Introduction to OSM

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OSM Training Seminar - SLICES

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Some requirements for the evolution of Telco Clouds...

**NEXT-GEN TELCO CLOUD**

**REQUIREMENTS FROM NEW SERVICES**

**BUSINESS DRIVERS**
- Cost reduction
- Time to market reduction
- Improved customer experience

**CONSTRAINTS**
- Network & IT, in process of convergence
- Legacy systems (e.g. preexisting OSS)
- Legacy Vertical Deployments

**NEW TECHNOLOGY ENABLERS**
- Containerization
- Autonomous Operation
How OSM Simplifies Telco Cloud Management...

... while keeping flexibility
OSM provides a platform to create Networks as a Service and to manage them conveniently later...

OSM manages the low-level setup for Network Functions, so that they are ready for use.

- It covers in 100% the role of a kind of **specialized PaaS for Network Functions**, with 2 key features:
  1. **Complex connectivity** setup, including EPA and underlay scenarios.
  2. Solve **inter-NF relations**.

- Returns: **NS/NF ready for its use and properly connected**:
  - Exposes the “function” and its lifecycle, not its components.
  - Presented as a whole (i.e., abstracts from low-level details of the NF).
  - Easy (standardized) access to NF's lifecycle operations, via **primitives**.

- This follows well-known paradigms in **IT** and **public clouds**.
... 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
  - 72 GB RAM
  - 24 GB RAM
  - 48 GB Huge Pages

- NUMA Topology Awareness
  - Line rate with all frame sizes
  - x100

- CPU Pinning
  - Interconnect
  - Pages of VM
  - CPU 1
  - Local memory

- Data Plane assignment
  - VM1
  - Virtual Switch
  - PUERTO 1
  - VM2
  - SR-IOV
  - VM2
  - PUERTO 2
  - VM3
  - Local memory

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OSM functionality is based on ETSI NFV reference framework

NF and NS as a Service

NFV MANO

NFVO

NF catalogue
Multi-tenancy
RBAC

VNFM

NB interface (REST API) based on SOL005 (+SOL003)

Common model for NS and NF packages (SOL004, SOL007) and descriptors (SOL001, SOL006)

Multi-site and multi-cloud southbound interaction
Key concept: replicability and predictability

Network designs can leverage on replaceable components that can be safely and automatically assembled.
Using the exact same packages, the same service can be deployed in multiple types of clouds and sites

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

PRIVATE TELCO CLOUD (PRODUCTION)
Using the exact same packages, the same service can be deployed in multiple types of clouds and sites.
As a result, OSM brings big operational benefits for the challenges of a modern Telco Cloud

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Description</th>
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<tbody>
<tr>
<td>Reduction of complexity</td>
<td>• Via abstraction &amp; layering</td>
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<td>Reliable deployment in multiple locations</td>
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<td>Independent of the type of cloud</td>
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<td>Vendor-agnostic</td>
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<td>Reliable and unambiguous testing</td>
<td>• Ideal for CI/CD</td>
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<td>Error minimization</td>
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<td>Minimal Time to Market for second deployments</td>
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<td>Easier capacity growth among clouds</td>
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<td>Ability to move workloads between clouds</td>
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<td>Allows for advanced redundancy schemas</td>
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<td>Reduction of efforts</td>
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A Vibrant and Thriving Community
OSM Community is really **LARGE AND DIVERSE**, with **153** members today, but always **OPEN** to new participants.

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

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

- **ETSI NFV**: Industry Specification Group on Network Functions Virtualisation

- **ETSI OSM**: ETSI hosted Open Source project developing a Management and Orchestration (MANO) stack aligned with ETSI NFV Architectural Framework and IM
OSM activities create continuous feedback loops with other ETSI initiatives...

- Architectural Framework
- Information/Data Model (IM/DM)
- API definitions
- Test Specs

**ETSI NFV**

- **Testing**
  - Release White Papers
  - IM improvements (100+ points raised), bugs in APIs
  - Lessons learnt [EUAG White Paper](#)

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... while providing a highly effective bridge between Standards and Research Projects

ETSI NFV

Open Source MANO

https://osm.etsi.org/wikipub/index.php/Research
OSM in production: two releases per year
OSM Release cadence

- **LTS Releases** (Long Term Support)
  - 24 months community support
  - Oriented to production
  - Focus on stability
  - Community grants upgrade between LTS’s
  - Upgrade on a best effort basis

- **STS Releases** (Short Term Support)
  - 6 months community support
  - Oriented to innovation & development
  - Focus on innovation & agility

**Release Calendar**:
- **Release TWELVE LTS**
  - Dec 2020
  - June 2022
  - Dec 2023
  - Dec 2025

- **Release THIRTEEN STS**
  - Dec 2022
  - June 2023

- **Release FOURTEEN LTS**
  - Dec 2024

- **Release FIFTEEN STS**
  - June 2025

- **Release SIXTEEN LTS**
  - Dec 2026

- **Release SEVENTEEN STS**
  - June 2027
Release FIFTEEN brings a whole set of new functionalities ...

NS instantiation and lifecycle mgmt
- Cancel operation task.
- Service Function Chaining.
- AZ for Cinder.
- Dual-Stack IP Support for VNFs in SOL003 VNFM interface.

Kubernetes support
- Support of OCI registries for Helm-based KDU
- Deprecation of Helm v2.

Closed-loop life cycle in public clouds
- Resource consumption metrics from GCP.

OSM installation
- Use of upstream MongoDB Helm chart in community installer.
- Make juju installation optional in community installer.
- Update of OSM Helm installer to latest versions.

E2E Testing
- Public Cloud Robot tests in OSM pipeline.
- Robot framework linting for E2E tests.
... which are added on top of an already long set of features.
Evolution of NFV orchestration
In 2012, a white paper was written by the world's leading telecom network operators, leading to the foundation of Network Function Virtualization.

Promises:
- CAPEX reduction through commodity HW
- OPEX reduction thanks to the automation of a SW-based network

Under ETSI’s umbrella, the industry elaborated a first NFV architecture
Under ETSI’s umbrella, the industry elaborated a first NFV architecture.
NFV architecture has evolved over time, incorporating new elements.

2012
- NFV architecture and interfaces specifications

2013: NFV Release 1
- First NFV architecture

2015-2016: NFV Release 2
- First interface specifications (SOL specs)

2017-2018: NFV Release 3
- Multi-domain NS mgmt. via Or-Or
- Multi-site connectivity services with WIM

2019-2020: NFV Release 4
- Container mgmt. and orchestration with CISM, CIR and CIS
- CIS Cluster mgmt. with CCM

NFV architecture and interfaces specifications

NFV architecture in Release 3

NFV architecture in Release 4