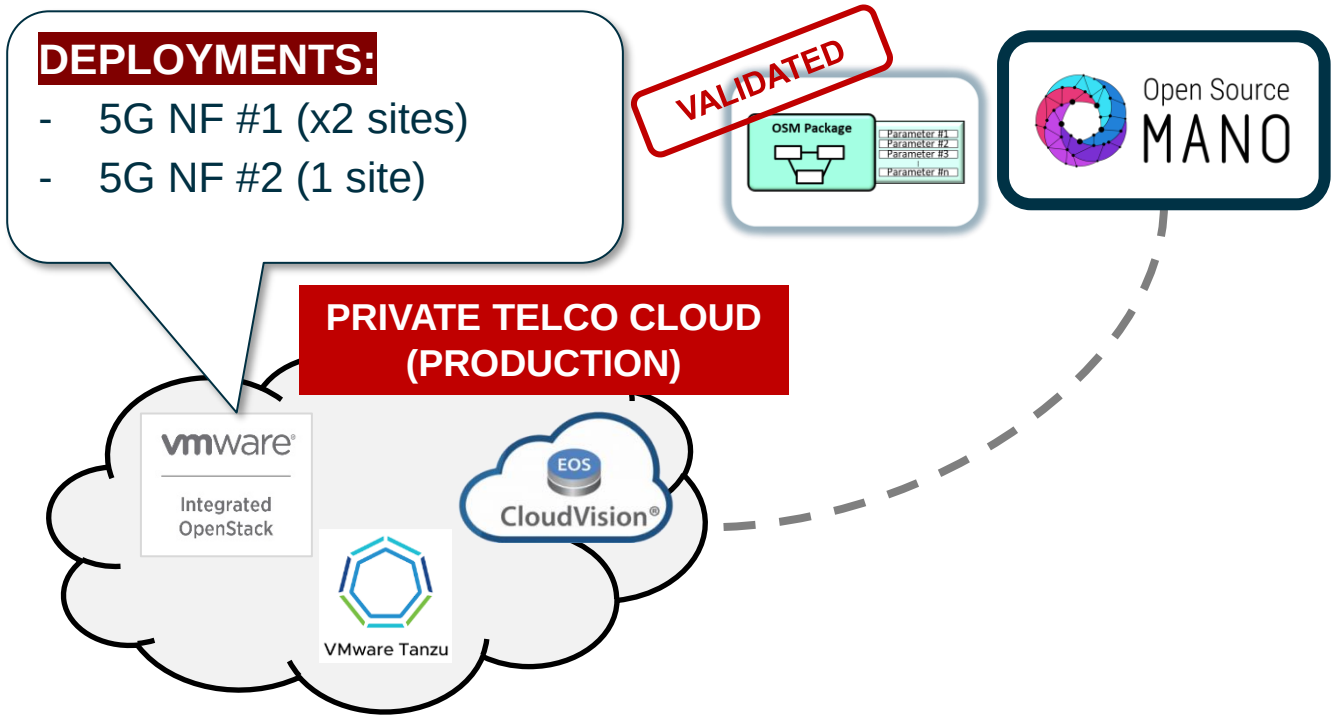
...

ETSI

Taking as starting point a service onboarded for production...



.. we can easily re-deploy it in 5 different types of clouds (and several sites)



