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**MANO**  
*by ETSI*

# NFV-OSM Cooperation

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OSM Vice-Chair, NFV NOC Vice-Chair

07/03/2023

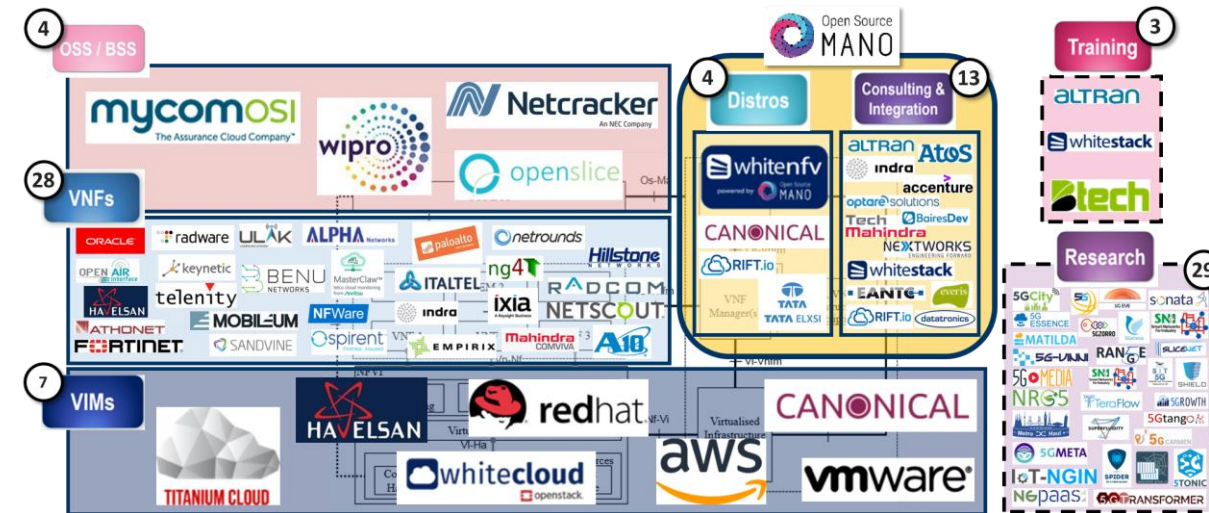
# ETSI OSM is a LARGE AND DIVERSE with 152 members



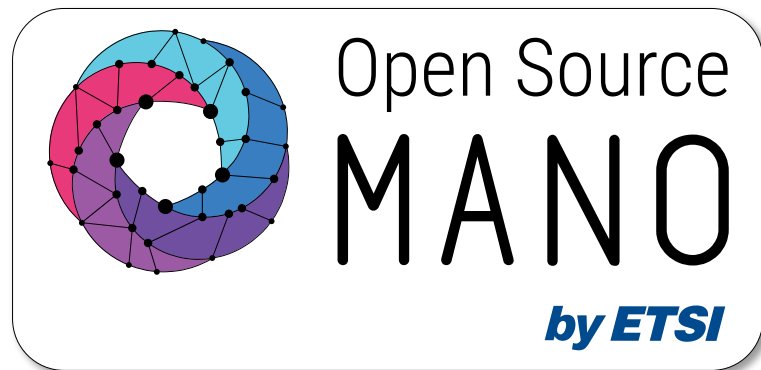
- 15 Global Service Providers
- Leading IT/Cloud players
- VNF providers



... with a significant number of commercial offers related to OSM (“OSM Ecosystem”)



# Strong relationship with research projects



<https://osm.etsi.org/wikipub/index.php/Research>

# OSM has a mature set of features following fourteen releases...

## Release ZERO

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

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## Release ONE

- Multi-VIM
- Multi-SDN
- Network Serv scaling
- Monitoring Plugin Model, N App metrics, no
- Full Day 0 & D operations

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## Release SIX

### NBI and operation

- RBAC improvem
- Re-enable NS pr

### Monitoring

## Release ELEVEN brings new features to foster current and new deployments

### SOL004 and SOL007 package formats



### Better coordination across PNFs, VNFs, and CNFs

- Enhanced data exchange between

### Brand-new support for Google Cloud

- Completing the infrastructure support for 3 largest public clouds

### Fine-grained operations in CN

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

### ... and other improvements in usability

- On-demand conf
- Push notification
- Policy support

### IMPROVED MOD

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

### NETWORK SLIC

- Integrated S
- IM extendec

### MULTI-SITE EX

- Dynamic int
- WIM plugin
- Multi-VIM E

### MONITORING IMPROVEMENTS

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

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## Release TWELVE adds features well connected with key use cases and field demands

### NF Healing

- VDU Healing
- Auto-healing

### SOL003 support

- SOL003 support as G-VI
- SOL003 subscription to

### NS Lifecycle

- Upgrade of VNF instances (upgrade of charms and p
- Removal of VNF instance from running NS.

### ... and other improvements in us

## Release THIRTEEN brings significant improvements in key areas

### New closed-loop life cycle arch.

- VM status, NS topology and VIM status acquired via Airflow.
- Prometheus Rec. Rules to derive VNF and NS status.
- Configurable Prometheus scrape targets.

### Internal LCM evolution

- Saga-based LCM Milestone 1
  - Configuration via configman library.
  - LCM-RO communication via Kafka.

### Execution Environments (day-2)

- Server-side authenticated gRPC channel in Helm-based Execution Environments.
- Upgrade of helm-based EE in VNF instances.
- New convention for charms naming in OSM.

