

## ETSI NFV Announcement on work progress, Release 2 and the Definition of Release 3

The ETSI NFV ISG has fulfilled its initial commitment for 2015 and 2016 to produce the initial set of normative documents that are generally referred as ETSI NFV Release 2. A description of Release 2 has been made available [1]. ETSI NFV Release 2 includes the requirements for the interfaces identified in the NFV architecture framework [ETSI GS NFV002], together with the interface specifications and their information models to be used for management and orchestration. Specifications detailing protocols and data models part of Release 2 are currently still in progress.

The ETSI NFV ISG has achieved its goals with respect to Release 2, notably the completion of requirements, interfaces and information model specifications. It has also identified the work items<sup>1</sup> to be included in Release 3. During the development of Release 2, the ETSI NFV ISG has also strengthened the collaboration with external communities, including SDOs and open-source projects, and started activities that will support practical interoperability assessment.

All documents produced by the ETSI NFV ISG have been made publicly available during their drafting phase [2], thus facilitating feedback from organizations and individuals interested in NFV technologies, and open interaction with other external bodies. We believe this has greatly increased the quality of the ISG documents and enhanced the openness of the document development process. An important consequence of this open collaboration has been the collaboration on NFV Information Modeling. This was initiated by a workshop held in January 2016 organized under the auspices of the ETSI NFV ISG. Fourteen organizations shared information, agreed on the risk of model fragmentation and immediate next steps to address such a risk. This activity has continued with direct contacts and informal collaboration between active individuals in each body. A follow-up workshop will be held 2nd week of December.

The ETSI NFV ISG has gone through a detailed analysis of proposed features for Release 3 and achieved consensus on the prioritization of features most required by users. A definition for Release 3 identifies the work items that will be addressed by the ISG in the coming months.

As part of Release 3 and other release-independent work items, the ISG NFV is currently engaged in:

- Information modeling (e.g., with work items [IFA016](#), [IFA017](#) and [IFA024](#))
- End-to-end multi-site services management ([IFA022](#))
- Additional considerations on management and orchestration ([IFA020](#), [IFA021](#) and [EVE009](#))
- Acceleration technologies ([IFA018](#) and [IFA019](#))
- Charging, billing and accounting ([EVE008](#))
- License management ([EVE010](#))
- Security analysis and management ([SEC013](#) and [SEC014](#))
- Reliability and availability considerations ([RELO07](#) and [RELO08](#))
- DevOps and continuous integration / continuous development (CI/CD) ([TST006](#))
- Testing ([TST004](#) and [TST007](#))
- Policy management ([IFA023](#))

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<sup>1</sup> In ETSI terminology a "Work Item" is a piece of work (mini-project) that generally results in the publication of a specification.

Likewise, the ETSI NFV ISG continues to be engaged in the coming months on maintenance of published Release 2 specification, as well as the completion of Release 2 protocols and data models specifications (aka Stage 3) which are expected to be completed during 2017. That is, Stage 3 work of Release 2 features is ongoing and overlapping in time with the initial specification stages (Stage 1 and 2) of Release 3 features. This maximizes the chances to provide a constant specification stream of feature enhancements throughout time.

Finally, it is worth highlighting that updates to documents ETSI GS NFV001 on Use Cases and ETSI GS NFV003 on Terminology are currently in progress with a targeted publication early 2017. The update of NFV001 will include a number of new use cases, such as 5G and IoT examples, that may bring new requirements to be studied in the ETSI NFV ISG. The update on terminology is consolidating new terms of general interest that have been defined in latest work items.

The following section 1 provides more information about the contents of the NFV Release 2 Description. Section 2 reports on the status of report deliverables that have been recently completed and on those work items that are close to completion. Section 3 introduces the current work items for the specification of protocol and data model. Finally, section 4 provides information about the NFV Release 3 Definition.

## 1. NFV Release 2 Description

The Release Description document describes the contents of the NFV Release 2. The Description lists the Group Specifications (GS) that are part of the Release together with the set of specified capabilities in the deliverables. At the time of delivering the Release 2 Description, Release 2 is comprised of 11 normative GS documents. The Group Specifications providing the specification of protocols and data models (Stage 3) conformant to the NFV Release 2 Description are also part of the NFV Release 2. However, such a set of deliverables will be published at a later time once the work is completed by the ETSI NFV ISG in 2017.