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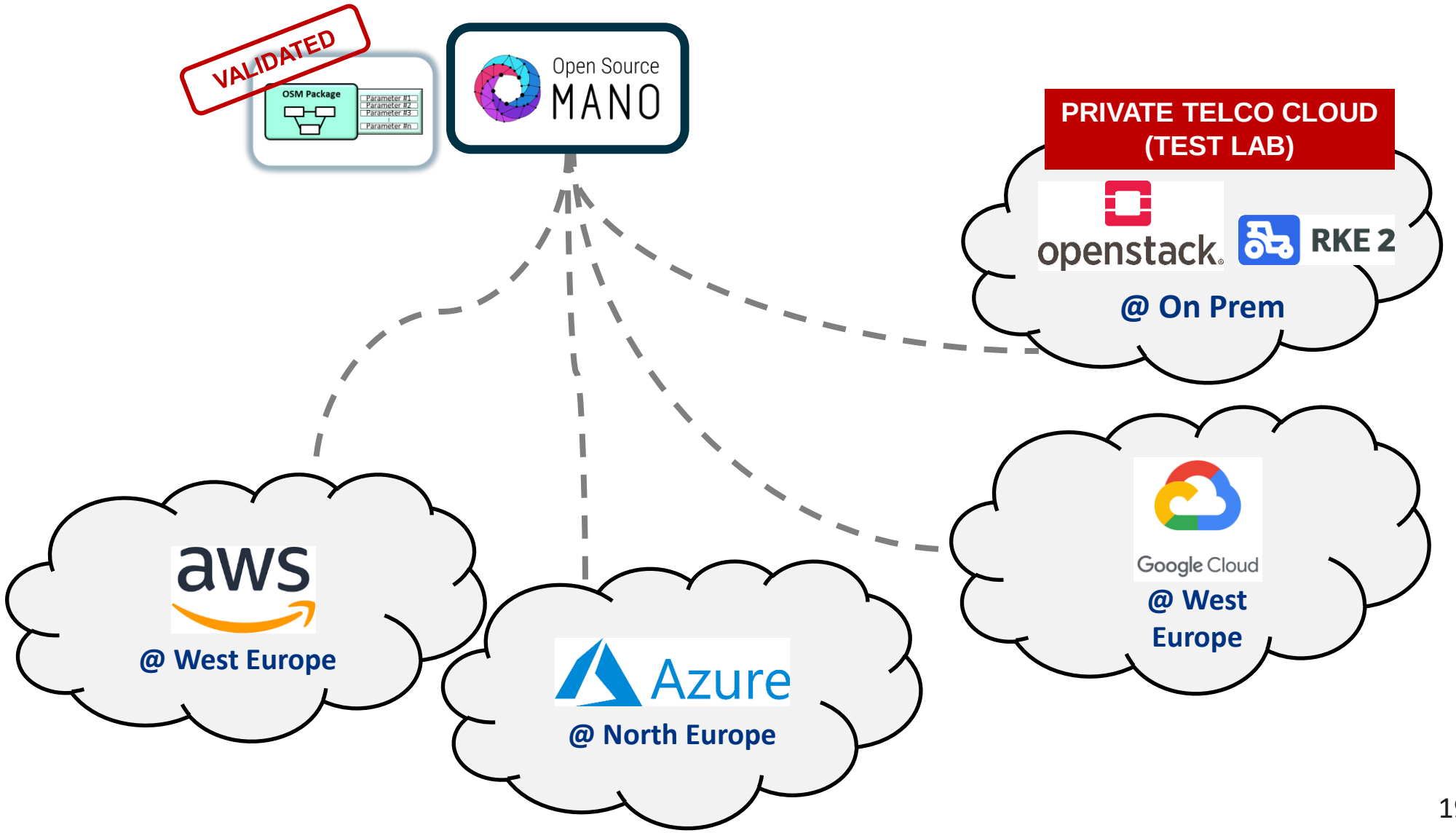
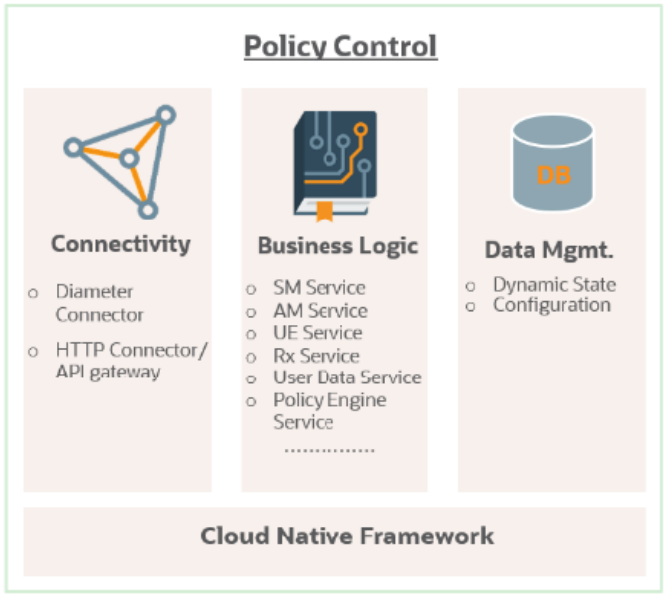


About the NF

Oracle's Cloud Native Core Policy

- Convergent solution for 5G Policy Control Function (PCF) and 4G Policy and Charging Rules Function (PCRF)
- Containerized Network Function (CNF) with different tiers, all of them fully based on containers:
  - Core Policy
  - DB tier
  - Monitoring tier



The deployment was prepared, for convenience, as a set of NF and NS.

DEPLOYMENTS:

- 5G NF #1 (x2 sites)
- 5G NF #2 (1 site)

PRIVATE TELCO CLOUD (PRODUCTION)

