Welcome to the World of Standards

ETSI NFV IFA WG – ARCHITECTURE AND INTERFACES

Raquel Morera: IFA WG Chair, Verizon
Mehmet Ersue: IFA WG Vice-chair, Nokia
Peter Wörndle: IFA WG Rapporteur, Ericsson
MANO ARCHITECTURAL FRAMEWORK
Network Functions Virtualisation: Layered view

NFV Infrastructure (NFVI)
- Compute
- Storage
- Network

Virtual Resources
- vCompute
- vStorage
- vNetwork

Virtualization Layer
- Compute
- Storage
- Network

VNF Instances
- VNF
- VNF
- VNF
- VNF

PNF: Physical Network Function
VNF: Virtualized Network Function

Management and Orchestration
Virtualised Infrastructure Manager (VIM)

- Manages the NFV infrastructure resources (compute, network and storage) in one or more NFVI-PoPs.
- Exposes virtualized resource management interfaces/APIs to the VNFM and NFVO.
- Sends virtualized resource management notifications to the VNFM and the NFVO.
VNF Manager (VNFM)

- Manages the lifecycle of VNFs
- Manages virtualized resources associated to the VNF it manages via the interfaces exposed by the VIM or NFVO
- Exposes VNF lifecycle management interfaces/APIs to the VNF, EM and NFVO.
- Sends VNF lifecycle management notifications to the VNF, EM and NFVO.
- Manages VNF initial configuration via the interfaces exposed by the VNF.
Manages the lifecycle of NS
- Exposes NS lifecycle management interfaces to the OSS/BSS
- Sends NS lifecycle management notifications to the OSS/BSS
- Exposes virtualized resource management interfaces to the VNFM
- Sends virtualized resource management notifications to the VNFM
- Manages the VNF lifecycle via the interfaces exposed by the VNFM
- Manages virtualized resources via the interfaces exposed by the VIM.
MANO INFORMATION MODEL
Network connection topology of a Network Service using VNFs, VLs, and Connection Points

VL1 = \{CP1, CP4\}
VL2 = \{CP5, CP8, CP10\}
VL3 = \{CP6, CP7\}
VL4 = \{CP11, CP14\}

CP = connection point, VL = Virtual Link

© ETSI 2015. All rights reserved
VNF Forwarding Graph and Network Forwarding Path on top of a Network Service

CP = connection point, VL = Virtual Link
Descriptors associated to

- Network Service (NS)
- Virtual Network Function (VNF)
- Virtual Links (VL)
- VNF Forwarding Graph (VNFFG)
- Physical Network Function (PNF)

Static & Runtime

- **Design** = Descriptor (e.g. VNFD)
- **Runtime** = Record (e.g. VNFR)

Records stores the current state of MANO constructs
Base Information Elements

NFV phase 1

from information elements in phase 1…
… to UML information model in phase 2

NFV phase 2

© ETSI 2015. All rights reserved
FROM MANO TO IFA WG
FROM MANO WG to IFA WG

Phase 1
MANO WG
(GS MAN001)

Phase 2
IFA WG
(Multiple GSs)

GS MAN001 Published

Feb 2013
Nov 2014
Feb 2016

MANO = Management and Orchestration
IFA = Interfaces and Architecture (builds on top of GS MAN001)

© ETSI 2015. All rights reserved
MANO WG Accomplishments and Current IFA WG Development

**Phase 1**
MANO WG (GS MAN001)
- NFV-MANO architectural framework
- Interfaces Description
- Information Elements Description
- Information Flows
- Industry/Technology Gaps

**Phase 2**
IFA WG (Multiple GSs)
- Interface Specifications
- Information Element Specifications
- NFV Descriptor (VNFD, NSD) Specifications
- Acceleration Specifications
- Report on architecture deployment options
- Report on NFV Information Model

Liaison’s with other SDO and Open source Projects to coordinate work
MANO Reference points and Interfaces

Network Service
- NS Lifecycle Management
- NS Lifecycle Change Notifications
- NS Descriptor Management
- NS Performance Management
- NS Fault Management

VNF
- VNF Package Management
- VNF Lifecycle Management
- VNF Lifecycle Operation Granting
- VNF Lifecycle Change Notifications
- VNF Configuration Management
- VNF Performance Management
- VNF Fault Management

Virtual Resource
- vResource Management
- vResource Information Management
- vResource Change Notifications
- vResource FA Management
- vResource Capacity Management
- vResource Performance Management
- vResource Reservation Management
- NFP Management

NFVI
- NFVI C/N/S Management
- NFVI Networking Management
- NFVI Storage Management
- NFVI Hypervisor Management
RESOURCE MANAGEMENT
(Developed in 2015)
Virtualised Compute Interfaces:
- Resources Management
- Resources Change Notification
- Resources Information Management
- Resources Capacity Management

Virtualised Network Interfaces:
- Resources Management
- Resources Change Notification
- Resources Information Management
- Resources Capacity Management
- NFP Management

Virtualised Storage Interfaces:
- Resources Management
- Resources Change Notification
- Resources Information Management
- Resources Capacity Management

Compute

Networking

Storage

Virtuilsed Resources Fault Management
Virtuilsed Resources Performance Management
Virtuilsed Resources Reservation Management

SW Image Management

Only relevant for Or-Vi reference point
VNF related resource management done by VNFM (Direct mode)

Simplified flow, focusing only on Resource Management

NFVO, EM, VNFM itself

Any VNF LCM request

VNFM gets permission from NFVO

VNFM processes the VNF LCM request

VNFM invokes directly RM operations towards the VIM

Additional processing skipped for simplicity

Resource Management operations handled by the VIM
VNF related resource management done by NFVO (Indirect mode)

- Any VNF LCM request
  - VNFM gets permission from NFVO
  - VNFM processes the VNF LCM request
  - VNFM invokes RM operations towards the NFVO
  - NFVO in turn invokes RM operations towards the VIM
  - Resource Management operations handled by the VIM

Simplified flow, focusing only on Resource Management
IFA WG Phase 2 Work Plan

**ETSI NFV Open Area:**

*) Recently finalized