ETSI NFV Release 2 builds on and leverages the results of the deliverables published at the end of 2014. Release 2 does not include any architectural changes; therefore the capabilities remain aligned with the ETSI NFV Architectural Framework [[ETSI GS NFV002](#)] and NFV Management and Orchestration (NFV-MANO) framework [[ETSI GS NFV-MAN 001](#)].

As part of Release 2, the ISG NFV has specified functional requirements applicable to the VIM, VNFM and NFVO functional blocks of the NFV-MANO identified within the NFV Architectural Framework, and requirements applicable to the reference points also identified in the Framework. In addition, requirements, interfaces and information models related to different capabilities have been specified, including (not an exhaustive list):

- Virtualised resources management and change notifications,
- Virtualised resources fault and performance management,
- VNF packaging and software image management,
- VNF lifecycle management and change notifications,
- Granting of VNF lifecycle operations,
- VNF fault, performance and configuration management,
- NS lifecycle and change notifications,
- VNF Descriptor information model,
- etc.

The current list of Release 2 deliverables comprises the following GS:

- [ETSI GS NFV-IFA 002](#): Network Functions Virtualisation (NFV); Acceleration Technologies; VNF Interfaces Specification
- [ETSI GS NFV-IFA 003](#): Network Functions Virtualisation (NFV); Acceleration Technologies; vSwitch Benchmarking and Acceleration Specification

- [ETSI GS NFV-IFA 004](#): Network Functions Virtualisation (NFV); Acceleration Technologies; Management aspects Specification
- [ETSI GS NFV-IFA 005](#): Network Functions Virtualisation (NFV); Management and Orchestration; Or-Vi reference point – Interface and Information Model Specification
- [ETSI GS NFV-IFA 006](#): Network Functions Virtualisation (NFV); Management and Orchestration; Vi-Vnfm reference point – Interface and Information Model Specification
- [ETSI GS NFV-IFA 007](#): Network Functions Virtualisation (NFV); Management and Orchestration; Or-Vnfm reference point – Interface and Information Model Specification
- [ETSI GS NFV-IFA 008](#): Network Functions Virtualisation (NFV); Management and Orchestration; Ve-Vnfm reference point – Interface and Information Model Specification
- [ETSI GS NFV-IFA 010](#) (v2.2.1): Network Functions Virtualisation (NFV); Management and Orchestration; Functional requirements specification
- [ETSI GS NFV-IFA 011](#): Network Functions Virtualisation (NFV); Management and Orchestration; VNF Packaging Specification
- [ETSI GS NFV-IFA 013](#): Network Functions Virtualisation (NFV); Management and Orchestration; Os-Manfvo reference point – Interface and Information Model Specification
- [ETSI GS NFV-IFA 014](#): Network Functions Virtualisation (NFV); Management and Orchestration; Network Service Templates Specification

More information and details about the set of capabilities provided by NFV Release 2 is available in the Release 2 Description document [1].

## 2. Reports Completed or Close to Completion

### [ETSI GS NFV-IFA 009 – MANO architectural options \[COMPLETED\]](#)

IFA009 is an informative architectural study that identifies different viable architectural and functional options for the portioning/distribution/consolidation of functionality amongst NFV-MANO functional blocks. IFA009 studies architectural options related to VNFM (either using generic VNFM or multiple VNFMs), VNF related resource management (resource management in direct or indirect mode), NFVO split (NFVO functionality could be further decomposed in RO and NSO), EM function deployments, and VNF lifecycle operation granting.

### [SEC007 – NFV Attestation](#)

Both authentication (a process of ensuring that the computing platform can prove that it is what it claims to be) and attestation (a process of proving that a computing platform is trustworthy and has not been breached) are necessary steps to ensure security in the NFV environment. Attestation procedures create assurances of platform's health, state, and ability to protect data in accordance with policy. This document analyzes current attestation technologies and practices, as applicable to NFV systems, identifying potential gaps.

### [ETSI GS NFV-TST 002 – Report on Interoperability Testing Methodology \[COMPLETED\]](#)

The goal of TST002 is to study how interoperability test methodology can be applied to NFV by analyzing the functional blocks and interfaces defined within the NFV architecture and the NFV capabilities enabled by the current release.

The TST002 report provides methodology guidelines for interoperability testing for NFV, including a review of basic concepts for interoperability testing and their fit in an NFV environment, and a methodology for the development of interoperability test specifications that is illustrated with examples related to NFV operations on specified interfaces. The report is completed by an overview of basic System Under Test (SUT) configurations and interoperability features enabled by the current release. TST002 is aligned with the requirements for NFV interfaces delivered with Release 2.

