INTRODUCING OPEN SOURCE MANO

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ETSI OSM Chair
MANAGEMENT AND ORCHESTRATION ARE KEY FUNCTIONS FOR NFV, BUT...

... THERE ARE MANY INTERPRETATIONS OF THE MANO STACK
  • What does it take to onboard VNF “X” in this MANO environment?
  • Would VNF “X” work as expected?
  • How could I operate the Network Service in practice?
  • How can I integrate it with the rest of my network and OSS/BSS?

... INDUSTRY FRAGMENTATION and ENTRY BARRIERS do not help to real deployments!

NEED TO ACCELERATE CONVERGENCE ON A TELCO-READY MANO SOLUTION
  • Drive NFV Ecosystem and Adoption
NFV REQUIRES REPLACEABLE COMPONENTS THAT CAN BE SAFELY & AUTOMATICALLY ASSEMBLED...

ONBOARDING

VNF

VNFD

VNF CATALOGUE

MANO

NSD

NETWORK SERVICE

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... BUT CURRENT MODELLING IS NOT YET THERE!

INADEQUATE VNF MODELLING

HARD ONBOARDING

UNEVEN VNF CATALOGUE

Basic NSD

Ad hoc integration often needed

BASIC AND HAND-MADE NETWORK SERVICE
OSM AIMS TO DELIVER A PRODUCTION-QUALITY MANO STACK...

- Capable of consuming openly published IM/DM
- Available for everyone, to minimize uncertainties
- Suitable for all VNFs, capturing real production complexity
- Operationally significant: including Service Orchestration too!
- VIM-independent

ALIGNED TO NFV ISG INFORMATION MODELS
- ... but capable of providing prompt and constructive feedback whenever needed

ENABLING AN ECO-SYSTEM OF IM-COMPLIANT VNF VENDORS
- Ready to be offered to cloud and service providers
- No need of integration per-customer & MANO vendor basis
... WHICH MINIMIZES ENTRY BARRIERS FOR VNF DEVELOPERS...

LOCAL DEVELOPMENT & TESTING
- Open Development Env
- Functional tests
- Low cost
- Integration from the beginning

TEST POOL FOR DEVELOPERS
- Real servers and switches
- Performance tests (EPA can be enforced)
- Cost-effective shared infrastructure
- Move the value to VNF services

SERVICE PROVIDER
- Production/pre-production environment
- Real network scenarios
- Final service configuration
- Fast deployment
- Low final integration cost

SAME IMAGES AND DESCRIPTORS ACROSS ALL THE CHAIN!
... AND INCLUDES THE OPERATIONAL ASPECTS REQUIRED FOR E2E SERVICE ORCHESTRATION

HIGH-LEVEL PRIMITIVES

E.g.:
- Add subscriber
- Add service profile
- Update subscriber profile
- Add service access to subscriber
...

PARAMETRIZED NS

PARTICULARIZATION

IP pools = x1
QoS1 definition = x2
QoS2 definition = x3
...

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OSM SCOPE COVERS ALL THAT IS REQUIRED TO DELIVER A PRODUCTION-QUALITY MANO STACK

RUN-TIME SCOPE

- Automated E2E Service Orchestration
- Superset of ETSI NFV MANO
- Plugin model for integrating multiple SDN controllers
- Plugin model for integrating multiple VIMs
- Integrated Generic VNFM with support for integrating Specific VNFM
- Support for Physical Network Function integration
- Greenfield and brownfield deployments

DESIGN-TIME SCOPE

- Network Service Definition
- Model-Driven Environment with Data Models aligned with ETSI NFV
- VNF Package Generation
- GUI

GUI & Design-Time Tools

Network Service Orchestrator

VNF Configuration & Abstraction

Resource Orchestrator (Includes VIM/SDN Connectors)

OpenVIM

OSS/BSS

EMSs

Specific VNFM

VNFs

PNFs

NFVI

OpenDaylight

VMware

Other Components

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BUT... WHY OSM?

3 UNIQUE FEATURES THAT MATTER
OUR COMMUNITY HAS GROWN SUBSTANTIALLY, WITH NEARLY 50 MEMBERS

- 7 Global Service Providers
- Leading IT/Cloud players

(*) Names & brands may be claimed as the property of others
... AND OPEN TO FELLOW TRAVELLERS, WITH REALLY LOW BARRIERS FOR PARTICIPATION

<table>
<thead>
<tr>
<th>ETSI MEMBERS</th>
<th>NON-ETSI MEMBERS</th>
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<tbody>
<tr>
<td>• Sign Member Agreement &amp; CCLA</td>
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<tr>
<td>• Free participation</td>
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<tr>
<td>• Sign Participant Agreement &amp; CCLA</td>
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<tr>
<td>• Fees per F2F meeting (same as in ETSI NFV)</td>
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**Individual developers and end users**

• Just create an individual account

MORE INFO AT: [osm.etsi.org](http://osm.etsi.org)
2) OSM EMBRACES THE COMPLEXITY REQUIRED FOR DEPLOYMENTS IN FIELD

1. EPA support
2. Multi-VIM
3. Multi-site
4. Ready for green & brownfield

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3) OSM DID NOT START FROM SCRATCH...