vmware Integrated OpenStack

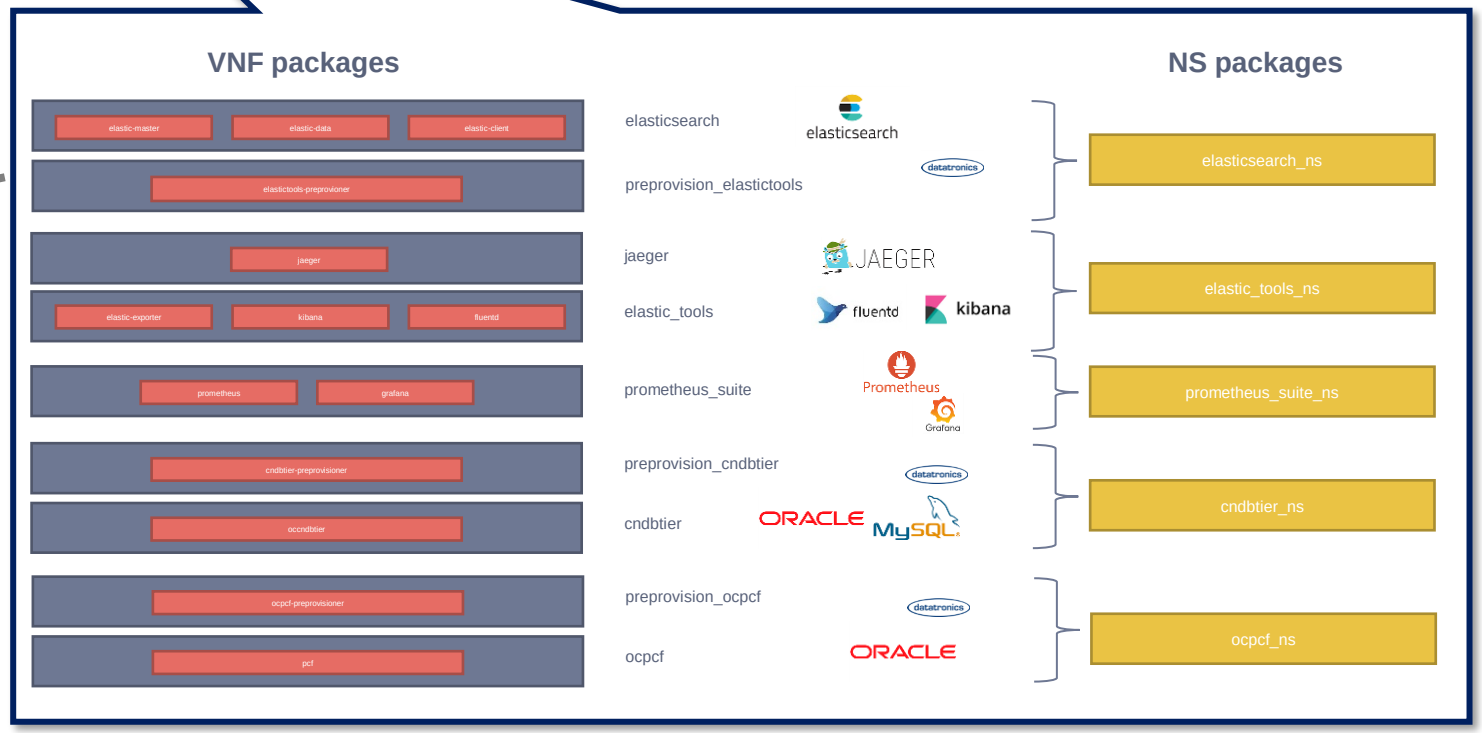
EOS CloudVision®

VMware Tanzu

OSM Package

Parameter #1
Parameter #2
Parameter #3
Parameter #n

Open Source MANO



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DEMO TIME

This brings obvious operational benefits out of the box…

- Huge cost savings in testing and validation.
- Time to market for second deployments is minimal.
- Minimization of errors.
- No lock-in with specific clouds.
- Package sharing between OBs becomes possible, regardless their underlying infrastructure.

… while enables advanced deployment scenarios

- Ability to move workloads between clouds.
- Easier growth in capacity with different clouds.
- Advanced HA schemes.

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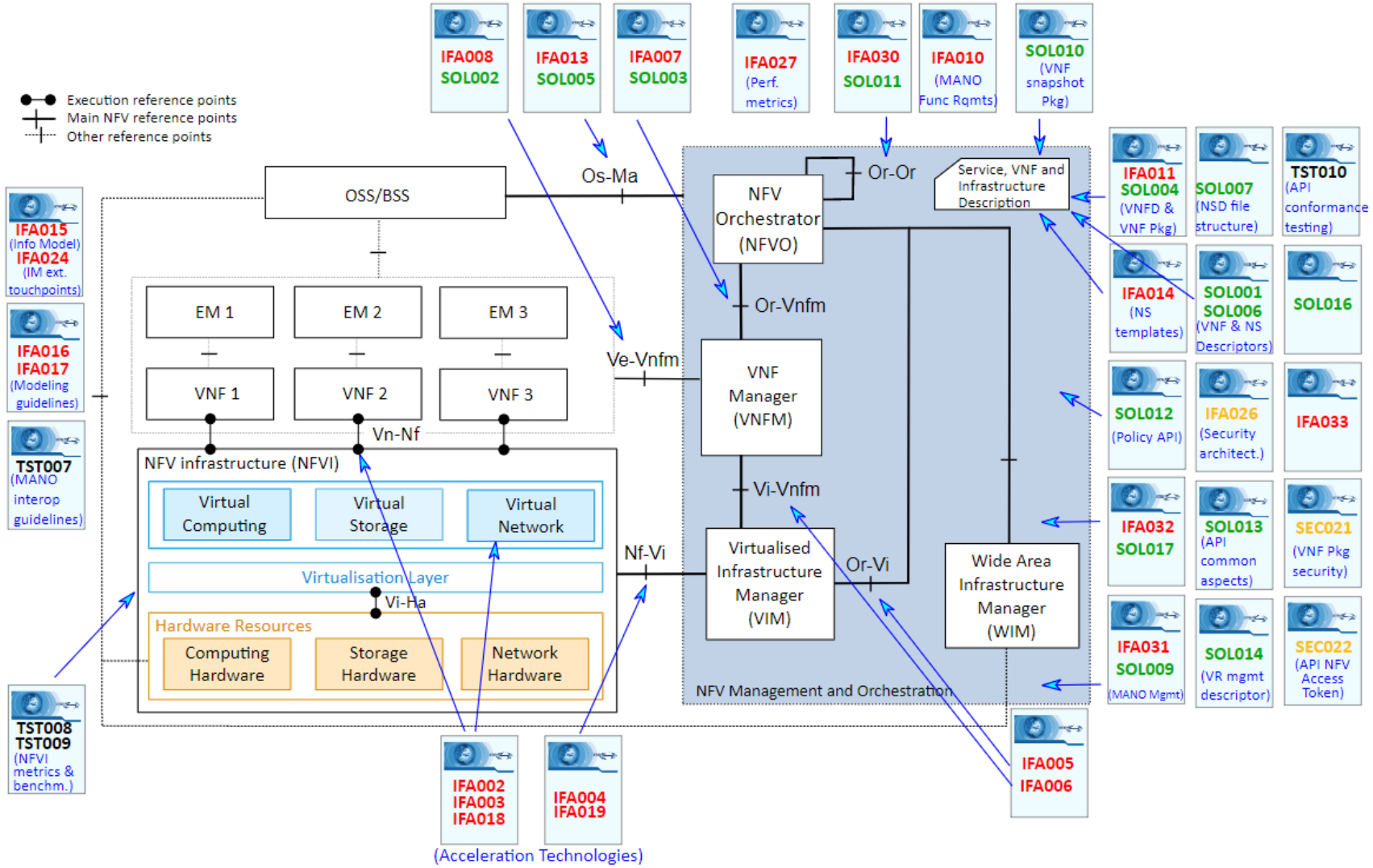
OSM and ETSI Architecture

