OSM 4th Hackfest – Introduction to NFV and OSM

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Agenda

• Quick review of NFV

• Introduction to OSM Release 4

• Contributing to the Community
Quick review of NFV
What is NFV trying to address?

- Network Function Virtualization (NFV) proposes to virtualize network functions that typically run in dedicated appliances.
- The main goal is to support virtualized functions over COTS servers.
- Virtual Network Functions (VNFs) acquire all the advantages of Cloud Applications!
How was this originated?

- A white paper was written in 2012 by the world's leading telecom network operators.
- This group evolved to the ETSI NFV ISG (Industry Specification Group), formed today by 300+ companies.
- Their main motivation had to do with the increasing TCO of building a network with proprietary hardware appliances.
ETSI Publications

• Based on member’s feedback, field experiences and proof of concepts, standard documents have evolved.

• 60+ publications exist today, including the following three main documents:

  • NFV Architectural Framework
    http://www.etsi.org/deliver/etsi_gs/NFV/001_099/002/01.02.01_60/gs_NFV002v010201p.pdf

  • NFV Infrastructure Overview
    http://www.etsi.org/deliver/etsi_gs/NFV-INF/001_099/001/01.01.01_60/gs_NFV-INF001v010101p.pdf

  • NFV Management and Orchestration
    http://www.etsi.org/deliver/etsi_gs/NFV/001_099/002/01.02.01_60/gs_NFV002v010201p.pdf
Benefits of a standard NFV architecture

We are looking for a **unified and generic virtualization infrastructure**, compatible with any vendor’s Virtual Networking Function (VNF), so **standardization is a must**.
The ETSI NFV Architecture

The standard architecture can be better understood in three blocks:
NFVI: NFV Infrastructure

• NFVI goal is to provide a virtualization environment for VNFs, including virtual compute, storage and networking resources.

• But! networking applications may have more strict performance requirements, we will discuss that later.
VNF Special Requirements

VNFs, especially data-plane ones, usually have additional requirements than common cloud applications, including:

• Minor latency (disk I/O & network) → faster disks, QoS, higher BW
• Geographical distribution → multi-site cloud
• Horizontal auto-scaling → automated operations
• Higher throughput or PPS → EPA: Enhanced Platform Awareness
EPA covers the different approaches that can be taken at the NFVI layer to increase performance while maintaining a generic (COTS) infrastructure. VIM and MANO should be able to request them.
The Virtualized Infrastructure Manager is part of the ‘MANO Stack’ and addresses provides lifecycle management for virtualized resources (VMs, volumes, networking paths and connectivity, etc.)

Examples: OpenStack distributions, VMWare products, Public Cloud managers, etc.
MANO: VNF Manager (VNF-M)

- The VNF Manager, also part of the ‘MANO Stack’, covers lifecycle management for Virtual Network Functions (VNFs), either directly or through their own Element Management System (EMS).

- VNF Managers can be generic (current trend), or vendor-specific ones.
MANO: NFV Orchestrator (NFV-O)

• The NFV Orchestrator, the higher entity in the ‘MANO Stack’, covers general resource orchestration and services lifecycle, which comprise multiple VNFs and define their roles (traffic paths, scaling decisions, and other service-related requirements).

• It can interact with a generic VNF Manager, or vendor-specific ones.
Virtual Network Functions (VNF)

- Finally, the VNFs, which are supported by the underlying NFVI, and managed by their own EM (internal manager) and the VNF Manager (external, ‘context-aware’ manager).

- They should be able to provide any networking function and interact with other VNFs.
VNF Descriptor files (VNFD)

One of the most important aspects of achieving a unified VNF catalogue, is having a standard way of describing VNFs.

- MANO solutions should give the possibility to describe VNFs through ‘descriptor files’
- The industry’s goal is a unified and standard descriptor file format across different platforms.
- Both NS (comprised of VNFs) and VNFs should be described in a simple way.
The NFV MANO Landscape

• Given that the VIM is already well covered by OpenStack distributions and proprietary solutions (e.g. vCD), in practice, the “NFV MANO” part focuses on the VNF Manager and NFV Orchestrator.

