ISG NFV UPDATE

ETSI ISG NFV

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TST WG Vice-Chair (Testing, Open Source, and Experimentation)
Outline

- NFV Release 2
- ETSI NFV Plugtest Summary and Results
- NFV Release 3 ongoing work
NFV RELEASE 2
<table>
<thead>
<tr>
<th>ID</th>
<th>Title</th>
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<tbody>
<tr>
<td>IFA 002 v2.1.1</td>
<td>Acceleration Technologies: VNF Interfaces Specification</td>
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<td>IFA 003 v2.1.1</td>
<td>Acceleration Technologies; vSwitch Benchmarking and Acceleration Specification</td>
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<tr>
<td>IFA 004 v2.1.1</td>
<td>Acceleration Technologies; Management aspects Specification</td>
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<tr>
<td>IFA 005 v2.1.1</td>
<td>MANO; Or-Vi reference point - Interface and Information Model Specification</td>
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<td>IFA 006 v2.1.1</td>
<td>MANO; Vi-Vnfm reference point - Interface and Information Model Specification</td>
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<td>IFA 007 v2.1.1</td>
<td>MANO; Or-Vnfm reference point - Interface and Information Model Specification</td>
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<td>IFA 008 v2.1.1</td>
<td>MANO; Ve-Vnfm reference point - Interface and Information Model Specification</td>
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<td>IFA 010 v2.2.1</td>
<td>MANO; Functional requirements specification</td>
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<td>IFA 011 v2.1.1</td>
<td>MANO; VNF Packaging Specification</td>
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<td>IFA 013 v2.1.1</td>
<td>MANO; Os-Ma-Nfvo reference point - Interface and Information Model Specification</td>
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<tr>
<td>IFA 014 v2.1.1</td>
<td>MANO; Network Service Templates Specification</td>
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<tr>
<td>IFA 015 v2.1.2</td>
<td>MANO; Report on NFV Information Model</td>
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</table>

[Link to Documents]
Important Note

- Information modeling and interface specifications present in MAN001 made obsolete by Rel 2 Docs
- Stage 3 specifications in ETSI NFV are being based on Rel 2 Docs
- Base your work on Rel 2 Docs
Ongoing Stage 3 Work

- IFA005 (Acceleration)
- IFA003 (Acceleration)
- IFA002
- IFA015
- NFV Information Model Report
- SOL005
- IFA013
- SOL004 (VNF Packaging)
- IFA001
- SOL001 (Descriptors)
- IFA004 (VNF Pkg)
- IFA011
- (NS)
- IFA010
- (MANO Fct Reqs)
- SOL003
- IFA007
- SOL002
- IFA008
- IFA006
- IFA005
- SOL004
- SOL003
- IFA011
- IFA014
- IFA010
- IFA007
- IFA015
## Ongoing Release 3 Work

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<th>Work Item(s)</th>
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<td>Information Modeling</td>
<td>IFA016, IFA017, IFA024 (Release 2)</td>
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<tr>
<td>End to end multi-site services mgmt</td>
<td>IFA022</td>
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<tr>
<td>Additional considerations on MANO</td>
<td>IFA020, IFA021, EVE009</td>
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<td>Acceleration technologies</td>
<td>IFA018, IFA019</td>
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<td>Charging, Billing &amp; Accounting</td>
<td>EVE008</td>
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<td>License management</td>
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<td>Security analysis and mgmt</td>
<td>SEC013, SEC014</td>
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<td>Reliability and availability considerations</td>
<td>REL007, REL008</td>
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<td>Devops and CI/CD</td>
<td>TST006</td>
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<td>Testing</td>
<td>TST004, TST007</td>
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<td>Policy Mgmt</td>
<td>IFA023</td>
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<tr>
<td>Metrics</td>
<td>TST008, IFA027 (Release 2)</td>
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Feedback!

NFV Release 2

More information on features (Release 2 Description):

- https://docbox.etsi.org/ISG/NFV/Open/Other/NFV(16)000274r3_NFV%20Release%20Description%20v10.pdf

Ongoing work (drafts) publicly available here:

- https://docbox.etsi.org/ISG/NFV/Open/Drafts/

Acronyms:
EM: Element Manager
MANO: Management and Orchestration
Mgmt: Management
NS: Network Service
VNF: Virtual Network Function
PLUGTEST SUMMARY AND RESULTS
Interoperability Test Sessions

• Among different combinations of Functions Under Test (FUTs)
• 3 types of FUTs: VNFs, MANO, NFVI&VIM
• At a functional level (conformance not enforced)

Validate basic **NFV Rel 2 capabilities:**

• NSD, VNF Package and SW Image Management
• NS and VNF Life Cycle Management, VR Management

“Early” Plugtest

• Stage 3 incomplete
• IOP through open APIs, plugins, ...
• ...and remote integration
WHO?

