Demonstrating Key 5G concepts: Telefónica-Telenor Network Slicing interoperability using OSM with NFV/SDN technologies involving new 5G verticals
How to build a future-proof network ready for 5G and beyond?
Our vision: a future proof software-based network designed to be agilely changed and operated in an automated fashion

- Wider and competitive vendor ecosystem
- Agile and open innovation
- Faster Time-to-market
- A way to differentiate

Key enabler for future 5G and beyond

- Simplified & automated operation
- E2E lifecycle management
- Common information models
- Simple integration per VNF
- Lowering entry barriers
- Elastic and scalable networks

SOFTWARE DEFINED

MOULDABLE HARDWARE

✓ Homogeneous and versatile infrastructure
✓ Commoditized infrastructure
✓ Easier interoperability
✓ Flexible and easy capacity addition
✓ Common IT+Network infrastructure operation
Joint PoC to operationalize Network Slicing with coexistence of eMBB and URLLC services using OSM

1st step. OSM to orchestrate and manage delivery of Slices with differentiated QoS, Availability, Assurance and Security (across ONE network)
Why Open Source? To accelerate the availability of a true standard while helping to build a wide and competitive ecosystem.

SDOs

Specs taken as a reference and implemented

Feedback provided to enhance the specs

Open Source
Why OSM? Led by Service Providers, ETSI OSM has demonstrated to be key to set up a common reference framework for orchestration.

OSM is on the 6th release & ready for commercial.

Available at: osm.etsi.org
Release FIVE extends and improves OSM in many key areas

**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

**IMPROVED MODELLING & NETWORKING**
- Service Function Chaining (SFC)
- Physical Deployment Units
- 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
**OSM is Model-centric.** Modelling is key to hide internal complexity and simplify/automate daily operations

OSM modelling is complete, self-contained and agnostic to technology infrastructure.

OSM allows modelling three different types of entities:

- **NF Packages (VNF, PNF, HNF)**
  - Mgmt Procedures
  - Resource Description

- **NS Package**
  - Mgmt Procedures
  - Topology

- **Network Slice Package**
  - Mgmt Procedures
  - Topology

All the life-cycle management aspects can be modeled: creation, initial configuration and further operations (reconfiguration, scaling, maintenance, etc.)
Presenting and Managing Network Services and Network Slices as single entities is key to simplify integration towards OSS/BSS.
OSM provides Network as a Service (NaaS) in the form of NS and Slices that can span across different VIM+NFVI, Transports, and Network Functions…
… with a **unique and non-ambiguous IM**, independent of the technologies southbound and capable to embed operational code of Network Functions.
… while the northbound view for **Day-2 operations** for the NS/Slice remains as high level actions

**NS actions** are available northbound as **high level primitives** during runtime
“In theory, there is no difference between theory and practice. But, in practice, there is”

(Benjamin Brewster)
PoC Objective

Deploy 2 Network Slices with some input parameters and operate them through Day-2 operations at Network Slice level

- **Deployment**: Each slice is modeled as a set of Network Services connected by networks or VLDs
  - Simple input parameters determine the type of slice to be created on demand
  - The 2 slices share some Network Services (shared NS Subnets)
    - If the shared NS was already deployed, it won’t be deployed again
    - It will be reused, but initial configuration for the second Network Slice can still be done in the shared NS to let it know that new elements are present.

- **Operation**: Running Day-2 primitives at Network Slice level (handled as a single object)
  - OSM, behind the scenes, maps them to a sequence of calls to NS primitives, which, in turn, are derived in calls to VNF primitives
PoC participants (so far)
1st Slice: eMBB

Slice #1: eMBB

EPC1 (shared) Subnet

RAN

Radio (shared) Subnet

Oracle PCRF

PCRF (shared) Subnet

VNF

PNF

S1

S5u

S5c

Gx

Gy (OCS)

SGi (INET)

S6a (HSS)

MGMT

S1U

S5U

S6A

SGI

GX

S5c

S5u

S1MME
Seeing the full picture

Slice #1: eMBB

Slice #2: URLLC
Reimagine.
Reinvent.
Reconnect.
Key takeaways and lessons learnt

- OSM is intended to facilitate the management at Network Service or Slice levels, coordinating behaviors of different components
- In OSM, there are no fundamental differences between a VNF, a PNF or a Hybrid Network Function (HNF)
- OSM does not mandate specific protocols to interact with the Network Functions
  - This adaptation is handled at charm level (bundled in the NF Package)
  - Charms usually leverage on pre-existing libraries to support the most common types of communication
- The VNF provider does not (and should not) need to known service provider’s NFVI+VIM upfront
  - OSM descriptor (bundled in the package) is sufficient to feed OSM with all information that is required
- The VNF vendors must have a well-known procedure to automate the different LCM aspects of the VNF
  - Clean delimitation of Day-0 vs. Day-1 vs. Day-2 is critical to make the process repeatable
  - It is critical to avoid hardcoded values (identify parameters instead)
  - Elaboration of VNF Packages by the own VNF developer is highly recommended to avoid reverse engineering
  - The VNF vendor should have a clear automation strategy across its organization and product lines
Next step: OSM capability towards cross-domain Orchestration
If you want to learn more…

• OSM Release FIVE – **GIVE IT A TRY!**
  • Follow instructions at:

• OSM EUAG White Papers

• Tutorials and examples from 5th OSM Hackfest
  • [https://osm.etsi.org/wikipub/index.php/5th_OSM_Hackfest](https://osm.etsi.org/wikipub/index.php/5th_OSM_Hackfest)
Reimagine.
Reinvent.
Reconnect.