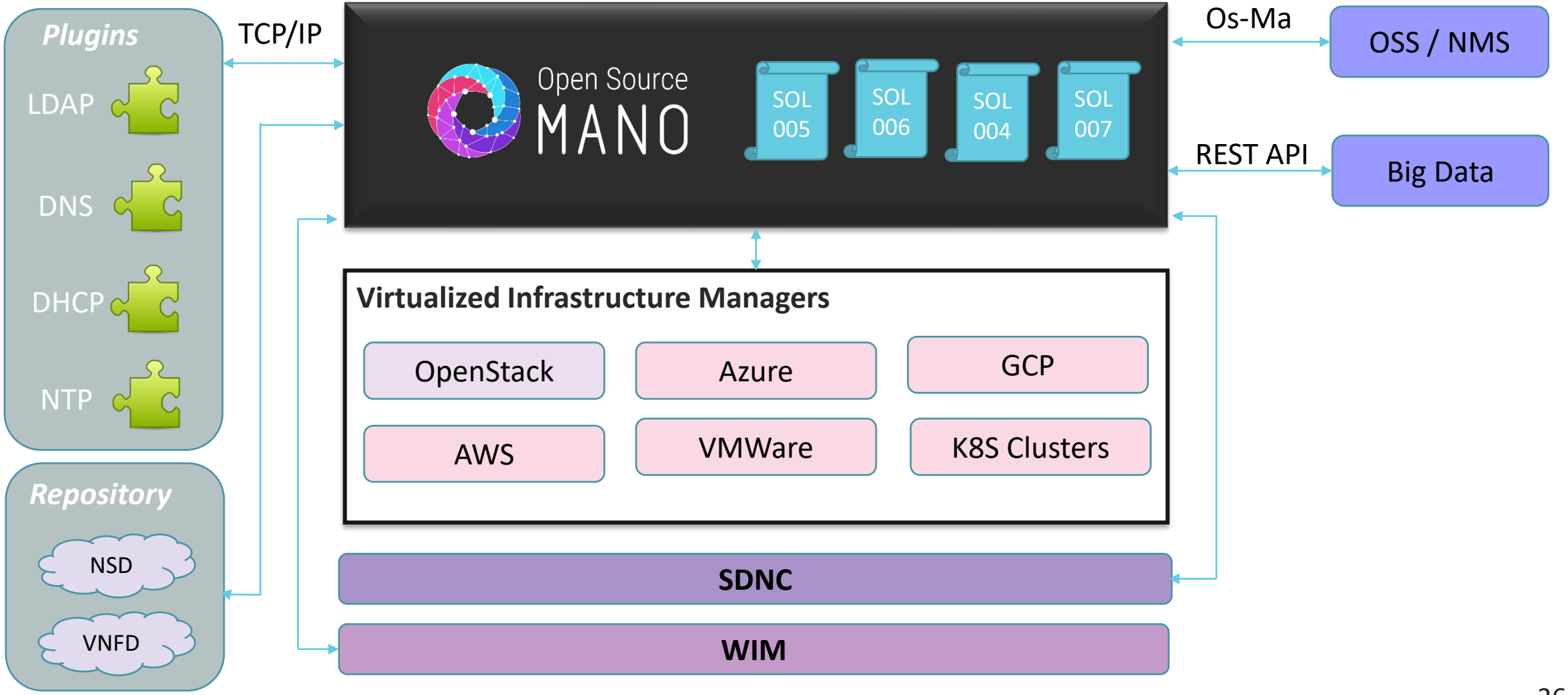
Ramesh Ramanathan (Tata Elxsi, TSC Member)

ETSI

OSM and ETSI NFV Architecture



OSM, Standardization and Open Platforms



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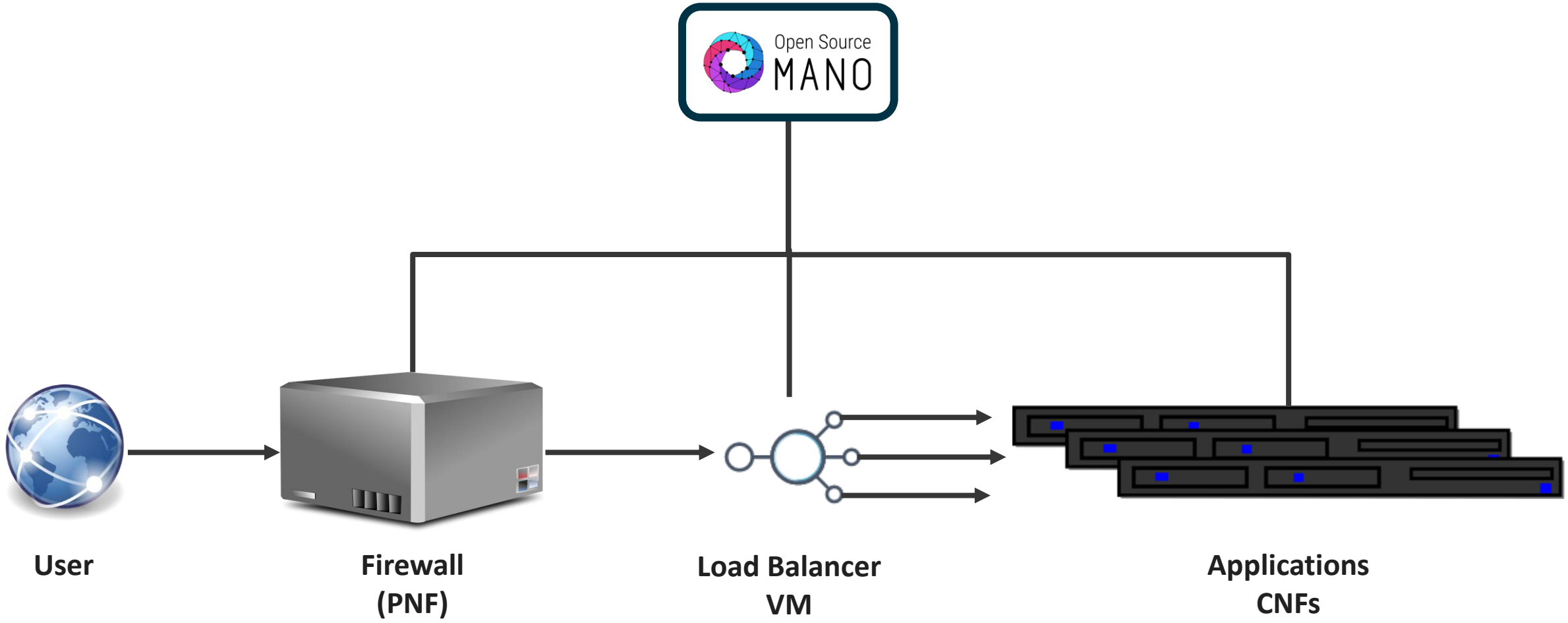
Coordination Between CNFs, VNFs, PNFs

Mark Beierl (Canonical, TSC Member)