- 31 participating companies
- 35 Functions Under Test (commercial and open source):
  - 15 VNFs,
  - 9 MANOs,
  - 11 NFVI&VIM

Several supporting open source communities:
- OPNFV
- Open-O
- OSM
- Open Baton
SETUP

- On-site setup
- Access to Remote Labs network (HIVE)
- + Some additional local instances (FUTs), tools, support functions
- + 1-2 representatives per FUT, max 64 people at a time
RESULTS PER TEST GROUP

Results Per Test Group (%)

<table>
<thead>
<tr>
<th></th>
<th>Interoperability</th>
<th>Not Executed</th>
<th>Totals</th>
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<tbody>
<tr>
<td></td>
<td>OK</td>
<td>NO</td>
<td>NA</td>
</tr>
<tr>
<td>Setup &amp; Instantiation</td>
<td>468</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>Scale</td>
<td>126</td>
<td>0</td>
<td>1096</td>
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<td>Scale VNF</td>
<td>178</td>
<td>0</td>
<td>1038</td>
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<tr>
<td>Update</td>
<td>305</td>
<td>7</td>
<td>292</td>
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<tr>
<td>Terminate &amp; Teardown</td>
<td>462</td>
<td>1</td>
<td>2</td>
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</tbody>
</table>
RESULTS PER TEST CASE

Setup & Instantiation

Scale (+/- VNF i)

Scale VNF (+/- VNFC i)

NS Update

Terminate & Teardown

Results per Test Case (%)
RELEASE 3 ONGOING WORK
Release 2 to Release 3

Release 2
- IFA 005
- IFA 008
- IFA 011

Release 3
- IFA 005
- IFA 008
- IFA 011

propagated

new
- TST XXX
- EVE YYY
- IFA ZZZ

Many of the features introduced in the following slides are at the stage of being documented as Release 3 reports (informative)
Network Slicing support in NFV

What is it about?
- The Use Cases related to Network Slicing can be supported by ETSI NFV architecture.
- Ensure that Service Providers can deploy smoothly 5G systems using NFV based solutions that meet the network characteristics required by the Network Slicing.

Scope and objectives
- Analyse Use Cases related to Network Slicing as defined in SDOs and industry fora.
- Describe how these use cases could be mapped to current NFV concepts and supported by the ETSI NFV architecture framework.
- Identify what NFV Architectural Framework support and enhancements are needed to cover Network Slicing use cases.

Work item(s) and schedule
- EVE012 (GR).
- Schedule:
Cloud-native and PaaS support in NFV framework

What is it about?
- NFV Architecture support for providing “Platform as a Service (PaaS)”-type capabilities and supporting VNFs which follow “cloud-native” design principles (e.g. micro-services).

Scope and objectives
- Develop use cases related to supporting flexible choices for the designers of VNFs in the NFV Architecture.
- Identify and provide recommendations on impacts and enhancements to the ETSI NFV Architectural Framework in order to support cloud-native principles.

Work item(s) and schedule
- IFA029 (GR).
- Schedule:
What is it about?

- Leveraging modern techniques like DevOps, Agile and CI/CD in NFV.

Scope and objectives

- Guidance and recommendations to make use of DevOps and CI/CD, specifically on the boundary between SW supplier and consumer.
- May make recommendations on the VNF packaging to help leverage the techniques.

Work item(s) and schedule

- **TST006.**
- Estimated schedule:
  - TST006: TB-approval in June 2017.
Testing

What is it about?
The testing framework for NFV features according to ongoing and published ETSI NFV publications.

Scope and objectives
- Development of Interoperability Test Descriptions to support NFV Plugtests.
- Study and report on Conformance Testing Methodology for NFV.
- Guidelines for test plans defining SDN Applications, different ways of arranging and federating SDN Controllers, and arrangements of network switching/forwarding functions (both physical and virtual) to create the various path-implementations between and among NS Endpoints and VNFs.

Work item(s) and schedule
- TST004 (GR), TST007 (GR)
- Estimate schedule:
What is it about?
- Consolidation and extension of current NFV information model with a top-down approach independently (but aligned) for the various GS(s).

Scope and objectives
- Specification of a VNF and NS logical model, with VNFD and NSD being deployment views of them.
- Updates to NFV Information Model based on addition/updates of information elements defined as part of Release 3 features.

Work item(s) and schedule
- Specific work items TBD, but likely a revision of IFA015 (GR).
- Schedule: TBD (open, to include features from other work items)
Multi-site Network Services and connectivity management

What is it about?
- Deployment and management of network services that require connectivity across one or more WANs, and the implications for the NFVI to provide required network service endpoints.

Scope and objectives
- Evaluate the implications for NFV on WAN legacy, SDN and hybrid infrastructures.
- Describe how Network Services and their components map to the underlying PoP and WAN, including VNF, PNF and PoP/WAN gateways, overlays, etc.
- Specification of requirements for WIM and associated reference points.
- Specification of enhancements to relevant information models and interfaces.