- **OpenMANO** as seed *Resource Orchestrator*
- **Riftware** as seed *Service Orchestrator*
- **Juju** as external reference for *VNF Config and Mgmt*

**CODE SEEDS** have helped to:
- Avoid over-engineering due to excess of abstraction
- Get traction at service provider level
- Improve influence (via credibility) in other forums

**While seed code represents an initial starting point, all components are subject to evolution (or even replacement) per release**
... BEING ABLE TO DEMONSTRATE THE FULL CONCEPT AS EARLY AS LAST MWC'2016...
AND WE HAVE ACCOMPLISHED A LOT SINCE THEN...
OSM LAUNCHED ITS 1ST RELEASE ("ZERO") AS EARLY AS MAY'2016...

- Simplified on-boarding process
- Human-readable VNF and NS descriptors
- Multi-VIM support: OpenStack, OpenVIM
- EPA Support, assuring predictable performance
- Underlay configuration with SDN
- Web interface
- Comprehensive documentation
  - Installation guides
  - How-to guides for users and developers
  - Data Model covered in detail
  - Minimal infrastructure requirements
  - Videos
  - ...

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... AND OUR NEW RELEASE ("ONE") WAS LAUNCHED LAST WEEK

Multi-VIM

Multi-SDN

Plugin model

Easy addition of new VIMs and SDN types

Multi-site Network Services

Simplified installer
(one-click installation)

OpenVIM now shipped as part of the OSM install
VIM for Enhanced Platform Awareness & Local Testing

... and a large number of enhancements in VNF/NS models

Available at:
osm.etsi.org
THE PLUGIN MODEL FACILITATES INTEROP WITH DIFFERENT CLOUDS AND CONTROLLERS

CMS PLUGINS

- OpenStack (several flavours)
- OpenVIM
- VMware (native)
- Add your plugin here

SDN PLUGINS

- ODL
- FloodLight
- Add your plugin here
1. Accurate assignment of resources at VM level
2. Proper assignment of I/O interfaces to the VM
3. **SDN gives the ability to create underlay L2 connections**
   - Interconnecting VMs
   - Attaching external traffic sources
OSM’s Network of Remote Labs Enables Continuous & Automated Testing with Different VIMs and NFVIs...

- Fully integrated with OSM CI/CD pipeline
- Bring realistic conditions to OSM testing, as continuous proof of interop
- Minimise barriers for community engagement
- Securely connected over ETSI’s HIVE (Hub for Inter-operability and Validation)
- POWERFUL TOOL TO ENSURE AND EXTEND INTER-OPERABILITY
The NFV Plugtest will help to assess the level of interoperability of different implementations of VNFs, Infrastructures and Orchestrators.

OSM as Supporting Open Source project
Hosted by 5TONIC with the technical support from Telefonica

www.etsi.org/nfvplugtest
AS ALWAYS, AFTER AN ACHIEVEMENT THERE ARE NEW CHALLENGES AHEAD

Next OSM Milestones
SOME CHALLENGES WILL DEMAND OUR ATTENTION IN THE COMING MONTHS

• Build new PoCs and demos leveraging on Release ONE capabilities
  • Selected PoCs to be sponsored by service providers

• Prepare feedback to NFV ISG after Release ONE

• Begin our participation in the NFV Plugtest

• Complete designs and implementations for Release TWO

• AND KEEP EXPLAINING WHAT WE DO!
FEEDBACK PLAN TO ETSI NFV

• **OSM Feedback:** Community-driven feedback doc per Release (since Rel. 1)
  • FOCUS: Network Service and VNF Descriptors and Record IMs

• Note: Pre-OSM, document submitted regarding findings based on implementation of ETSI-NFV ISG Phase 1 models:
  • VNFD Implementation Challenges ([NFVIFA(15)0001351](https://example.com/nfvifa150001351))
  • Partially incorporated in phase 2 models
  • Additional submissions planned to address delta
THE RECENT OSM F2F (OSM#2) HAS BEEN A GREAT SUCCESS...

• An enlightening set of tutorials and demos...
  ... brought everyone up to speed on what OSM can achieve

• An in-depth review of IM/DM...
  ... led to concrete and constructive feedback to give to NFV ISG

• Lively whiteboard discussions...
  ... with an excellent level of participation
  ... have set some architectural directions for Release TWO (at least...)

• And an initial set of potential features for Release TWO were identified

AND ALL THIS WITH AN EXCELLENT HOSTING BY DELL! 😊
... AND HAS ALLOWED US TO SET DIRECTIONS FOR RELEASE TWO (AND BEYOND)...