- Docker, Vagrant and VM image install

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6

## Better access to OSM's subscription API

OSM client extension



## Monitoring of availability

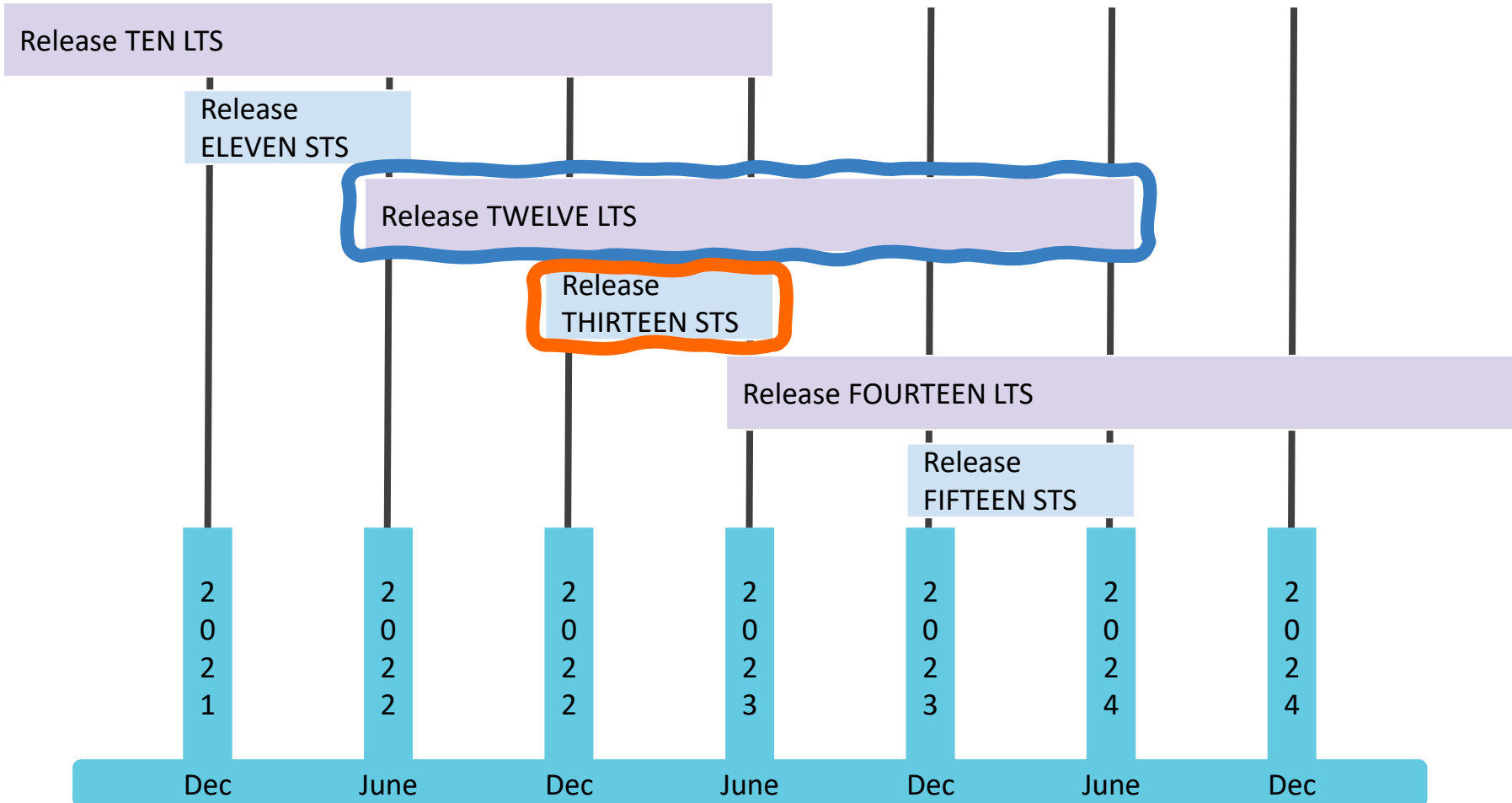
VIM resources

OSM's portal now provides visibility on available resources



## the learnings of latest OSM production deployments

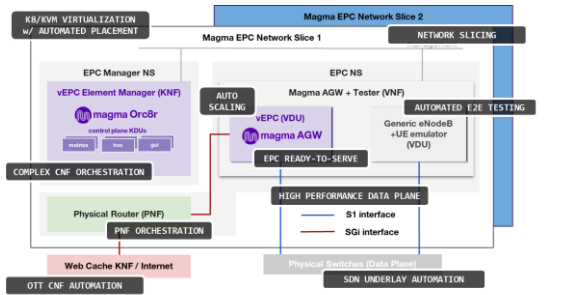
# Cadence of OSM releases



LTS Releases (Long Term Support)	STS Releases (Short Term Support)
24 months community support	6 months community support
Oriented to production	Oriented to innovation & development
Focus on stability	Focus on innovation & agility
Community grants upgrade between LTS's	Upgrade on a best effort basis

# Programme of Hackfests, Webinars, and Ecosystem days

## MAGMA EPC DEMO (2020)



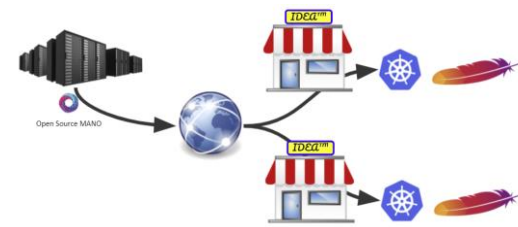
<https://osm.etsi.org/gitlab/vnf-onboarding/osm-packages/tree/master/magma>

## OSM#11 Hackfest

11 teams onboarding 8 NFs in just one week!



## Release TEN Webinar Edge orchestration with OSM

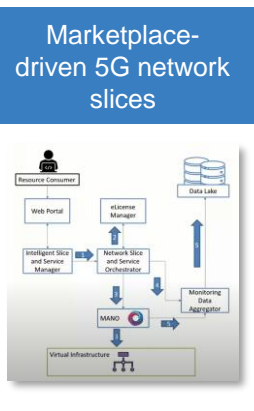


## OSM-MR#11 Hackfest

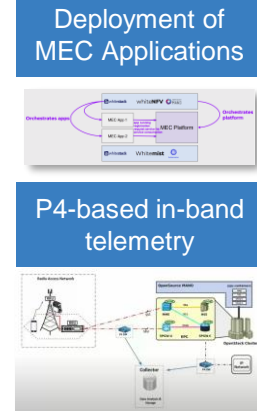


## OSM Ecosystem Day 2022

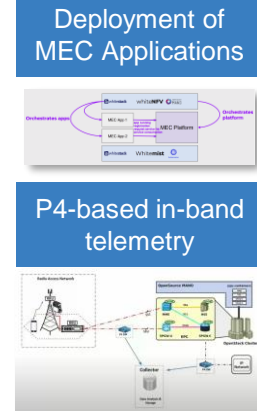
### Marketplace-driven 5G network slices