• Among the most popular open source platforms for NFV MANO, we have:
Introduction to OSM Release Four
The Open Source MANO Project

We are here!
Open Source MANO is an ETSI-hosted project to develop an Open Source NFV Management and Orchestration (MANO) software stack aligned with ETSI NFV.
OSM Architectural Principles

Layering
Abstraction
Modularity
Simplicity

Architectural Principles
Release 3 architecture (OLD)

UI: User interface
SO: Service Orchestrator
VCA: VNF Configuration & Abstraction
RO: Resource Orchestrator

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Release 4 architecture & additions

1. Unified Northbound Interface (SOL005-based), decoupled from LCM
2. Lightweight Life Cycle Manager (LCM)
3. Message bus for async communications
4. Common DB and object storage
5. Integrated components for policy, fault and performance management
6. Complete control through CLI and stand-alone new UI
Release 4 architecture & additions

Microservice architecture to enable extensibility

OSM stack
- NBI
- Kafka
- MON
- MONGO
- Zookeeper
- POL
- Light-UI
- LCM
- RO
- RO-DB

ELK stack
- Elasticsearch
- Logstash
- Kibana

Perf. Mon. stack
- Prometheus
- Grafana

Add here your stack
- docker X
- docker y

netOSM docker network

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Why is OSM Awesome?

It has a rich and open information model

• Agnostic to VIM, SDN platform, VNF and OSS connectors/specifications.
• It allows for a uniform NFV orchestration, abstracted from the environment
• Aligned with ETSI-NFV Information Model

Visit:
https://osm.etsi.org/wikipub/index.php/OSM_Information_Model
Why is OSM Awesome?

It has a large and diverse community!
More than 100 members and growing

- 11 Global Service Providers
- Leading IT/Cloud players
- VNF providers
Why is OSM Awesome?

It is well organized for producing production-ready upstream code

LEADERSHIP GROUP

TSC

MDG

END USER ADVISORY GROUP

LG member
TSC Chair
TSC member
MDG lead
Committer
Contributors
Adv Group Member
Users

Committers
Contributors
Users
Why is OSM Awesome?

It prioritizes features for production readiness

- **APRIL 2017**
  - Multi-VIM
  - Multi-SDN
  - One-click installer
  - Network Service Scaling
  - Multi-Site, and more!

- **DECEMBER 2017**
  - Multi-tenancy & RBAC
  - Monitoring Module
  - Enhanced VIM support & emulation
  - NB API Consolidation
  - Affinity/Anti-Affinity Rules
  - CI/CD Workflow
  - Information Model Consolidation

- **MAY 2018**
  - Model-driven NBI
  - Monitoring Improvements
  - Cloud-native deployment
  - Improved modeling
  - Service Chaining
  - Native Charms
  - Enhanced usability

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Why is OSM Awesome?

...and will keep expanding its features towards Release FIVE and production deployments:

• Improved interface towards VNFs

• Further evolution of Performance and Fault Management capabilities

• Management of VNFs of new generation
  • Docker containers + Kubernetes management
  • Hybrid NFs (Virtual + Physical)

• Support of future 5G deployments
  • Network Slicing likely to require NS Nesting, Management of shared resources
Open Source MANO

Contributing to the Community
Join [here](https://osm.etsi.org/about/how-to-join) as a company or individual contributor!

**HOW TO GET INVOLVED IN OSM**

There are two paths to get involved in OSM as an organisation: as an ETSI Member, or as an OSM Participant.

Check first if your organization is already involved by consulting the list of [OSM Members and Participants](https://osm.etsi.org/about/how-to-join).

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<th>Get involved as an ETSI Member</th>
<th>Get involved as an OSM Participant</th>
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<td>To take part in the development of OSM and participate to the meetings, ETSI Members need to sign the OSM Membership Agreement and CCLA. In doing this, they agree to the OSM operating rules which in some cases are different from those in ETSI’s Technical Working Procedures. Check if your company is an ETSI Member.</td>
<td>Organizations who are not members of ETSI may also participate in OSM, attend meetings and help to develop OSM by making technical contributions. They are not applicable for leadership (LG) positions and must pay a participation fee to attend OSM meetings. To get involved as a Participant, please sign the OSM Participant Agreement and the CCLA.</td>
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**Developers and Users**

Individual developers and end users are welcome to contribute code and feedback to OSM, they just need to [create an individual contributor or user account](https://osm.etsi.org/about/how-to-join).
OSM Community Activities

• Weekly Conference Calls
  • Technical, leadership, DevOps, and more!

• Face to Face Meetings
  • Plenaries and Mid-Release meetings (every 3 months)
  • Next location: Castelldefels, Spain (Feb 2019)

• OSM Hackfest
  • Fifth edition taking place on February 2019 at Spain, expecting to keep co-locating with OSM Face-to-Face meetings.
Ways to contribute to OSM

- **Try OSM** and give feedback to the community.
- Join as a developer to **make contributions to the code**.
- Join the community to **contribute to design discussions**.
- **Start building your own distribution** of OSM as an integrator.
- **Host an OSM meeting** to contribute to the community’s growth and diversity.
Open Source MANO

Find us at:

osm.etsi.org
osm.etsi.org/wikipub