ETSI

Simple Network Service



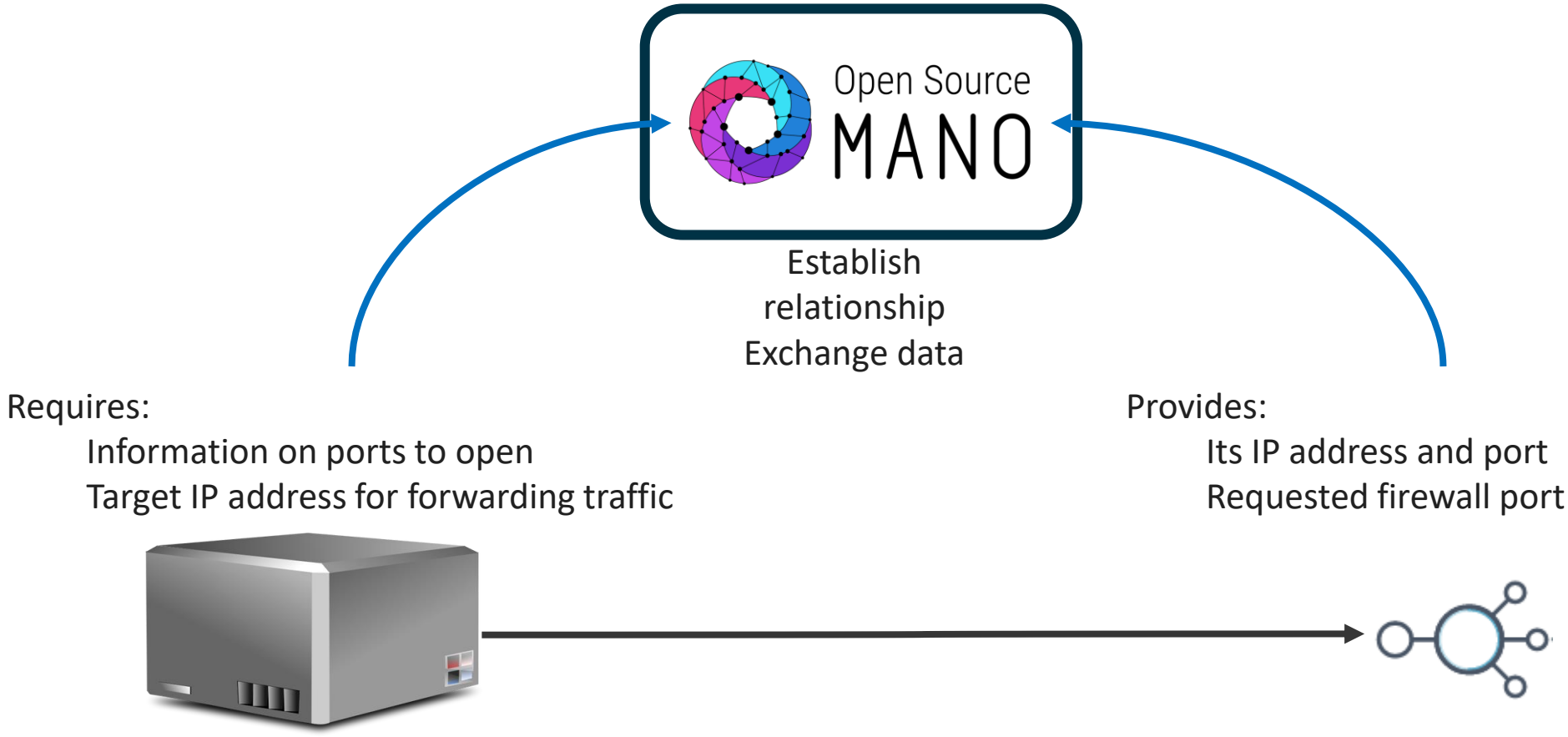
Information Exchange

Firewall must open ports and forward traffic to Load Balancer

Load Balancer needs IP addresses of backend CNFs

CNF units can be scaled individually

Data Exchange via Relationship



Defining a Relationship

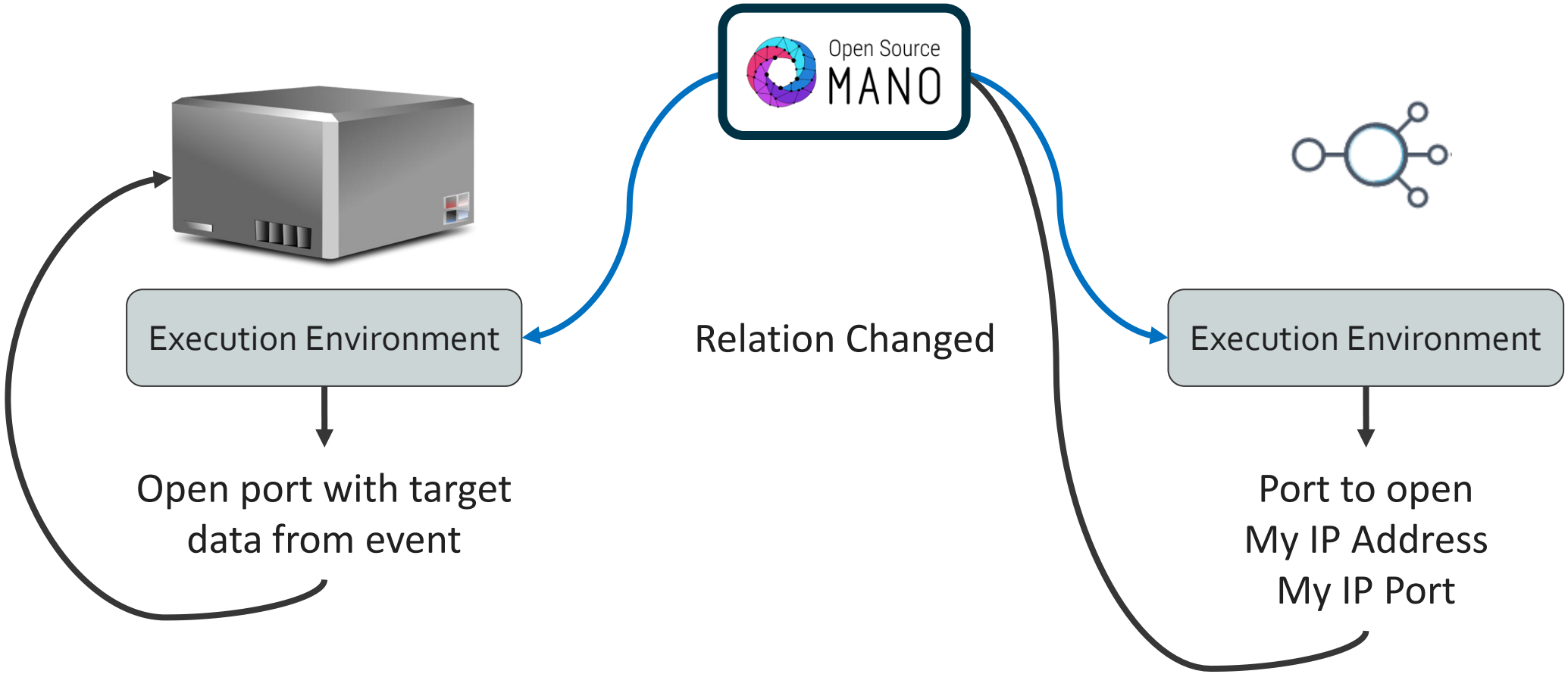
```
relation:
    - name: firewall-loadbalancer
      provider:
        endpoint: firewall-rule
        vdu-profile-id: load-balancer
      requirer:
        endpoint: firewall-rule
        vdu-profile-id: firewall
```