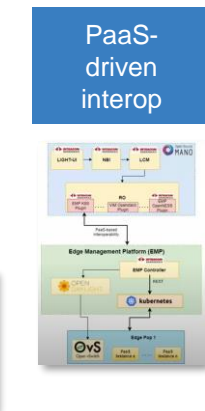
### Deployment of MEC Applications



### P4-based in-band telemetry



### PaaS-driven interop

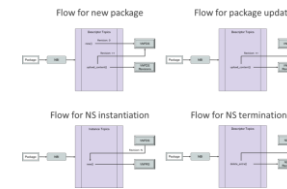


## Release TWELVE Webinar

### Healing & scaling in massive sports events

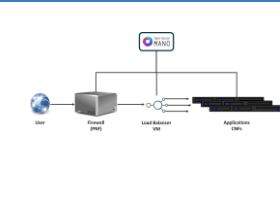


### Live upgrade of a NF

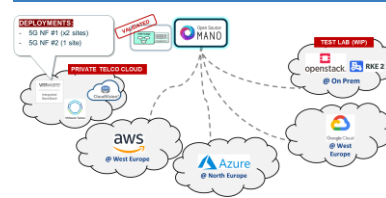


## Release ELEVEN Webinar

### Resolution of inter-NF relations



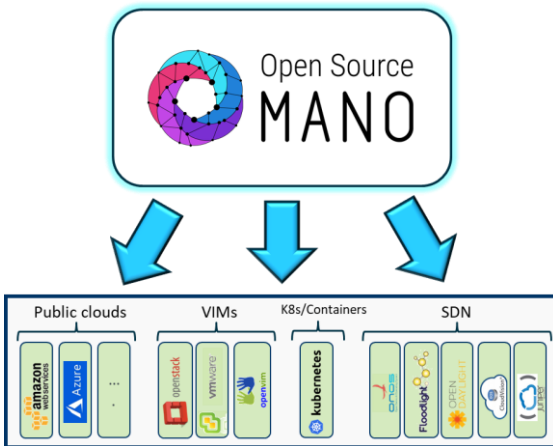
### Multi-Cloud Deployments



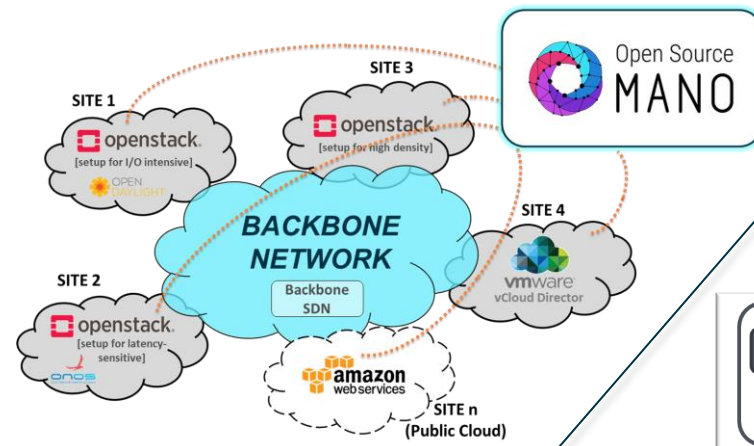
# OSM orchestrates ...

... on different types of infrastructure and across different locations...

## MULTI-VIM & MULTI-SDN

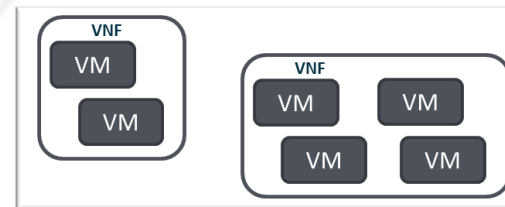


## MULTI-SITE

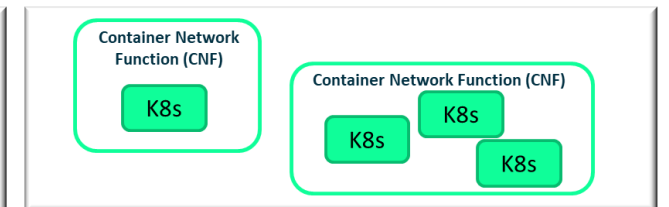


... with NFs composed of VMs, containers and/or physical elements...

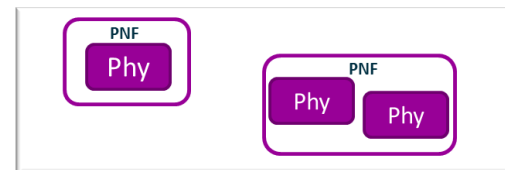
a) All VMs



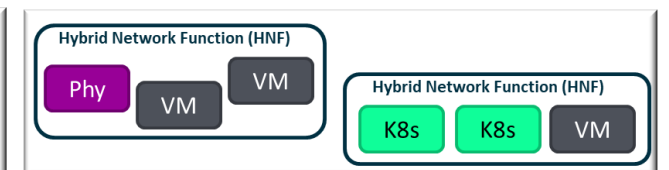
b) All Containers



c) All Physical



d) Hybrid cases

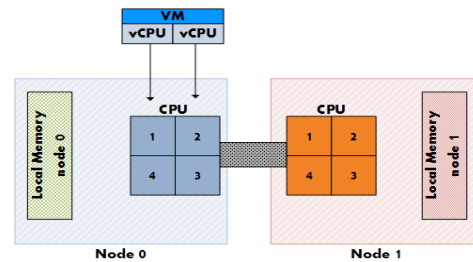


... and ready for network-specific workloads whenever needed

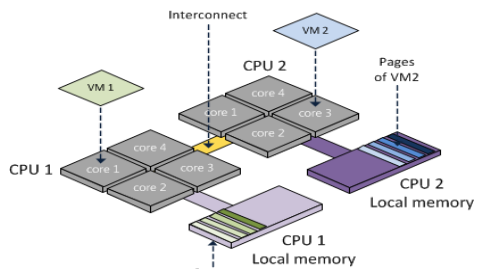
### Huge Pages



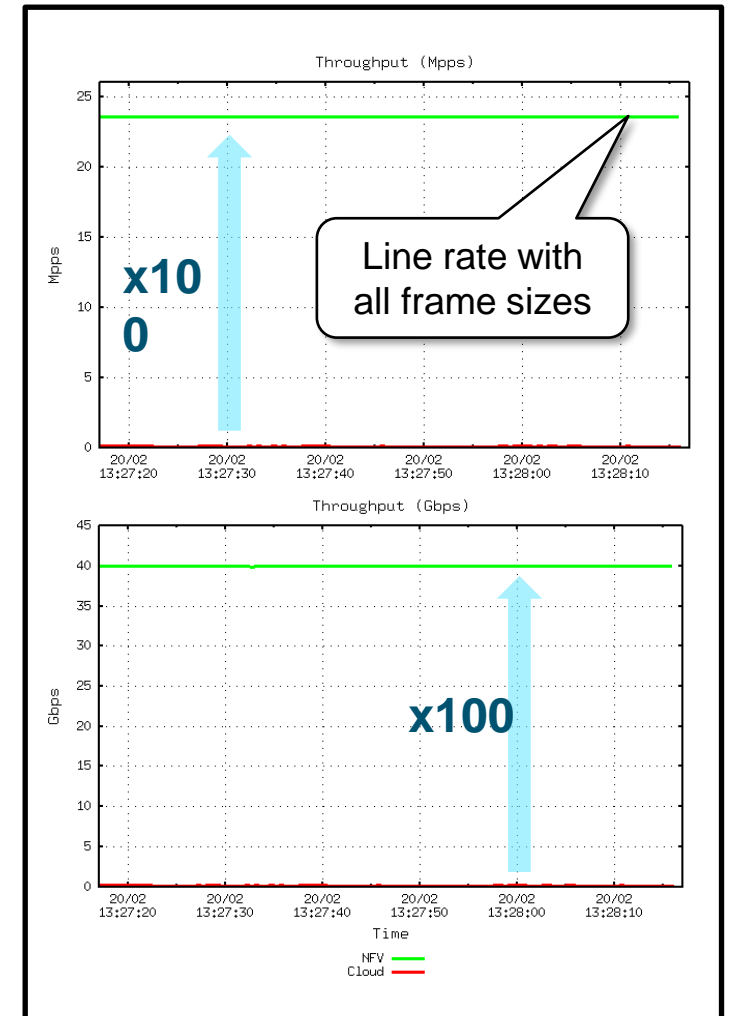
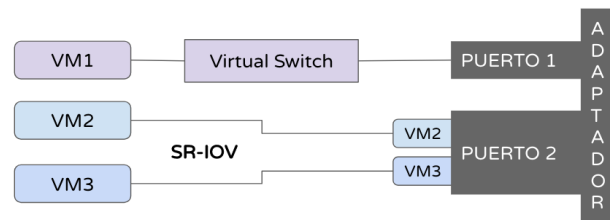
### NUMA Topology Awareness



### CPU Pinning

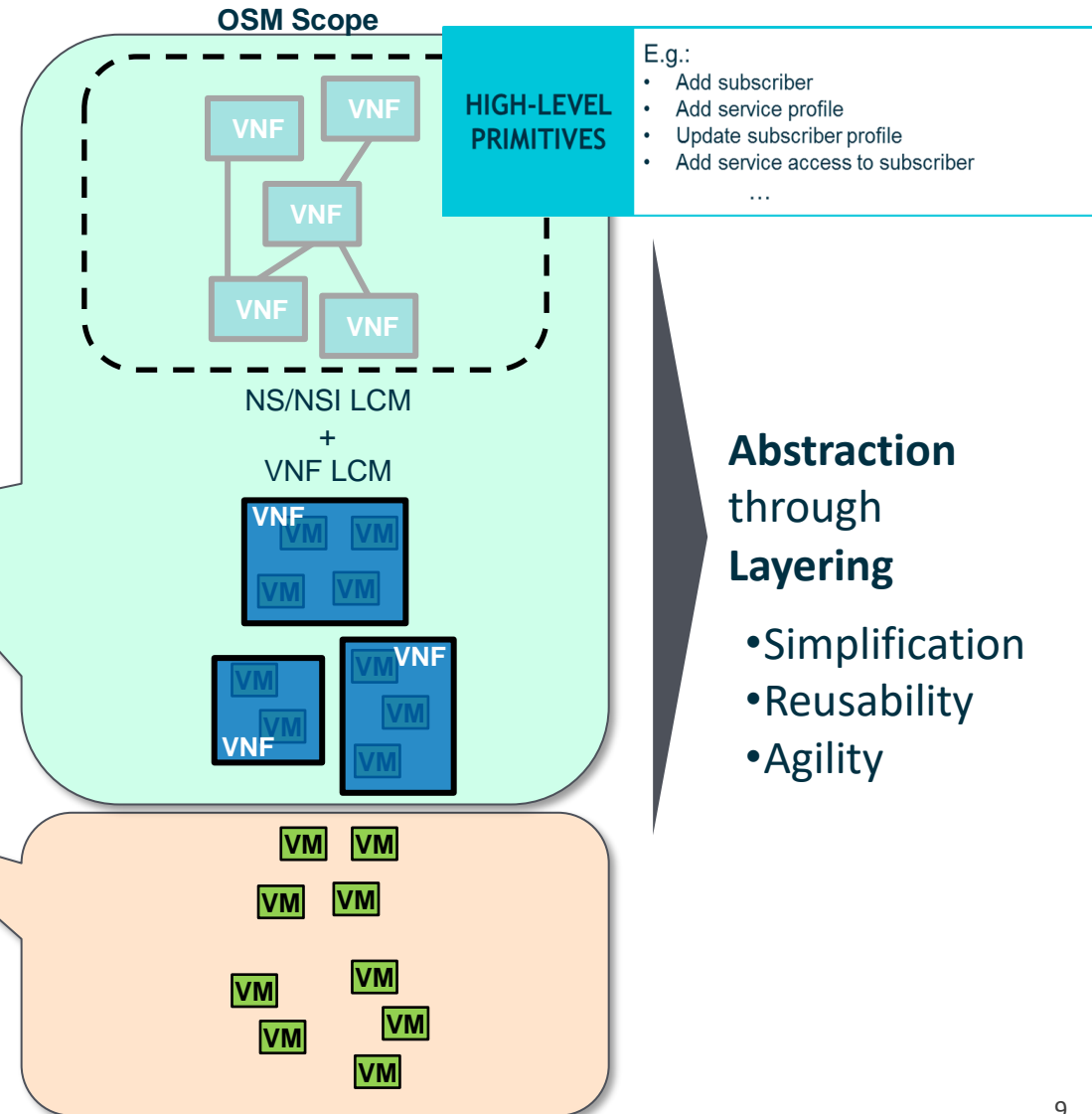
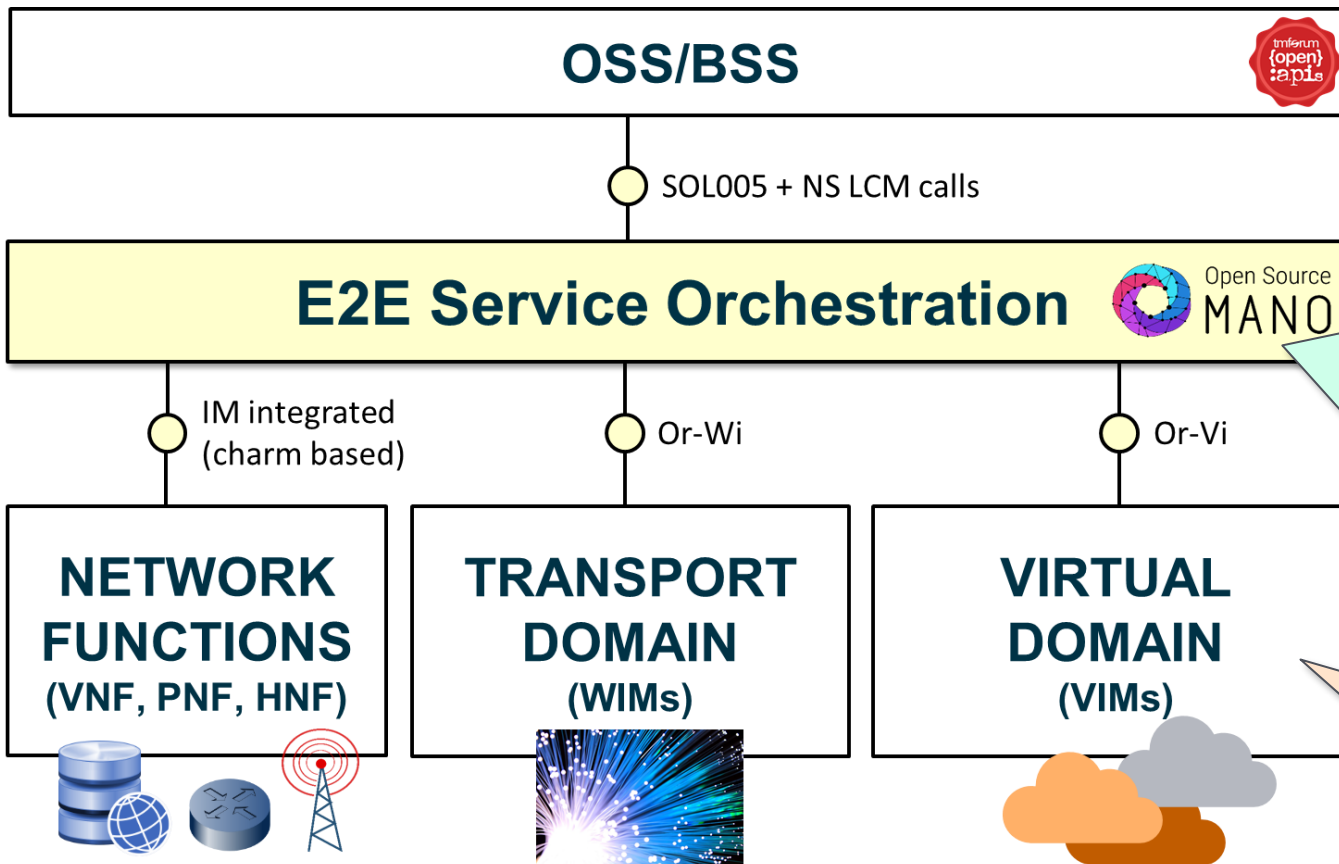


