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NFV Release 2 Description

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Foreword

An initial set of capabilities of the Network Functions Virtualisation Release 2 had been identified and described in the NFV Release 2 Definition [1] (also known initially as NFV Release 2015 Definition).The present NFV Release 2 Description is issued once the capabilities identified by the present document have been specified up to the level of requirements, interfaces and information model(s).

The specification of protocols and data models conformant to the NFV Release 2 Description are also part of the NFV Release 2. A list of these specifications, compiled at the time of delivering the present document version, is also provided in the present document. Furthermore, guidelines and recommendations on testing related to capabilities of NFV Release 2 is also considered in the work programme of the ETSI ISG NFV.

NFV Release 2 dependent deliverables are a subset of the whole ETSI ISG NFV's work programme. In addition to the release dependent specifications, the ETSI ISG NFV has published in the same timeframe several other reports and guidelines. All deliverables are available at ETSI's "Search and Browse Standards" tool [2].

1 Scope

The present document describes the NFV Release 2. It documents the contents of the Release, listing the specified capabilities and the Group Specifications (GS) and Reports that comprise it.

The purpose of the Release Description is to also describe the normative work that ETSI ISG NFV has developed as part of Release 2 with the objective to specify a stable and internally aligned set of capabilities.

2 References

For the purposes of the present document, the following references apply:

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

[1] ETSI ISG NFV, "NFV Release 2015 Definition," NFV(15)000170r1.

[2] ETSI, "Search and Browse Standards,". [Online]. Available at http://www.etsi.org/standards-search. Access date: September 2016.

[3] ETSI, "ETSI Directives," Dec. 2014. [Online]. Available at http://docbox.etsi.org/Board/ETSI_Directives/34_directives_dec_2014.pdf

[4] ETSI ISG NFV, "NFV Release 2016 Planning Process," NFV(15)000173r2.

[5] ETSI GS NFV 003, "Network Functions Virtualisation (NFV); Terminology for Main Concepts in NFV".

[6] ETSI GS NFV 002, "Network Functions Virtualisation (NFV); Architectural Framework".

[7] ETSI GS NFV-MAN 001, "Network Functions Virtualisation (NFV); Management and Orchestration,".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions in [3] and [4], and the following apply:

Capability: ability of an item to perform an action under given internal conditions in order to meet some demand.

3.2 Abbreviations

For the purposes of the present document, the abbreviations in [5], and the following abbreviations apply:

EM	Element Management
ISG	Industry Specification Group
GR	Group Report
GS	Group Specification
NSD	NS Descriptor
NFP	Network Forwarding Path
OSS	Operations Support System
PNFD	Physical Network Function Descriptor

4 Release Description

4.1 Introduction

ETSI ISG NFV Release 2 (hereinafter referred also as NFV Rel-2 or the present Release) builds on top and leverages the results of ETS ISG NFV documents published by the end of 2014. The NFV Rel-2 does not include any architectural changes and the list of capabilities part of the Release are thus aligned with the ETSI NFV Architectural Framework [6].

NFV Rel-2 is comprised of 20 normative GS and 5 informative GR (see clause 5).

NOTE: At the time of delivering the present Release Description document version, ongoing Work Items are:
- two Work Items specifying the data models and interface protocols of NFV Rel-2,
- two Work Items specifying requirements related to security aspects of specified capabilities, and
- two Work Items related to testing guidadlines and specification of conformance testing of APIs.

A high-level description of the main outcomes of the NFV Rel-2 are provided in clause 4.2. Clause 4.3 describes the capabilities that are covered in the present Release. Clause 5 lists the published GS comprising the present Release, and the active Work Items specifying the data models and interface protocols of capabilities part of the present Relese.

4.2 High-level description

NFV Rel-2 specifies requirements, information models, data models and interface protocols to enable interoperable implementations of the NFV Architectural Framework.