Relation Events

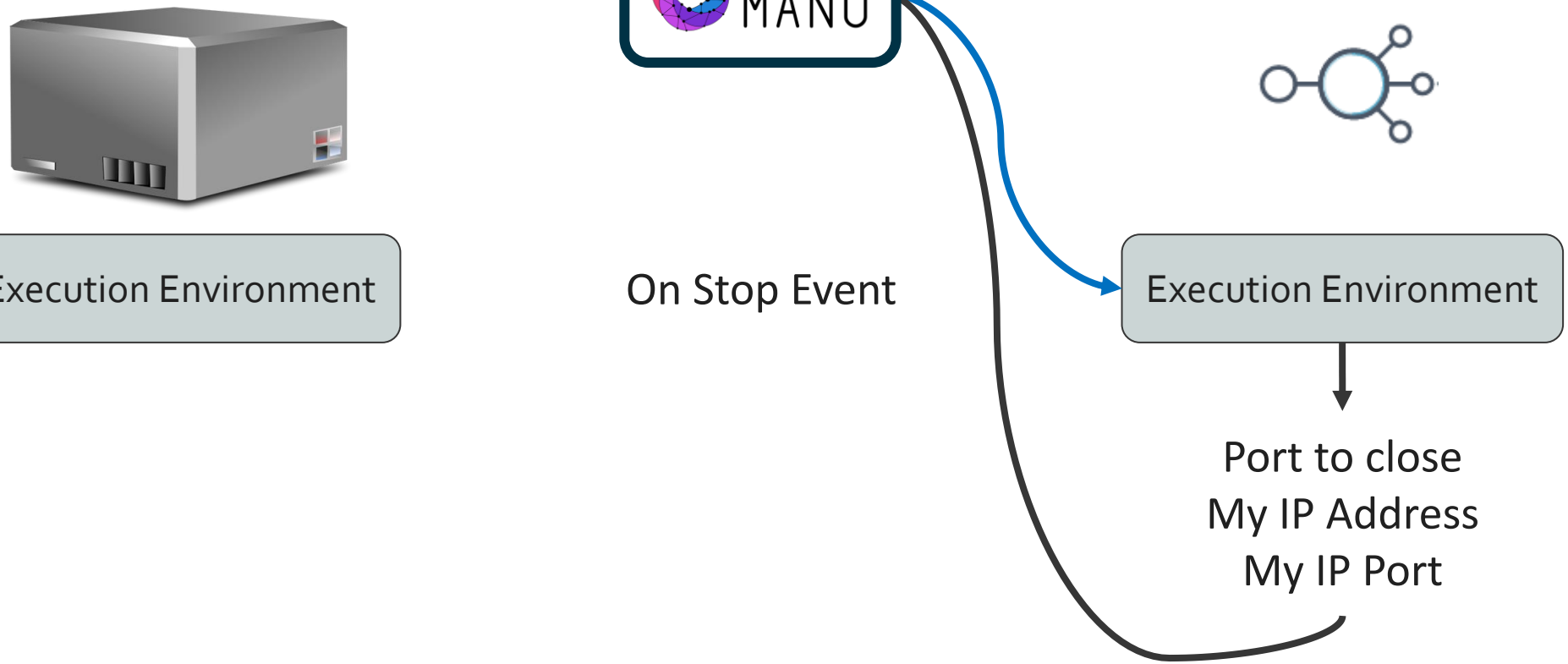
- Relation Joined
  - Notification that a new relation is going to be formed
- Relation Changed
  - Primary means of data exchange
  - Used to send and receive data between deployment units
- Relation Departed
  - Notification that relation is being removed due to deployment unit being terminated
- Relation Broken
  - Sent after all units have been terminated as the final message

Create Network Service With Relationship

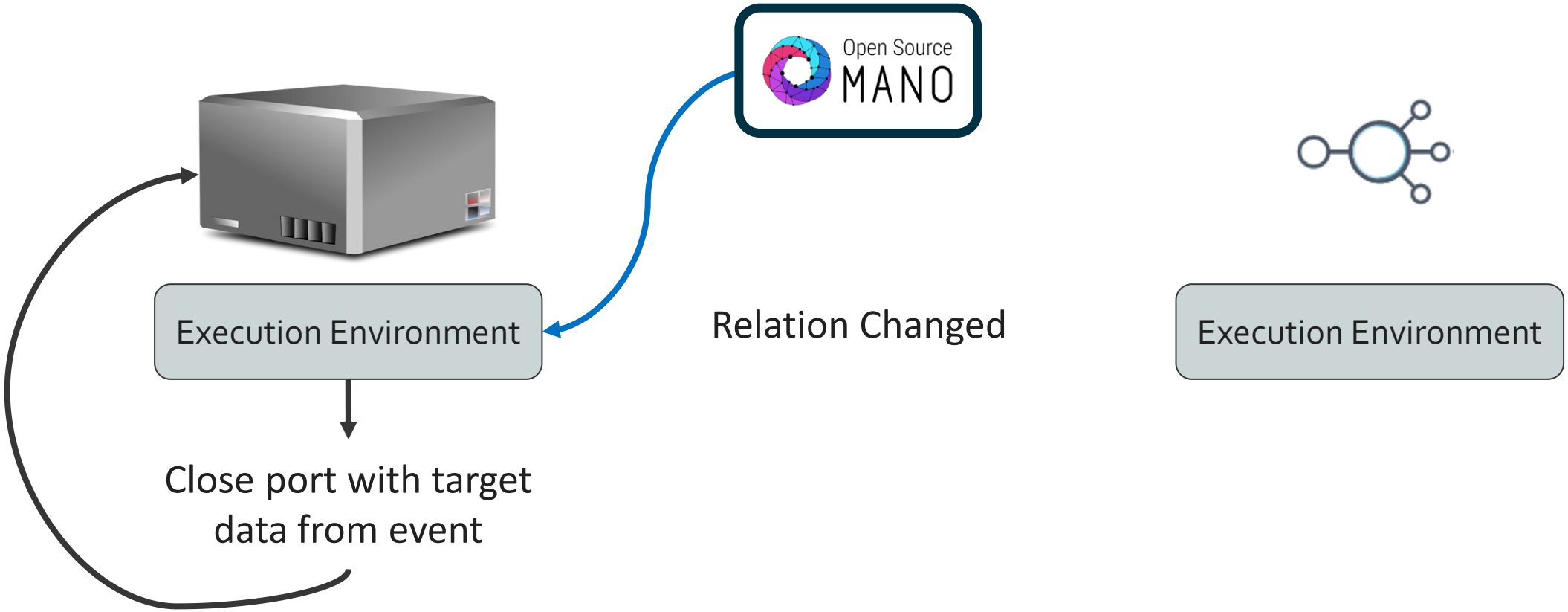
Data Exchange via Relationship



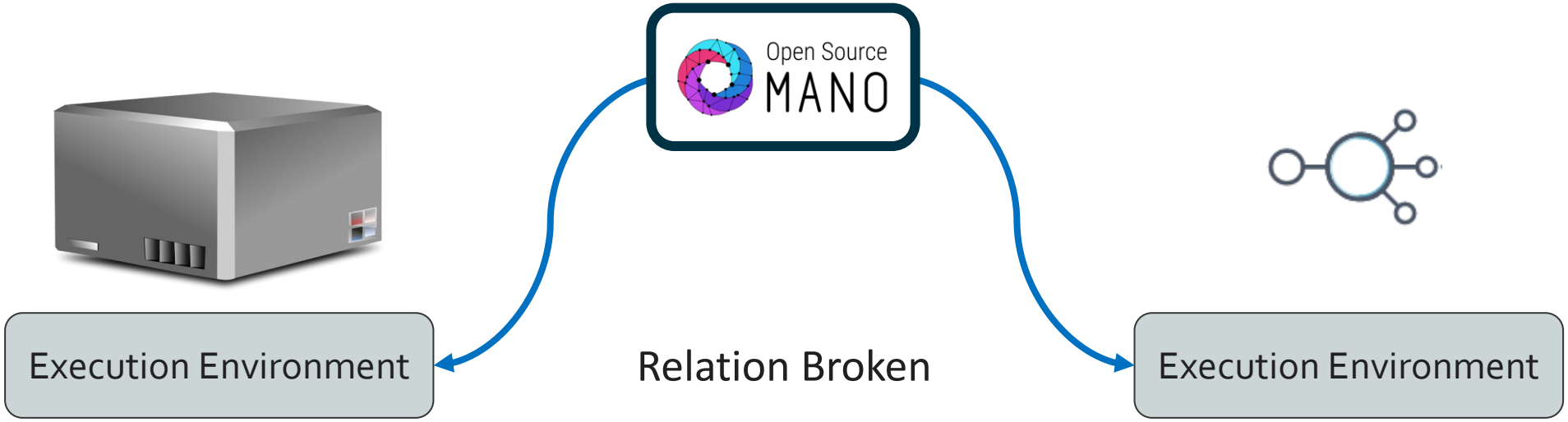
Removing the Network Service



Removing the Network Service



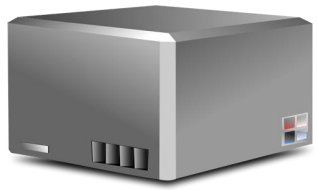
Removing the Network Service



Providing Information in Events

```
def on_firewall_loadbalancer_relation_changed(self, event):
    event.relation.data[self.model.unit]["port-to-open"] = "443"
    event.relation.data[self.model.unit]["target-address"] = self.ip_address
    event.relation.data[self.model.unit]["target-port"] = self.listen_port
```

```
def on_firewall_loadbalancer_relation_changed(self, event):
    port=event.relation.data[self.model.unit]["port-to-open"]
    target_address=event.relation.data[self.model.unit]["target-address"]
    target_port=event.relation.data[self.model.unit]["target-port"]
    add_firewall_rule(port, target_address, target_port)
```



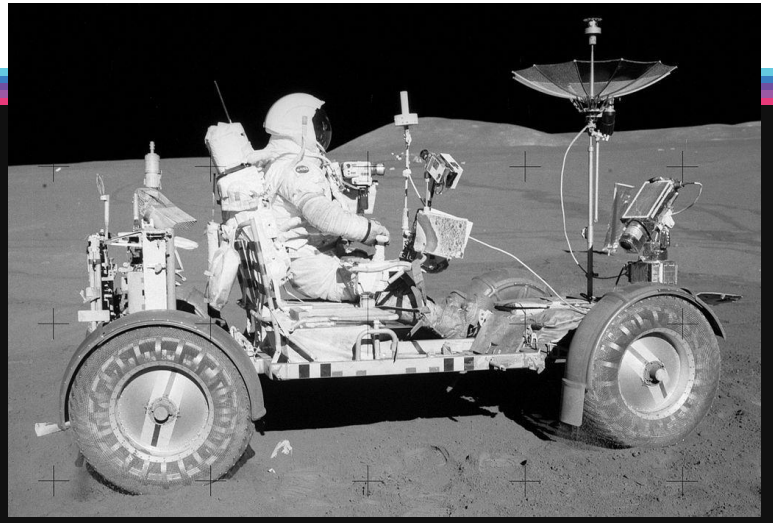
Further Information

https://juju.is/docs/sdk/relations

Open Source MANO

For more information:

osm.etsi.org
osm.etsi.org/wikipub
osm.etsi.org/docs/user-guide



Open Source MANO Release ELEVEN

ETSI