### Data Plane assignment

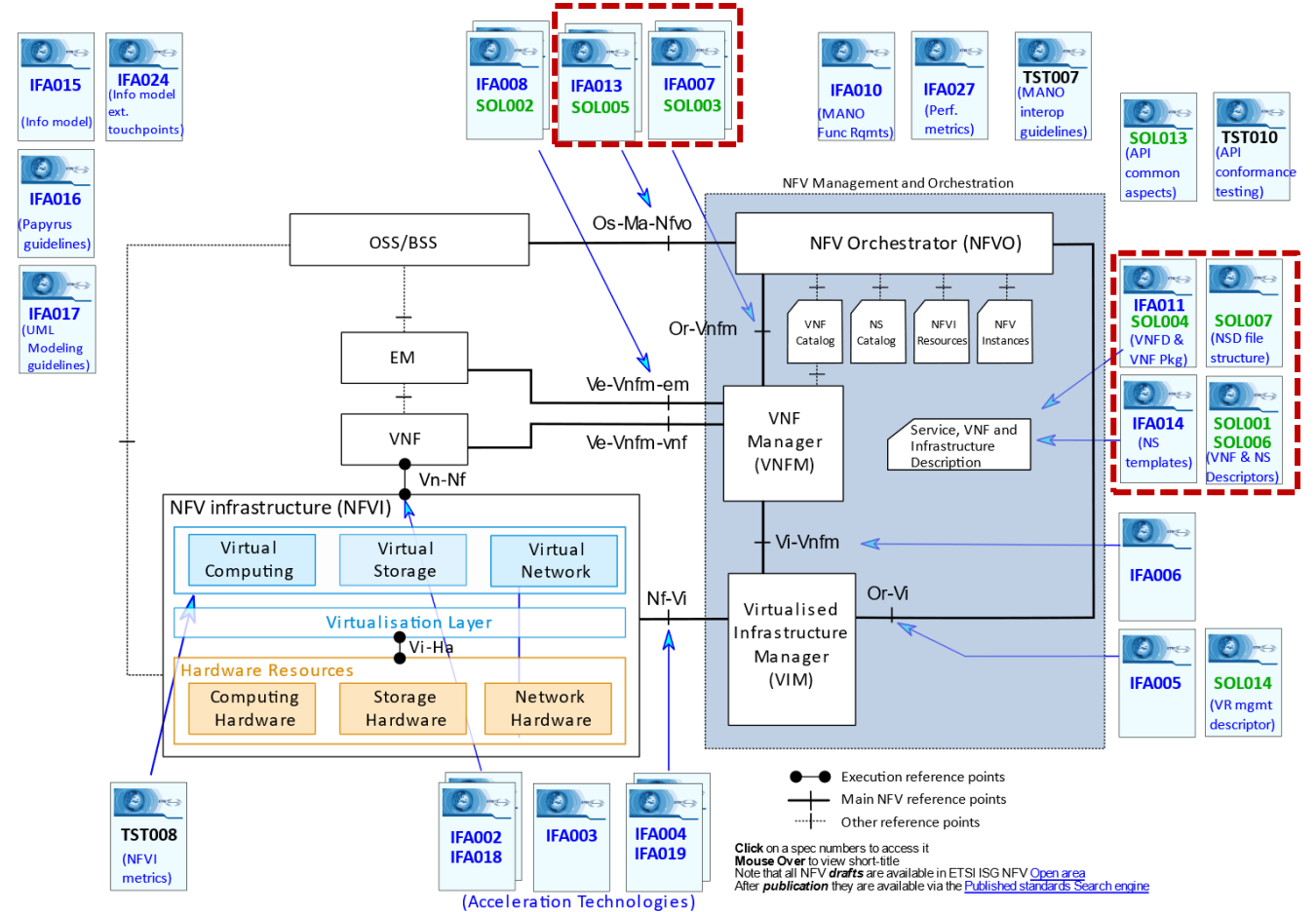
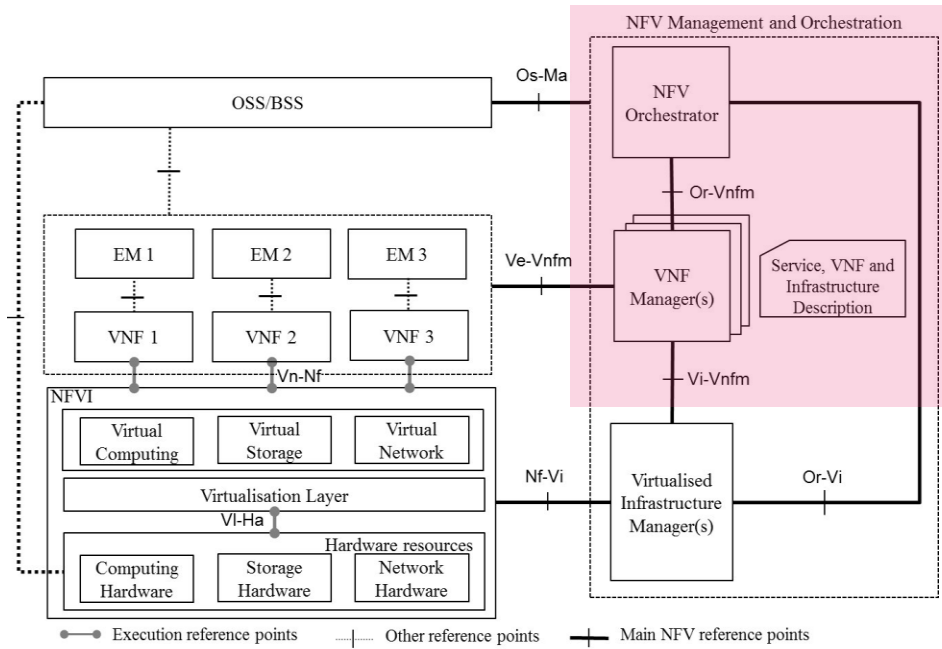