Work item(s) and schedule
- IFA022 (GR).
- Schedule:
What is it about?

NFV-MANO services across multiple administrative domains.

Scope and objectives

Develop use cases related to offering NFV MANO services across multiple administrative domains, including NFVIaaS and NS over multiple administrative domains and derive requirements.

Examine interactions between functional blocks belonging to different administrative domains.

Identify what NFV Architectural Framework support and enhancements.

Work item(s) and schedule

- IFA028 (GR).

Schedule:

What is it about?

- Establishment of holistic security policies, coherent enforcement of the policies, and security monitoring across the lifecycle of the end-to-end network service in both virtualized and legacy networks.

Scope and objectives

- Definition of use cases for NFV Security Management across planning, enforcement and monitoring targeting at holistic security policies and functions, and specification of requirements and workflows.
- Specification of enhancements to current NFV Architectural Framework.
- Perform a threat analysis for MANO internal and external ref. points and MANO functional blocks.

Work item(s) and schedule

- SEC013 (GS), SEC014 (GS), SEC015 (GS).
- Schedule:
  - SEC013: Completed. TB-approval at NFV#17.
  - SEC014: Close to completion.
Secure sensitive components in the NFV framework

What is it about?

Secure sensitive components in the NFV framework.

Scope and objectives

Providing guidance on securing:
• Hosts on which sensitive components will be hosted.
• The broader context in which sensitive components will be hosted.
• Physical, logical and operational measures related to securing sensitive components.
• Provisioning and de-provisioning sensitive components.
• Specification of requirements for sensitive components.

Work item(s) and schedule

SEC012 (GS).

Schedule:
• SEC012: Completed. TB-approval at NFV#17.
Policy management framework

**What is it about?**
- Policy management framework for NFV-MANO, including distribution of policy, policy conflict detection and resolution, and federation of policy domains.

**Scope and objectives**
- Study use cases related to applying policy framework in NFV-MANO.
- Study of the impacts on NFV-MANO for applicable policy components at referred functional blocks and reference points.
- Specification of requirements applicable to NFV-MANO functional blocks, interfaces and information models applicable to policy distribution and general policy description in VNF and NS descriptors.

**Work item(s) and schedule**
- IFA023 (GR).
- Schedule:
License management

What is it about?

- NFV license management framework aspects to ensure Service Providers can deploy VNFs quickly without customizing the licensing mechanisms for each VNF and each VNF Provider.

Scope and objectives

- Develop use cases related to license management.
- Derive requirements from license management use cases.
- Identify what NFV Architectural Framework support and enhancements are needed to cover license management requirements.

Work item(s) and schedule

- EVE010 (GR).
- Schedule:
  - EVE010: TB-approval June 2017.
Charging, billing and accounting

What is it about?
- Metering of virtual resources and charging triggers in NFVIaaS model, NFVPaaS model, and VNFaaS model in the NFV environment.

Scope and objectives
- Identification of use cases and specification of requirements.
- Identification of possible solutions to determine what type of usage information needs to be collected and various interaction points in between existing or new functional blocks.
- Framework for charging, billing and accounting for NFV, with specification of interfaces to support the agreed identified solution(s).

Work item(s) and schedule
- EVE008 (GR).
- Schedule:
  - EVE008: TB-approval TBD.
VNF snapshot

What is it about?
- Creation and use of VNF snapshots in an NFV framework.

Scope and objectives
- Definition of use case(s) of VNF snapshots, and study under what conditions the capture of VNFC snapshots and VNF data can be performed.
- Specification of requirements for the support of VNF/VNFC snapshots.
- Definition of end-to-end orchestration procedures for VNF snapshot.
- Specification of enhancements on interfaces and information models.

Work item(s) and schedule
- TST005 (GR).
- Schedule:
  - Released
Hardware-independent acceleration technologies

**What is it about?**

- Flexible allocation of VNFs to available NFVI and acceleration components by exposing acceleration capabilities instead of specific acceleration resource characteristics.

**Scope and objectives**

- Specify the message flows and information elements on the interface between the VNF and an allocated switch controlled by the VNF.
- Interfaces and information elements used for acceleration resource management on the Nf-Vi reference point, including 1) discovery of acceleration resources, and 2) lifecycle management of acceleration resources.

**Work item(s) and schedule**

- IFA018 (GS), IFA019 (GS).
- **Schedule:**
Management and automation NFV-MANO and other management functions

What is it about?
- Enable the management of NFV-MANO functional entities.
- Automated deployment of element management functions and other OSS functions.

Scope and objectives
- Study and clarification of the concept of element management functions and service-dependent OSS functions.
- Identification of use cases to determine support of management for NFV-MANO functional entities and EM/OSS functions automated deployment.
- Specification of enhancements on existing interfaces or new interfaces and information models to support the required management tasks.

Work item(s) and schedule
- IFA021 (GR).
- Schedule: