Welcome to the World of Standards

ETSI NFV INTERFACES AND ARCHITECTURE

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Outline

- Intro to IFA WG
- MANO Architectural Framework
  - MANO Basic Concepts
  - MANO Architectural Framework
  - Information Model
- Reference points, interfaces, operations
- Resource Management
- Overview of IFA work items
ETSI NFV ISG Interfaces and Architecture WG (IFA) WG

Feb’12
- ETSI NFV ISG Created
- ETSI NFV Management and Orchestration (MANO) WG Created

Dec’13
- ETSI NFV Architectural Framework Published

Nov’14
- ETSI NFV MANO WG Closed
- ETSI NFV IFA Created
- Release 2 work starts

Jan’15
- MAN001 - ETSI NFV Management and Orchestration Report – Published

Jan’16
- First IFA WG Release 2 specifications published

Apr’16
- Release 3 work starts

Jun’16
- Finalization of Release 2 work on interfaces and descriptors

Sep’16
- Finalization of information model

Soon
- Publication of IFA WG Release 2 specifications

IFA WG Scope

- Normative Interface Specifications
- Normative Information Element Specifications
- Normative NFV Descriptors Specifications
- Acceleration Use cases, Specifications and Reports
- Informative Reports on new features evaluating interface and architecture impacts

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MANO ARCHITECTURAL FRAMEWORK
Network Functions Virtualization: VNFs, NS and E2E Network Service
Network Functions Virtualisation: Management of NFV Components

Application & Functional Management

Functional Management of Network Service

Functional Management of (V)NFs

Functional Management of SW Instances

NFV Management & Orchestration

Network Service (NS) Mgmt.

VNF Management

Virtualised Resource Mgmt.

Virtualisation Layer

Compute  |  Storage  |  Network

NFVI

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Management and Orchestration: Architecture

- OSS/BSS
- NFV Orchestrator (NFVO)
  - NFV Service Catalog
  - VNF Catalog
  - NFV Instances
  - NFVI Resources
- VNF Manager (VNFM)
  - NFV Instances
  - NFVI Resources
- Virtualised Infrastructure Manager (VIM)
  - Nf-Vi
- Os-Ma-nfvo
  - Ve-Vnfm-em
  - Ve-Vnfm-vnf
  - Vi-Vnfm
  - Or-Vnfm
- Or-Vi

NFV Management & Orchestration
- NS Management
- VNF Management
- Virtualised Resource Management
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.

NFV Orchestrator (NFVO) -> VNF Catalog
NFV Orchestrator (NFVO) -> NFV Instances
NFV Orchestrator (NFVO) -> NFVI Resources

VNF Manager (VNFM) -> VNF Catalog
VNF Manager (VNFM) -> NFV Instances
VNF Manager (VNFM) -> NFVI Resources

Virtualised Infrastructure Manager (VIM) -> NFV Orchestrator (NFVO)
Virtualised Infrastructure Manager (VIM) -> VNF Manager (VNFM)
Virtualised Infrastructure Manager (VIM) -> NFVI

EM -> VNF -> NFVI

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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.
VNF Forwarding Graph and Network Forwarding Path on top of a Network Service

CP = connection point, VL = Virtual Link, VNFFG = VNF Forwarding Graph, NFP = Network Forwarding Path

Traffic flow

Graph endpoint

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Base Information Elements

Information Elements

from information elements…

… to UML information model

https://docbox.etsi.org/ISG/NFV/Open/Drafts/IFA015_NFV_Information_Model
MANO Reference points and Interfaces

- **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**
- **VNF Indicator**

**Virtualised Resource**
- **vResource Management**
- **vResource Information Management**
- **vResource Quota Management**
- **vResource Capacity Management**
- **vResource Change Notification**
- **vResource Fault Management**
- **vResource Performance Mgmt.**
- **vResource Reservation Mgmt.**
- **NetworkForwardingPath Mgmt.**
- **SW Image Management**

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RESOURCE MANAGEMENT
Virtualised Resource

- vResource Management
- vResource Information Management
- vResource Change Notification
- vResource Fault Management
- vResource Performance Management
- vResource Reservation Management
- vResource Reservation Change Notification
- vResource Capacity Management*
- vResource Quota Management*
- Network Forwarding Path Management
- Software Image Management

*Only applicable to Or-Vi Reference Point
VNF related resource management done by VNFM (Direct mode)

1. Any VNF LCM request
2. VNFM gets permission from NFVO
3. VNFM processes the VNF LCM request
4. VNFM invokes directly RM operations towards the VIM
5. Resource Management operations handled by the VIM

Simplified flow, focusing only on Resource Management
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

Notify successful LCM operation

Simplified flow, focusing only on Resource Management
OVERVIEW OF IFA WORK ITEMS
ETSI NFV IFA WG Group Specifications

- **IFA010**: Functional Requirements
- **IFA011**: VNF Package & VNFD
- **IFA014**: NS Descriptor

Diagram:
- **IFA012**: VNF Package & VNFD
- **IFA013**: Functional Requirements
- **IFA007**: NS Descriptor
- **IFA008**: VNF Manager (VNFM)
- **IFA009**: VNF Orchestration (NFVO)
- **IFA005**: Virtualised Infrastructure Manager (VIM)
- **IFA006**: VNF Catalogue
- **IFA004**: NS Catalogue

References:
- [http://www.etsi.org/nfv](http://www.etsi.org/nfv)
IFA WG Reports

IFA009 – Architectural Options
IFA015 – NFV Information Model
IFA016 – Papyrus Guidelines
IFA017 – UML Modeling Guidelines
IFA020 – NFVO Decomposition Options (Release 3)
IFA021 – MANO and Automated Deployment (Release 3)
IFA022 – Multi Site Services (Release 3)
IFA023 – Policy Management in MANO (Release 3)
IFA024 – External Touchpoints related to NFV Information Model

http://docbox.etsi.org/ISG/NFV/Open/Drafts/
http://www.etsi.org/nfv
IFA WG Acceleration Work Items

- IFA001 – Acceleration Overview & use Cases
- IFA002 – VNF acceleration interface specifications
- IFA003 – vSwitch Requirements
- IFA004 – Acceleration Management Aspects
- IFA018 – Resource Management Acceleration
- IFA019 – Acceleration Interface
Reminder: Next webinar coming soon
NFV Acceleration Technology Overview and Standards Update
29 September 2016, 12noon EDT, 16.00 UTC, 18.00 CEST
Speaker: Ning Zong, Principal Engineer in Network Research at Huawei Technologies and vice-chair of ETSI NFV IFA

Register now at:
• https://www.brighttalk.com/webcast/12761/223025
More information:

Drafts (Open Area) [http://docbox.etsi.org/ISG/NFV/Open/Drafts/](http://docbox.etsi.org/ISG/NFV/Open/Drafts/)


NFV Technology Page (information) [http://www.etsi.org/nfv](http://www.etsi.org/nfv)

NFV Portal (working area) [http://portal.etsi.org/nfv](http://portal.etsi.org/nfv)

NFV Proofs of Concept (information) [http://www.etsi.org/nfv-poc](http://www.etsi.org/nfv-poc)

NFV Plugtest (information & registration) [http://www.etsi.org/nfvplugtest](http://www.etsi.org/nfvplugtest)