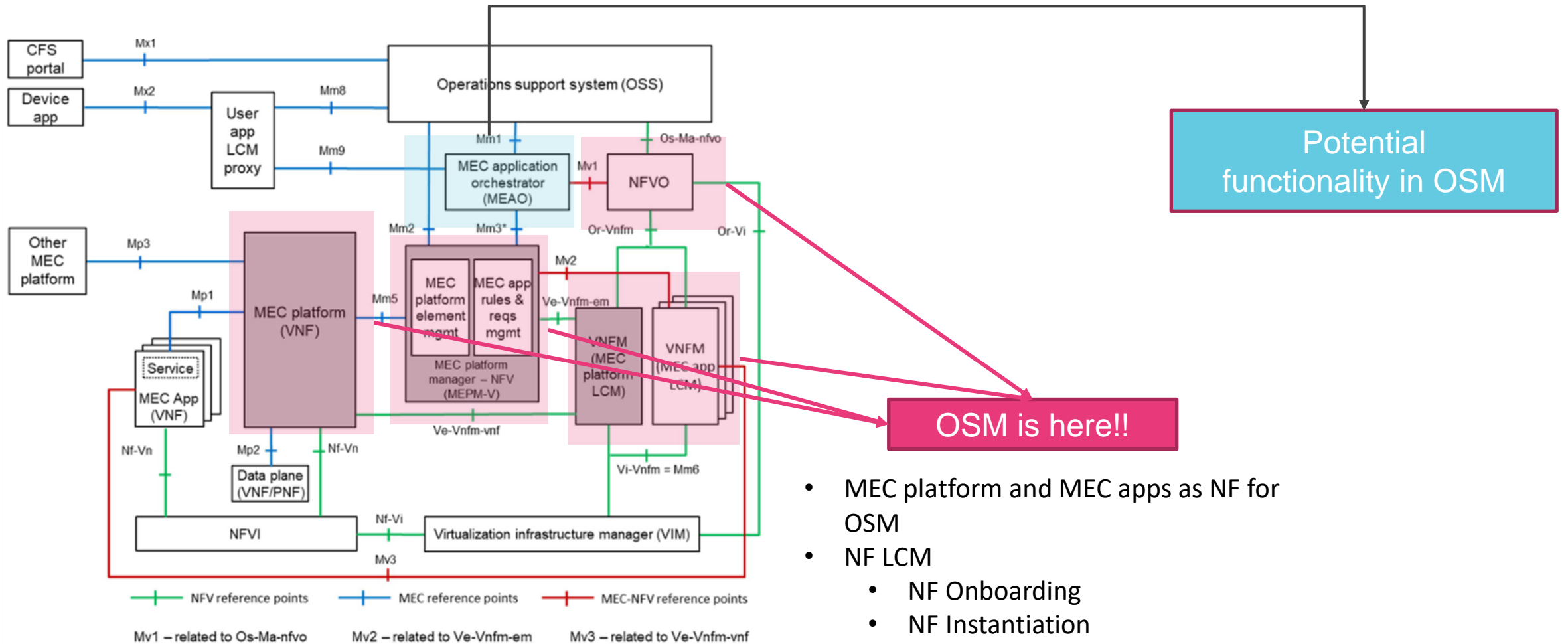
# Scope of OSM



# OSM in ETSI NFV architecture

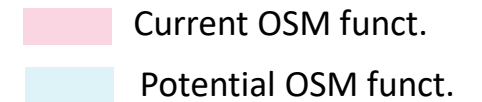
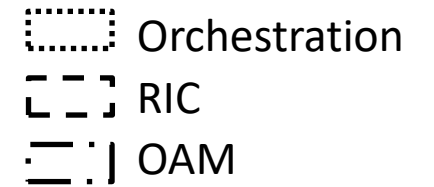
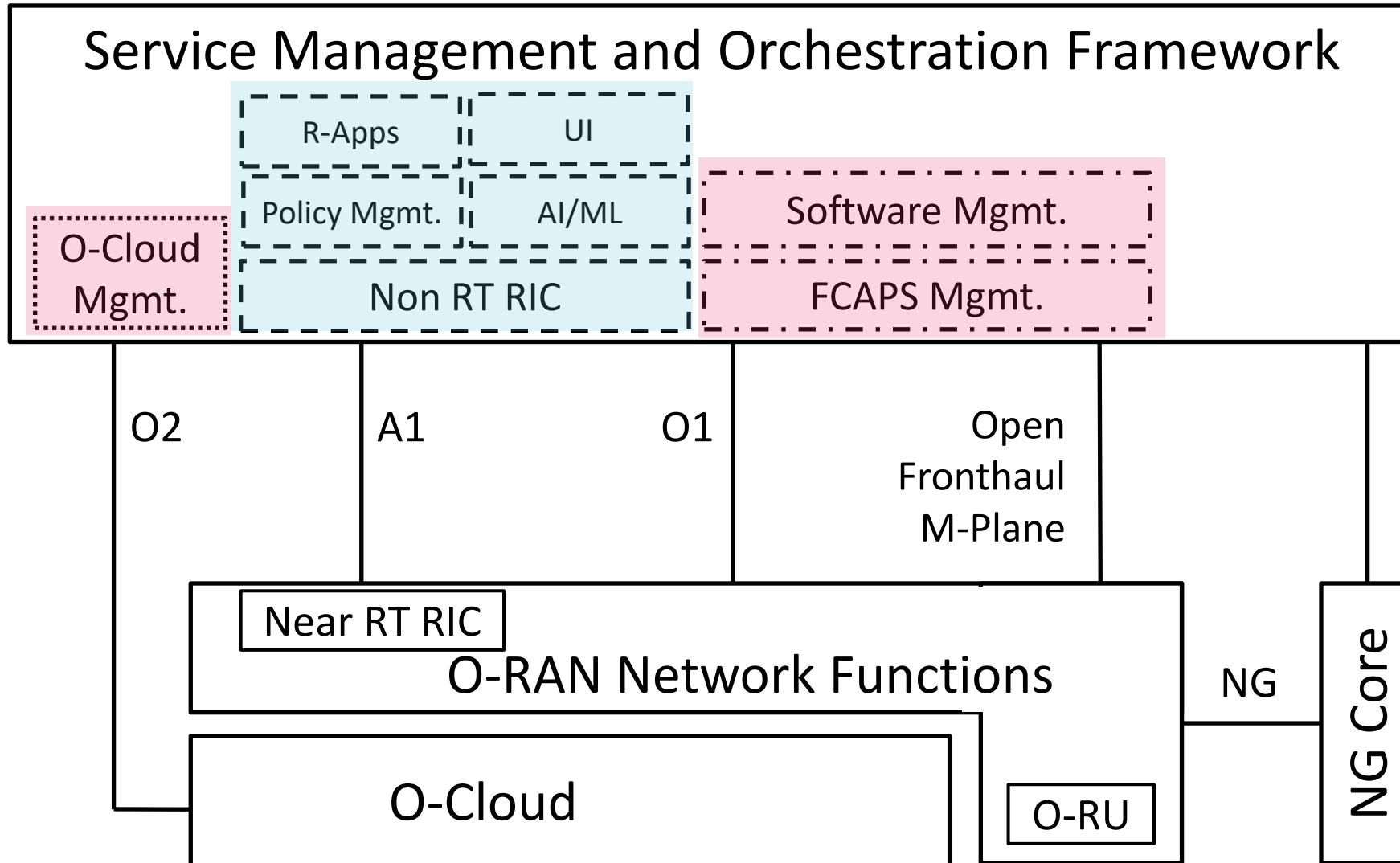


