



Introduction to OSM & Orchestration Business Cases

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Agenda

- Telco Challenges
- Overview of OSM
- Orchestration Business Cases
- Welcome to the Hackfest
- Hands on Time



More and more network functions become available (virtual, containerised, etc.)

Network Functions





Network Services





A network service is any network node (virtualized or containerized) consisting of interconnected VNFs

interfaces





5G network functions



All of them have to be deployed, managed and orchestrated



Those network functions can be provided by multiple vendors



So, multiple vendors will provide multiple orchestrators



All of them need automated life-cycle management of network services for Day-0 to Day-N operations

ETSI NFV stack





NFV Architecture defined in NFV002

OSM in the ETSI NFV Architecture







OSM in the picture..







Open Source MANO Simplifies Telco Cloud Management...

How can OSM help to Telco Deployments?





Multiple types of Workloads, Single Engine







All Bare Metal - Physical network function



All Containers - Cloud-native network function



VMs, Containers and Physical - Hybrid network function



Multi- VIM support





Multi-Cloud Orchestration is a reality





How this is possible?



Parameterized topologies and day1, day 2 operations





Model-driven, portable and reusable VNF packages



Juju drives Application Operations

- Juju is a universal service modelling system
- Able to use various substrates (machines and kubernetes)
- Operations such as Install, update, configure, scale, integrate, and actions



Open Source

Μ



Deploy your Network Service in 3 Steps...





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OSM Community and Ecosystem

OSM community is <u>really LARGE</u> and DIVERSE, with 150 members today, but always OPEN to new participants





OSM Ecosystem





OSM commercial distributions



Charmed OSM







<u>WhiteNFV</u>





OSM Business Use Cases

B. Ramesh Ramanathan

TATA ELXS



Agenda



- Traditional Operator Business Models
- Drivers for Change SDN & NFV
- Open Source MANO and next Generation Networks
- Future Business Model Use Cases



Telecom Operator Woes

Telecom Operator Woes





Customer Interests





More than speed, the main difference between 4G and 5G is the fact that 5G is an application aware network







- Large and complex infrastructure , continuously evolving
- Vendor lock in ecosystem
- Network functions are on Proprietary Hardware
- Rigid, inflexible systems for scale
- Lacks deployment speed for go to market of new services
- Large investments on CAPEX and OPEX

Traditional Networking & the Challenges





Management PLane

The Holy Grail – SDN & NFV







NFV – Network Function VirtualizationSDN – Software Defined Networking




Advantages of NFV driven Telco Cloud







Seamless deployment of new Network Function and increased efficiency in terms of configuring services, monitoring and managing necessary resources from the platform for NFV services. Easier upgrades of network function and flexibility in deploying new services to open up new business value streams.

Reduction in CAPEX and OPEX due to usage of COTS hardware and ease of maintenance of network functions.

03

Interoperability of network functions from different vendors can be handled with ease as NFV provides standards and definitions which allows orchestrator to model and to maintain its lifecycle.

04



Software centric network enable large scale collection of data from multiple tap points for data correlation and associated assurance.

SDN – Delivering a Programmable Network



SDN: Separation of Control & Data Layer



Features of SDN

- Makes Networking & IP Routing flexible
- Decoupling Control & Data plane
- Offloads brain to centralized controller
- Central view of Resources
- Programmable Network, Centrally Managed, Agile for any Need



Sounds great, But hey, what's the catch ??

- VNF's, VM's, virtualization ... so many moving parts !!
- So many vendors, versions, resource lifecycles
- So many services built using these resources

How to manage this ??





A coalition government 😌 How to run it 😌





Open Source MANO & Next Gen Networks

Telco Cloud done right





Automated and Orchestrated Telco Cloud Solution







Open Source MANO & Business Use Case

Show me the money!

Operational Benefits

- Faster Time to Market
- Automated Life cycle management
- Better NPS

Business Benefits

- Network Slicing
- IOT
- Industry 4.0
- Private 5G
- Edge MEC Applications

Industry 4.0





Software Defined Vehicles





Smart Energy





Smart City





Progression of Telco Clouds







ETSI OSM relation to Reference Architectures



(a) 🗠

TST010

conformance

testing)

SOL007

(NSD file

structure)

SOL001

SOL006

(VNF & NS

Descriptors)

(d) 🔫 🖂

SOL014

(VR mgmt

descriptor)

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common

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IFA011

SOL004

(VNFD &

VNF Pkg)

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templates)

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IFA006

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IFA005

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(API

SOL013

OSM in ETSI NFV Architecture



Mouse Over to view short-title Note that all NFV drafts are available in ETSI ISG NFV <u>Open area</u> After *publication* they are available via the <u>Published standards Search engine</u>

1

IFA027

metrics)

(Perf.