NFV Rel-2 specifies in the following categories:

- Functional requirements applicable to the Virtualised Infrastructure Manager (VIM), VNF Manager (VNFM) and Network Functions Virtualisation Orchestrator (NFVO) functional blocks of NFV-MANO identified by the NFV Architectural Framework.

- Requirements applicable to the reference points Or-Vi, Vi-Vnfm, Or-Vnfm, Os-Ma-nfvo, Ve-Vnfm-vnf and Ve-Vnfm-em identified by the NFV Architectural Framework and NFV-MANO Architectural Framework [7].

- Requirements, specification of interfaces and protocols defined at the reference points Or-Vi, Vi-Vnfm, Or-Vnfm, Os-Ma-nfvo and Ve-Vnfm identified by the NFV Architectural Framework and NFV-MANO Architectural Framework, including:

  * Virtualised resources information management,

  * Virtualised resources management and change notification,
  * Virtualised resources reservation management and change notification,
  * Virtualised resources quota management and change notification,
  * Virtualised resouces fault, performance and capacity management,
  * VNF Packaging and software image management,
  * Network Forwarding Path (NFP) management,
  * VNF lifecycle management and change notification,
  * Granting of VNF lifecycle operation(s),
  * VNF fault, performance and configuration management,
  * VNF indicator(s),
  * Network Service (NS) lifecycle management and change notification, and
  * NS fault and performance management.
- Requirements, information model specification and data models of Network Service Descriptor (NSD),
- Requirements for VNF Packaging, and requirements, information model specification and data models of VNF Descriptor (VNFD), and
- Requirements for hardware-independent acceleration and virtual switch acceleration.
- Requirements related to the security aspects concerning the specified capabilities.

4.3 Release capabilities

The capabilities that comprise the NFV Rel-2 are listed in Table 4.3-1.

Table 4.3-1: Description of Release capabilities.

Capability title	Capability Id.	Description	Mapping to Architectural Framework ([6-7])
Management of virtualised resources	R02.CAP01	The capability supports performing the necessary operations on virtualised resources in order to instantiate and maintain VNFs during their lifecycle. The present release supports performing virtualised resource management operations to allocate, query, update, scale, migrate, operate and release virtualised resources. Change notifications related to virtualised resources is also supported. Operations are provided both in direct mode (consumer invokes directly the producer) and indirect mode (consumer invokes through an entity that is not the end producer of the capability, and only applicable at the Or-Vnfm ref. point). All these operations are available for the three types of virtualised resources that can be instantiated from the NFVI, i.e., compute, storage and network resources. Specifically to network resources, the present release specifies management functions to create, query, delete, update and change the state of NFP. The present release supports the management of virtualised compute resources through “compute flavours”. Operations for the management of virtualised compute flavours,	Functional blocks: VIM, VNFM, NFVO Reference points: Or-Vi, Vi-Vnfm, Or-Vnfm.

Capability title	Capability Id.	Description	Mapping to Architectural Framework ([6-7])
		including creation, query, and deletion of compute flavours are also specified. The present release supports the following resource commitment methods as part of the virtualised resource management: - With reservation, where resources are committed but not allocated, including operations to create, query, update and release of resource reservations. - Quota-based, which limits number of resources used by consumers. - On-demand, where resources are committed only when they are requested to be allocated.	
Virtualised resources information management	R02.CAP02	The capability comprises operations to retrieve information about consumable virtualised resources. The present release supports operations for the subscription and notification of resources information changes as well as the query of consumable virtualised resources information. Operations are provided both in direct mode (consumer invokes directly the producer) and indirect mode (consumer invokes through an entity that is not the end producer of the capability, and only applicable to the Or-Vnfm ref. point). All these operations are available for the three types of virtualised resources that can be instantiated from the NFVI, i.e., compute, storage and network resources.	Functional blocks: VIM, VNFM, NFVO Reference points: Or-Vi, Vi-Vnfm, Or-Vnfm.
Fault and performance management of virtualised resources	R02.CAP03	The capability enables providing fault and performance information to functional blocks responsible for the lifecycle management of VNFs and NSs. The present release specifies means for monitoring virtualised resource faults, the correlation with other underlying NFVI faults, and the notification of such fault events by means of subscription, or through explicit retrieval of the alarms. With respect to virtualised resource performance management, the present release specifies: - the management of PM jobs, including creation, querying and deletion of jobs; - the management of performance thresholds, including creation, querying and deletion of thresholds; and - the corresponding notifications related to threshold crossing and performance information availability based on subscriptions. Operations are provided both in direct mode (consumer invokes directly the producer) and indirect mode (consumer invokes through an entity that is not the end	Functional blocks: VIM, VNFM, NFVO. Reference points: Or-Vi, Vi-Vnfm, Or-Vnfm.