# Relation to ETSI MEC architecture

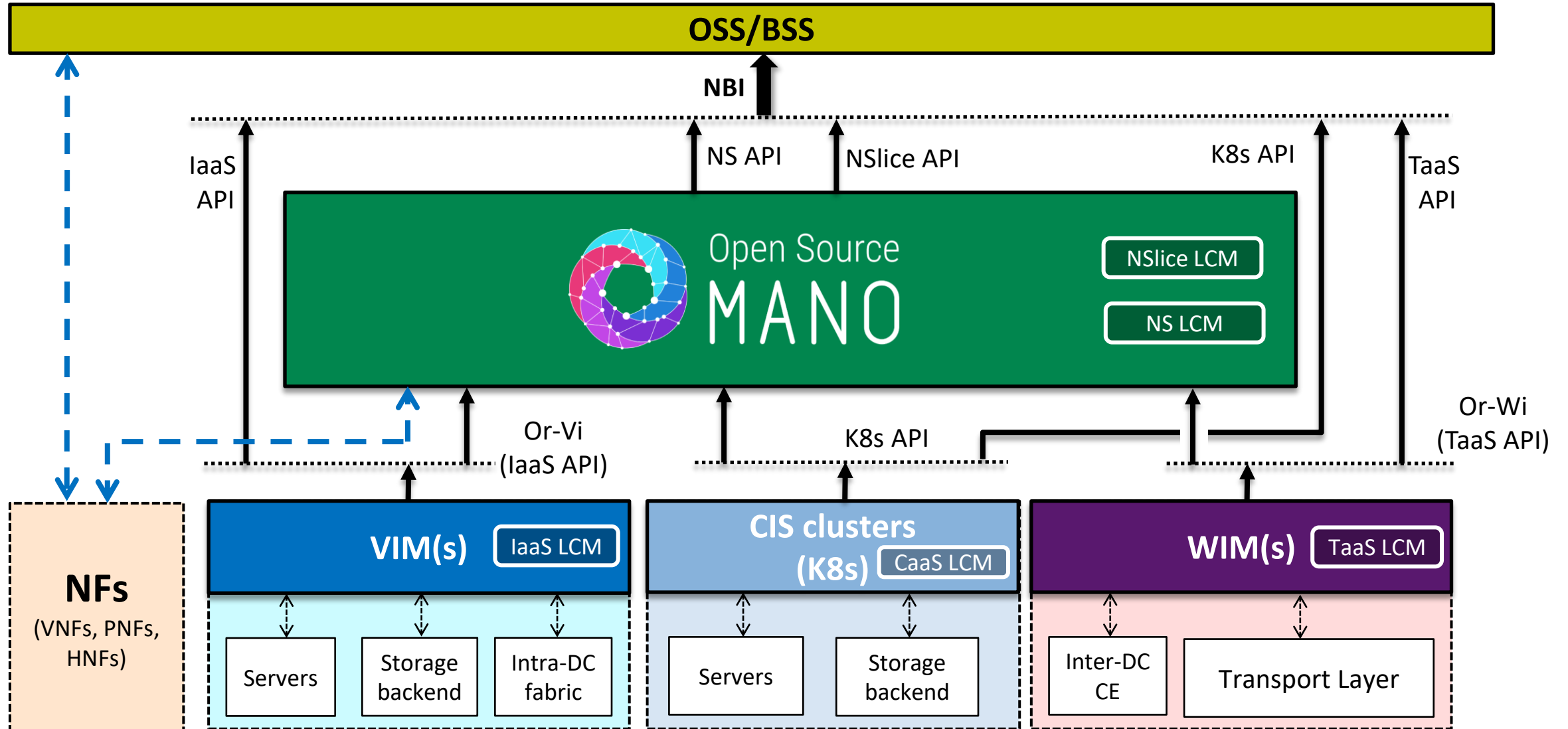


- MEC platform and MEC apps as NF for OSM
- NF LCM
  - NF Onboarding
  - NF Instantiation
  - NF Operation

# Relation to O-RAN architecture

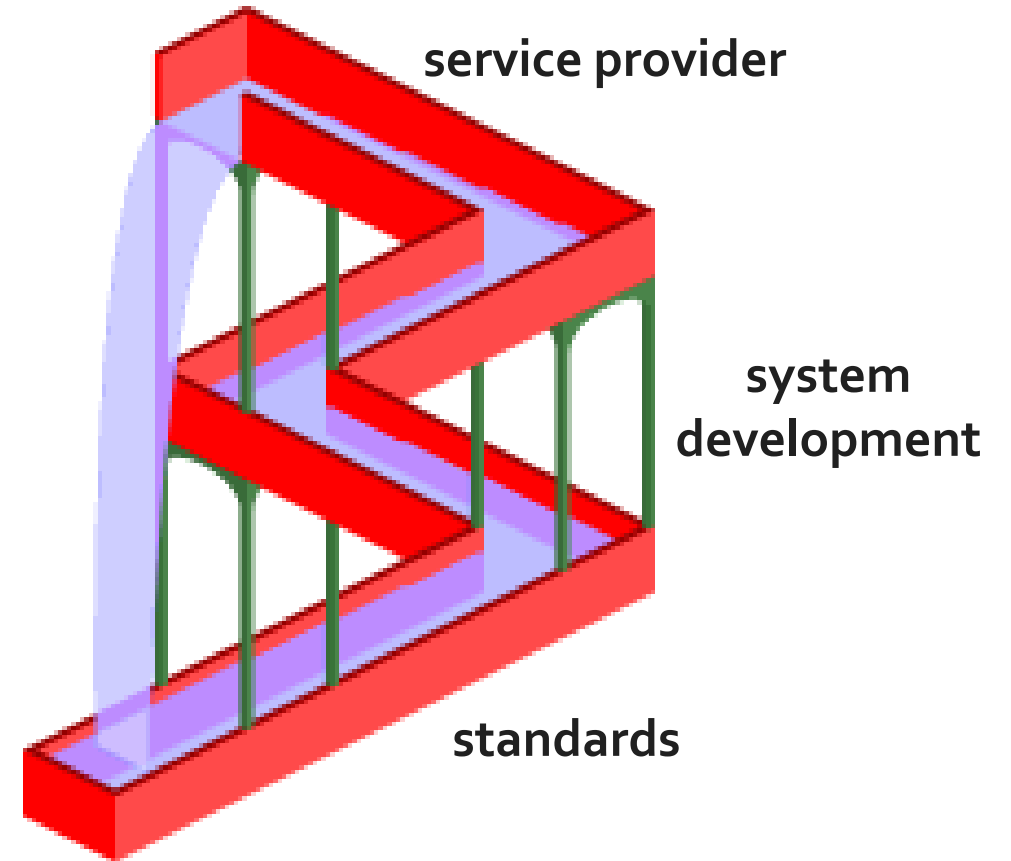
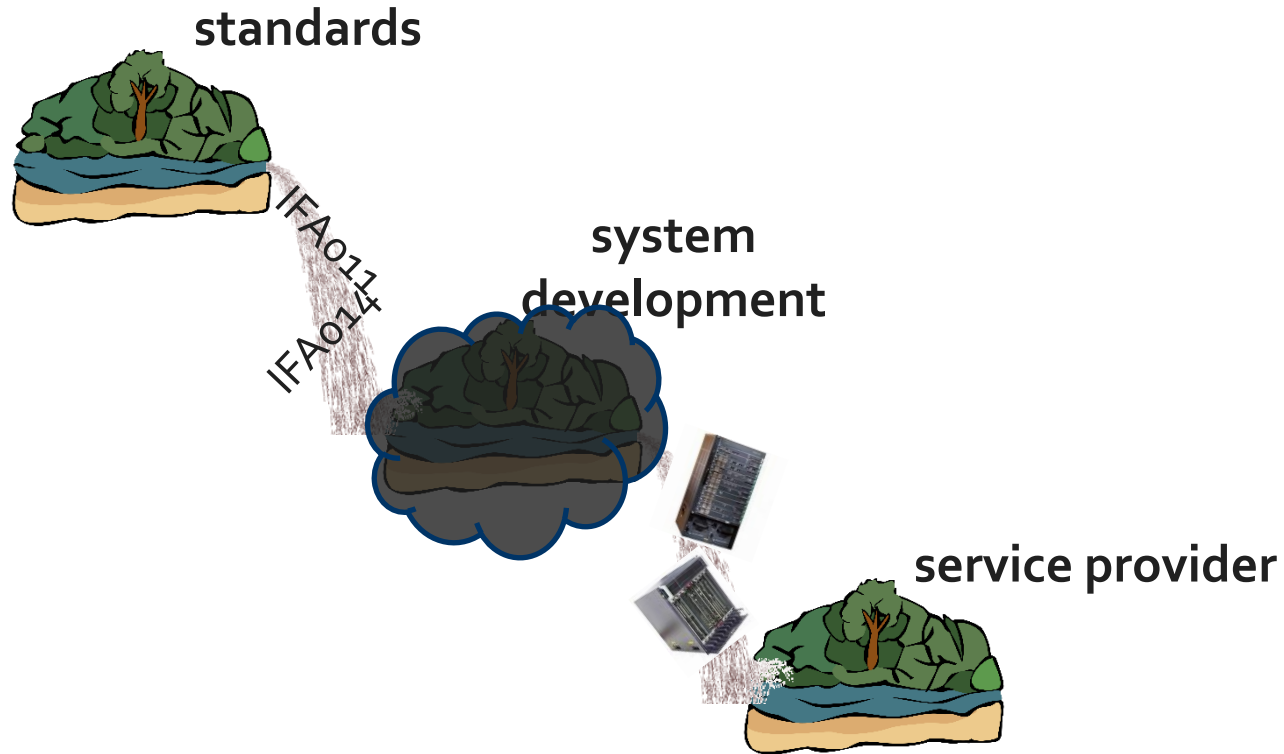