- Agreement to make Release TWO DEPLOYMENT READY

- SOME DIRECTIONS for Release TWO and beyond:
  - Towards full VNF and NS dynamicity and scaling
  - Architectural support of Service Assurance
  - Security – RBAC & Authentication between modules
  - New types of VIMs and SDNC (leveraging on plugin model):
    - Public cloud
    - ONOS.
  - Generalized approach to service chaining
  - Nested Network Services

- Continuous improvements in usability and modelling are foreseen!
OSM STRUCTURE FOR RELEASE TWO

Leadership Group (LG)
Chair: FJ Ramón Salguero (Telefónica)
Vice-Chair: Andy Reid (BT)
Vice-Chair: Pål Grønsund (Telenor)

End User Advisory Group (EUAG)
Chair: Andy Reid (BT)

Technical Steering Committee (TSC)
Chair: Adrian Hoban (Intel)
Member: Gerardo García de Blas (Telefónica)
Member: Mark Shuttleworth (Canonical)
Member: Matt Harper (Rift.io)
Member: (vacant)

Marketing TF
Convenor: Chris Buerger (Intel)

User Interface MDG (UI)
MDG Lead: Kiran Kashalkar (RIFT.io)

VNF Config & Abstraction TF (VCA)
Convenor: Marco Ceppi (Canonical)

Nw Service Orchestration MDG (NSO)
MDG Lead: Rajesh Velandy (RIFT.io)

Interoperability Testing TF
Convenor: Noel Charath (RIFT.io)

Resource Orchestration MDG (RO)
MDG Lead: Alfonso Tierno Sepúlveda (Telefónica)
IF YOU WANT TO LEARN MORE...

- OSM Release ONE – GIVE IT A TRY!
  - All-in-one installer: https://osm-download.etsi.org/ftp/osm-1.0-one/install_from_source.sh
  - Documentation: http://osm.etsi.org/wikipub/index.php/OSM_Release_1

- OSM Release ONE White Paper
Open Source MANO

BACKUP SLIDES
ARCHITECTURAL PRINCIPLES FOR OSM

• LAYERING
  • Require clear delineation between the layers and modules.
  • Should be broadly aligned with ETSI-NFV

• ABSTRACTION
  • Moving up/down the layers should offer clear differentiation in the levels of abstraction/detail presented.

• MODULARITY
  • Even within layers, clear modularity enabled with a plugin model preferred to facilitate module replacements as OSM community develops.

• SIMPLICITY
  • Solution must have the minimal complexity necessary to be successful and no more.
INITIAL OSM ARCHITECTURE
(Demo and Release 0)

NSO: Network Service Orchestrator
CM: Configuration Manager
RO: Resource Orchestrator
INITIAL OSM ARCHITECTURE
(Demo and Release 0)

Riftware (NSO)

Juju (CM)

OpenMANO (RO)

E2E SERVICE ORCHESTRATION
(service primitives & attributes)

NSO: Network Service Orchestrator
CM: Configuration Manager
RO: Resource Orchestrator
INITIAL OSM ARCHITECTURE
(Demo and Release 0)

GUI (RIFT.io – Launchpad)

**NS Primitives and Attributes**
Service Automation & Abstraction Workflow Engine

**VNF Primitives and Attributes**

VNF Configuration & Abstraction (Juju)

 Resource Orchestrator (OpenMANO)

VIM

NFVI

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Having identified all the required information, allows a clean mapping to an agnostic DM...

OSM INTERNALS

OpenMANO VNFD

VNF resource orchestration info
(EPA resources and internal connectivity)

Juju charm

- Descriptive information
  - metadata.yaml
  - config.yaml
  - actions.yaml

- Executables
  - Hooks
  - Actions

- Additional info (icon, README)
Having identified all the required information, allows a clean mapping to an agnostic DM...

OSM INTERNALS

VNF package
- VNFD
- VNF artifacts
- Additional metadata?

OpenMANO VNFD
- VNF resource orchestration info (EPA resources and internal connectivity)

Juju charm
- Descriptive information
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  - Actions
- Additional info (icon, README)
... or even several DMs as long as they fit into the same IM!

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OSM INTERNALS

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Open Source MANO

OUR WAY OF WORK
OSM HAS AN ORGANIZATION ORIENTED TO THE PRODUCTION OF UPSTREAM CODE...

LEADERSHIP GROUP

TSC

END USER ADVISORY GROUP

Contributors

LM member

TSC Chair

TSC member

MDG lead

Committer

Contributors

Adv Group Member

Users

Committers

Users
... WHICH FAVOURS EFFICIENT DECISION TAKING

LEADERSHIP GROUP
Sets the policies of the organization
Takes administrative decisions

END USER ADVISORY GROUP

TSC
Sets the Information Model
Decide features per release

Confirms TSC Chair
Supports TSC work
Reports progress to the LG
Reports progress on features
Produce use cases
Produces feature requests

MDG
Creates/removes MDG
Appoints/revokes MDG leads

Commits module releases
Commits project releases

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MORE INFORMATION AT:

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