Capability title	Capability Id.	Description	Mapping to Architectural Framework ([6-7])
		producer of the capability, and only applicable to the Or-Vnfm ref. point). Fault and performance information is available for the three types of virtualised resources that can be instantiated from the NFVI, i.e., compute, storage and network resources.	
Lifecycle management of VNFs	R02.CAP04	The capability enables the creation, maintenance and termination of VNFs. This set of functions allow managing the association of the virtualised resources throughout the lifecycle of a VNF instance, and the maintenance of such association according to VNFD and runtime information. In the present release, VNF lifecycle management functions specified are the creation/deletion of VNF instance identifier, instantiation, scaling, scaling to VNF level, change of VNF deployment flavour, healing, operation of the VNF, modification and querying of VNF information, change of external VNF connectivity, and termination of VNF instances. In addition, in the present release, notifications related to the state of a VNF instance as a result of changes made during lifecycle procedures, updates of VNF information attributes and creation/deletion of VNF instance identifier are also supported. Finally, the present release supports the VNF lifecycle operation granting, which allows the VNFM to request NFVO the permission to perform a lifecycle management action and its associated resource management operations. Such a capability is only supported at the Or-Vnfm reference point.	Functional blocks: VNFM, NFVO, EM, VNF. Reference points: Or-Vnfm, Ve-Vnfm-em, Ve-Vnfm-vnf.
Fault, configuration and performance management of VNFs	R02.CAP05	The present release specifies capabilities related to fault, configuration and performance management of VNFs. Fault management of VNFs enables the provisioning of VNF fault information (e.g., faults detected by the VNFM, faults generated due to changes in state of virtualised resources used by a VNF instance) to a consumer functional block. In the present release, VNF fault management supports the retrieval of on-demand fault information, alarm acknowledgement, as well as fault and alarm list rebuilt notifications by means of subscription. Escalating the perceived severity of a fault by the EM towards the VNFM is also supported. Performance management of VNFs enables the provisioning of VNF performance information. The present release specifies: - the management of PM jobs, including creation, querying and deletion of jobs; - the management of performance thresholds, including creation, querying and deletion of thresholds; and	Functional blocks: VNFM, NFVO, EM, VNF. Reference points: Or-Vnfm, Ve-Vnfm-em, Ve-Vnfm-vnf.