#### **[TST004 - Guidelines for Test plan for path implementation through NFVI](#)**

The objective of this informative report is to provide testing guidelines for path implementations in NFV, using various configurations of networking capabilities. The report will look at SDN applications, different ways at arranging and federating SDN controllers, as well as different options of networking switching and forwarding, including physical device options. The report will include detailed test plans, but will remain abstract enough to the extent of being usable in the various configurations investigated.

#### **[TST005 - Report on use cases and recommendations for VNF Snapshot](#)**

This informative report will study VNF snapshots. It will report on use cases where they are beneficial, study the conditions for capturing VNF/VNFC snapshots, as well as produce recommendations for the conditions for their capture, along with their data. It will also detail the end to end orchestration procedures and framework for their capture.

#### **[TST006- Report on NFV CICD and DevOps](#)**

This report will focus on how to adapt the concepts of DevOps and CI/CD for application in the NFV framework. It will focus on the boundary between software supplier and the consumer. It will outline the testing aspects when 3rd party SW is integrated into the operator's CI/CD pipeline. It may, as a result, provide recommendations to how VNFs are packaged.

#### **[TST007 - Guidelines on Interoperability Testing for MANO](#)**

This report will outline interoperability test guidelines for the interactions between VNF, MANO and the VIM-NFVI combination. Examples include, but are not limited to, VNF lifecycle management, VNF package management and software image management. The report will be based on the interoperability test methodology developed in the TST002 report.

### **3. Specifications on Protocols and Data Models (aka Stage 3)**

#### **[SOL001 - NFV Descriptors based on TOSCA](#)**

The work item scope includes developing a data model specification for NFV Network Service Descriptor and VNF Descriptor. The specification will be based on OASIS Simple TOSCA for NFV specifications. The specification development is on track.

#### **[SOL002 - RESTful protocols specification for the Ve-Vnfm Reference Point](#)**

The work item scope is to develop a set of Restful protocol specifications for the interface used over the Ve-Vnfm reference point. This specification defines resources, HTTP methods and the request/response data structures of the interfaces. The specification development is on track.

#### **[SOL003 - RESTful protocols specification for the Or-Vnfm Reference Point](#)**

The work item scope is to develop a set of Restful protocol specifications for the interface used over Or-Vnfm reference point. This specification defines resources, HTTP methods and the request/response data structures of the interfaces. The specification development is on track.

### **4. NFV Release 3 Definition**

A Release 3 Definition document collects all the features that the ETSI NFV ISG plans to develop as part of Release 3. The elaboration of use cases and specification of requirements, architecture and interfaces (i.e., up to Stage 2) of features part of Release 3 is expected to be finalized by mid 2017.

At this time, the NFV Release 3 Definition is composed of 18 features, including 15 new features plus 3 features identified in the previous NFV Release 2 Definition that had to be postponed or extended. The breadth of features in Release 3 Definition is substantial, covering new aspects such as charging, billing and accounting in NFV, license

management, security sensitive components, policy distribution framework, and other features consolidating existing specification efforts in the fields of acceleration, information modeling, among others.

The section “Reports Completed or Close to Completion” provides further insights into some of the informative work associated to certain Release 3 features. More information and details about the features and the list of work items and completed Group Specifications and Group Reports of NFV Release 3 is available in the Release 3 Definition document [3].

## References

[1] ETSI ISG NFV, “NFV Release 2 Description,” NFV(16)000274r3. [Online] available at: [https://docbox.etsi.org/ISG/NFV/Open/Other/NFV\(16\)000274r3\\_NFV%20Release%20%20Description%20v10.pdf](https://docbox.etsi.org/ISG/NFV/Open/Other/NFV(16)000274r3_NFV%20Release%20%20Description%20v10.pdf)

[2] ETSI ISG NFV, Open Area. [Online] available at: <https://docbox.etsi.org/ISG/NFV/Open/Drafts/>

[3] ETSI ISG NFV, “NFV Release 3 Definition,” NFV(16)000229r4. [Online] available at: [https://docbox.etsi.org/ISG/NFV/05-CONTRIBUTIONS/2016//NFV\(16\)000229r4\\_NFV\\_Release\\_3\\_Definition.zip](https://docbox.etsi.org/ISG/NFV/05-CONTRIBUTIONS/2016//NFV(16)000229r4_NFV_Release_3_Definition.zip)