TST007

guidelines)

(MANO

interop

(2)

(MANO

VNF

Catalog

VNF

Manager

(VNFM)

+ Vi-Vnfm

Virtualised

Infrastructure

Manager

(VIM)

(Acceleration Technologies)

Click on a spec numbers to access it

IFA010

Func Rqmts)

NFV Management and Orchestration

NS

Catalog

4

Or-Vi

Execution reference points Main NFV reference points

Other reference points

NFV Orchestrator (NFVO)

NEVI

Service, VNF and

Infrastructure

Description

Resource

NFV

Instance

metrics)

OSM in ETSI MEC Architecture







Thank you

And... Welcome to the Hackfest

Hackfest Environment





Your Openstack Tenant







Hands On Time



Logging Into OSM





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Taking a Look Around

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Hands On



cd osm-packages/Hackfest_Demos/OSM-MR13/1.1-Welcome/

```
./1.Build Package.sh
                                                                   Cleaning out any prior versions of the descriptors from OSM
                                    Uploading packages
                            Validating package my first vnf
                            Validation OK
                            List of charms in the descriptor: {'my-first-charm'}
                            Adding File: my first vnf
                            Package created: ./my first vnf.tar.gz
                            94d25154-5809-4838-8395-00aa2e5b6e8e
                            Validating package my first ns
                            Validation OK
                            List of charms in the descriptor: set()
                            Adding File: my first ns
                            Package created: ./my first ns.tar.gz
                            653dc522-bc8d-4a23-ae75-d4f351024484
                            Done
```



Hands On



./2.Launch_Network_Service.sh

Launching network service
2a1933cd-4e77-4957-9683-28bba515945b
Done



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Congratulations!

./3.Get_IP_Address.sh

		N/A							
My_t1rst_ns bb114a6b-/dec-439a-8e2d-01cd/2680/84 202 	2-10-14112:14:22 READY IDLE (None)	N/A							
Getting IP Address of VNF	Activities E Terminal -	Oct 14 18:28							
	welcome to Ubuntu 20.04.5 LTS (GNU/Linux 5.4.0- * Documentation: https://help.ubuntu.com	Q							
======================================	<pre>* Management: https://landscape.canonical.com * Support: https://ubuntu.com/advantage System information as of Fri Oct 14 18:17:41 UTC 2022</pre>								
	System load: 0.0 Processes: Usage of /: 19.0% of 9.51GB Users logged Memory usage: 25% IPv4 address Swap usage: 0%	107 in: 1 for ens3: 10.0.0.169							
	0 updates can be applied immediately.								
	Last login: Fri Oct 14 18:10:51 2022 from 10.0. <mark>ubuntu@my-first-ns-my-first-vnf-my-first-vnf-0</mark> :	0.10 ~\$							

Run Some Actions

./4.Run_Actions.sh

osm ns-action my_first_ns --wait --vnf_name my_first_vnf --action_name reboot
osm ns-action my_first_ns --wait --vnf_name my_first_vnf --action_name cancel-reboot

Log into your VNF vm, then try traceroute google.com

osm ns-action my_first_ns --wait --vnf_name my_first_vnf --action_name add-package --params '{package: traceroute}'
osm ns-action my_first_ns --wait --vnf_name my_first_vnf --action_name remove-package --params '{package: traceroute}'

osm ns-action my_first_ns --wait --vnf_name my_first_vnf --action_name update-system

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Let's Edit Some Code

🗐 Visual Studio Code 🔻

Activities

./5.Edit_Code.sh

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	95														
	96	def _reboo	t <mark>(</mark> self, _):												
	97	self.u	nit.status =	= Maintena	anceStat	us ("Rel	pooting	server	")						
ര	98	shell("shutdown -r	r +1")											
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23	101	def _remov	e_package(se	elf, event	t):										
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Upload New Version

./6.Change_Package.sh

Uploading new package content

Validating package my_first_vnf
Validation OK
List of charms in the descriptor: {'my-first-charm'}
Adding File: my_first_vnf
Package created: ./my_first_vnf.tar.gz
./my_first_vnf.tar.gz
Updated
Done

Deploy the New Software

./7.Update_NS.sh

Performing software update	
detailed-status: Done 479d1336-ba29-4378-9a3d-f4ce6f92c866	
Done	

Say "Hi" To Yourself

./8.Run_Actions.sh

osm ns-action --vnf_name my_first_vnf --action_name announce --params "{message: hi}" my_first_ns

主 ubuntu@my	y-first-ns-my-first-vnf-m	y-first-vnf-0:	Q ≣	- 0	×
System load: Usage of /: Memory usage: Swap usage:	0.0 19.0% of 9.51GB 26% 0%	Processes: Users logged IPv4 address	in: for ens3:	113 1 10.0.0.16	9
0 updates can b	e applied immediat	ely.			
Last login: Fri	Oct 14 18:53:09 2	022 from 10.0	.0.10		
Broadcast messa 0 (pts/2) (ge from ubuntu@my-	first-ns-my-fi	irst-vnf-m	y-first-vn	ıf-
hi					I

Cleanup Time

./9.Remove_NS.sh

osm ns-delete my_first_ns

- VM Removed from Openstack
- Resources freed
- No longer showing in Instances


Community installer

wget

https://osm-download.etsi.org/ftp/osm-12.0-twelve/install_osm.sh
chmod +x install_osm.sh
./install_osm.sh

Charmed installer

wget

https://osm-download.etsi.org/ftp/osm-12.0-twelve/install_osm.sh
chmod +x install_osm.sh
./install_osm.sh --charmed

Try OSM...





ETSI members, non-members,

individual developers and users.

Learn how to join



Join us!

Follow us!





OpenSourceMANO



Open Source



Thank You!