# Interoperability architecture is key

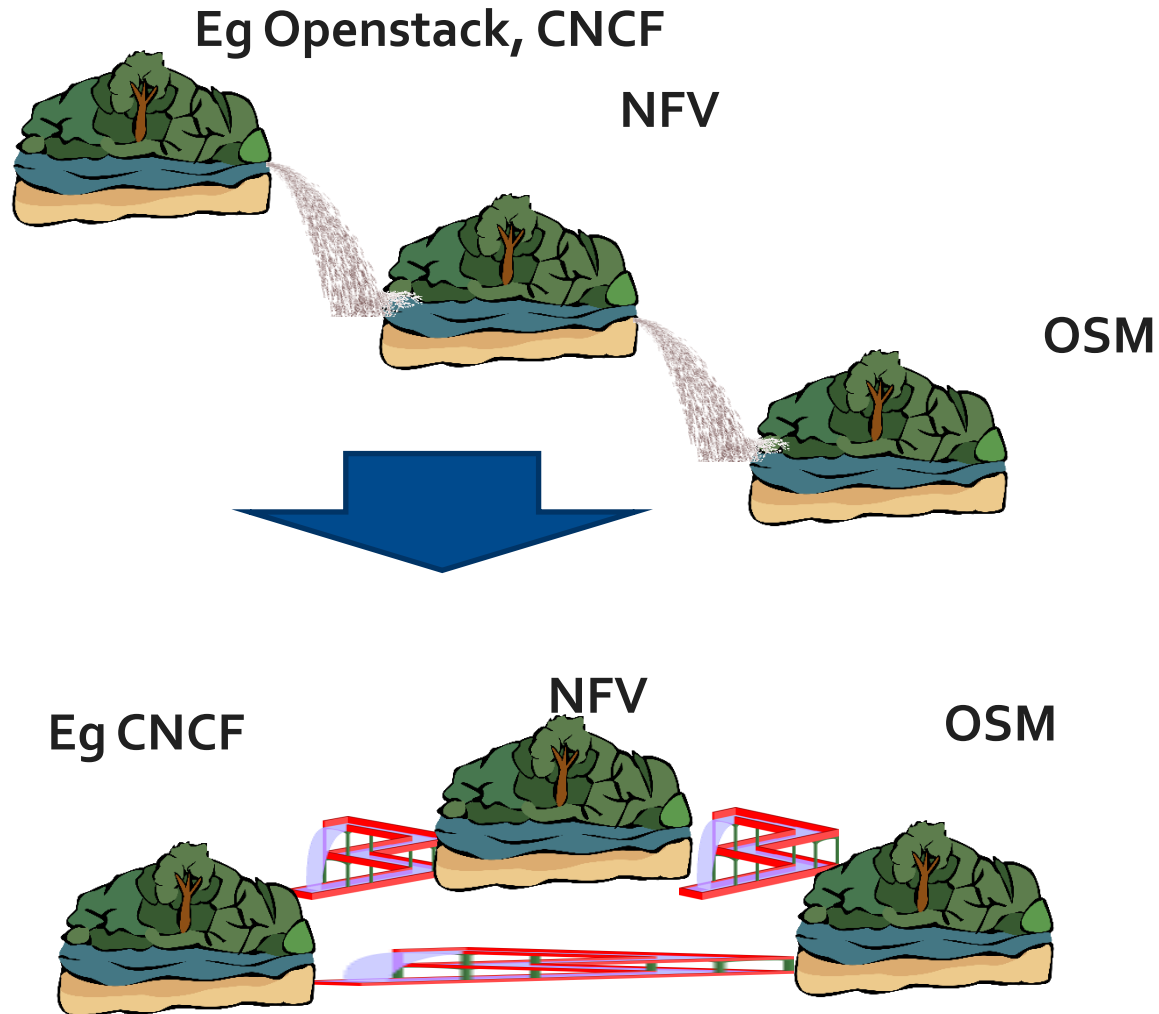


# Learning by doing

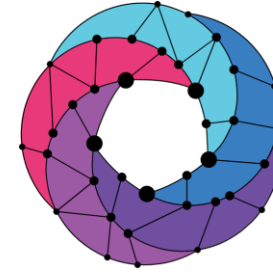
(OSM EUAG Slide from 2017)



# Evolving NFV-OSM Cooperation



- But ...
  - OSM does not currently implement every feature specified in NFV
  - OSM has already implemented some features not yet addressed by NFV
- And ...
  - CNCF projects do not always recognise or prioritise NFV features
  - Some CNCF projects are commencing without NFV input



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**Thank You!**