Capability title	Capability Id.	Description	Mapping to Architectural Framework ([6-7])
		- the corresponding notifications related to threshold crossing and performance information availability based on subscriptions. Configuration of VNFs comprises the configuration of a VNF during its lifecycle as part of lifecycle changes (e.g., instantiation, scaling, etc.) and due to explicit VNF configuration management request. In the present release, the set of configuration management functions provided by VNFM are the modification of VNF instance information and VNF configurable properties and notifications due to changes in the corresponding attribute values. The VNF configuration interface produced by the VNF include operations to support setting configuration for a VNF instance. Finally, the present release specifies the interface for providing information on value changes of VNF-related indicators, including notification of value changes, and retrieval of indicator values.	
Lifecycle management of Network Services	R02.CAP06	The capability enables the lifecycle management of Network Services (NS) as performed by the NFV Orchestrator and the management of related NS descriptors. With respect to NSD and PNFD management, the present release supports: - the management of NSD, including: on-boarding, enabling, disabling, updating, deleting and querying NSD; - the management of PNFD, including: on-boarding, updating, deleting and querying PNFD, and - notification of NSD on-boarding and NSD changes. With respect to NS lifecycle, the present release supports the set of functions for the creation/deletion of NS instance identifier, instantiation, scaling, healing, update (including changing NS deployment flavour), querying of information, and termination of NS instances. As part of NS update, several NS LCM fine-grained sub-operations related to VNF instances part of an NS instance, service access points (SAP) and VNFFG are supported. The present release also supports other functions, such as runtime notifications related to NS instance lifecycle changes.	Functional blocks: OSS, NFVO Reference points: Os-Ma-Nfvo.
Fault and performance management of Network Services	R02.CAP07	The present release specifies capabilities related to fault and performance management of NS instances. NS fault management comprises the provisioning of fault information on NS instances, including the fault information resulting from the processing of information received from other functional blocks, as well as forwarding of fault information after correlation to the	Functional blocks: OSS, NFVO Reference points: Os-Ma-Nfvo

Capability title	Capability Id.	Description	Mapping to Architectural Framework ([6-7])
		Network Service instance affected. These information facilitate the fault management operation on NSs performed by OSS. The present release specifies the function to support the retrieval of on-demand fault information, as well as fault notifications by means of subscription. NS performance management comprises the provisioning of NS-related performance information. NS metrics can be calculated from measurement results coming from the underlying layers including metrics related to network performance and resource consumption. The present release specifies: - the management of PM jobs, including creation, querying and deletion of jobs; - the management of performance thresholds, including creation, querying and deletion of thresholds; and - the corresponding notifications related to threshold crossing and performance information availability based on subscriptions.	
Package and software image management	R02.CAP08	The capability concerns to end-to-end view of the VNF package lifecycle, from design to runtime, including the necessary lifecycle management operations. The present release specifies requirements related to VNF Packaging, and VNF package management functions to enable on-boarding, querying, fetching, fetching of VNF Package artifacts, enabling, disabling, deleting, and aborting deletion of VNF packages. It also supports the notifications for VNF Package on-boarding and management changes. With respect to VNF software image management, the present release supports the set of functions that enable adding, deleting, updating, querying and copying a software image in the image repository controlled by the VIM(s).	Functional blocks: OSS, NFVO, VNFM, VIM. Reference points: Os-Ma-Nfvo, Or-Vnfm, Or-Vi, Vi-Vnfm.
VNF Descriptor – VNF information modelling	R02.CAP09	The capability concerns to the specification of VNFD. The present release specifies the attributes and information elements part of the VNFD, including: - VNF metadata, - Virtualisation deployment unit (VDU) of a VNF component (VNFC), - Internal VNF Virtual Links, - Virtual compute, storage and network resources requirements. - VNF external connection points (CP).	Functional blocks: NFVO, VNFM. Reference points: Or-Vnfm.

Capability title	Capability Id.	Description	Mapping to Architectural Framework ([6-7])
		- Configurable properties and modifiable attributes, - VNF indicators and monitoring parameters, - VNF deployment flavours, and - VNF lifecycle management scripts.	
Network Service descriptors – NS information modelling	R02.CAP10	The capability concerns to the specification of NSD. The present release specifies the attributes and information elements part of an NSD and contained in the NSD that reference other descriptors, including: - NS metadata, deployment flavour, monitoring information and lifecycle management scripts, - SAP Descriptor (SAPD), - VL Descriptor (VLD) and deployment flavour, - VNFD, - VNFFG Descriptor (VNFFGD), - Physical Network Function Descriptor (PNFD), and - NFP Descriptor (NFPD).	Functional blocks: OSS, NFVO Reference points: Os-Ma-Nfvo
Virtualised resources capacity management	R02.CAP11	This capability enables the capture of information about resources usage and input to capacity planning, capacity changes, and consequently for Network Service planning. The present release supports functions to retrieve information about the total capacity of the resources managed by a VIM instance, the consumable capacity available for new virtualised resources, and the utilization of the capacity, both on VIM global level and per resource zone. In the present release, both on-demand retrieval of capacity information and information from notifications through subscription are supported.	Functional blocks: VIM, NFVO Reference points: Or-Vi
Hardware-independent acceleration	R02.CAP12	This capability comprises the functions to enable the implementation of high-performance VNFs ensuring the decoupling of VNF software from underlying acceleration resources. The present release specifies functional requirements for VIM and NFVI for NFV acceleration from an infrastructure management perspective, including the controlling and management of acceleration resources. The present release also specifies requirements for abstract interfaces enabling a VNF to leverage acceleration services from the infrastructure. It also provides an acceleration architectural model.	Functional blocks: NFVI, VIM, NFVO, VNFM. Reference points:Nf-Vi, Vi-Vnfm, Or-Vi.

Capability title	Capability Id.	Description	Mapping to Architectural Framework ([6-7])
		The present release specifies performance benchmarking metrics for virtual switching achieved through virtual switch acceleration and associated requirements.	

5 Release Group Specifications

5.1 Published deliverables

The present clause lists the deliverables (Group Specifications and Group Reports) that form the NFV Rel-2. The NFV Rel-2 is comprised of multiple specification and reports, which can be categorized according to different specification stages (Stage 1, Stage 2, etc.) and provisions compliance (normative or informative).

NOTE 1: The versions among the different deliverables may differ, e.g., a deliverable may have been updated and published with a newer version due to maintenance, whereas some other deliverable not. The latest available published version of each deliverable is indicated in the following tables.

Table 5.1-1 lists the published GS that comprise the NFV Rel-2 and the addressed capabilities, and that provide the specification of requirements, architecture, interfaces and information models (Stage 1 and Stage 2).

Table 5.1-1: List of GS specifying requirements and information models that comprise the NFV Rel-2.

GS Id. & version	Old versions	Full title	Addressed capabilities(s)
ETSI GS NFV-IFA 002 v2.4.1	v2.3.1 v2.1.1	Network Functions Virtualisation (NFV) Release 2; Acceleration Technologies; VNF Interfaces Specification	R02.CAP12
ETSI GS NFV-IFA 003 v2.4.1	v2.3.1 v2.1.1	Network Functions Virtualisation (NFV) Release 2; Acceleration Technologies; vSwitch Benchmarking and Acceleration Specification	R02.CAP12
ETSI GS NFV-IFA 004 v2.4.1	v2.3.1 v2.1.1	Network Functions Virtualisation (NFV) Release 2; Acceleration Technologies; Management aspects Specification	R02.CAP12
ETSI GS NFV-IFA 005 v2.5.1	v2.4.1 v2.3.1 v2.1.1	Network Functions Virtualisation (NFV) Release 2; Management and Orchestration; Or-Vi reference point - Interface and Information Model Specification	R02.CAP01 R02.CAP02 R02.CAP03 R02.CAP08 R02.CAP11
ETSI GS NFV-IFA 006 v2.5.1	v2.4.1 v2.3.1 v2.1.1	Network Functions Virtualisation (NFV) Release 2; Management and Orchestration; Vi-Vnfm reference point - Interface and Information Model Specification	R02.CAP01 R02.CAP02 R02.CAP03 R02.CAP08
ETSI GS NFV-IFA 007 v2.5.1	v2.4.1 v2.3.1 v2.1.1	Network Functions Virtualisation (NFV) Release 2; Management and Orchestration; Or-Vnfm reference point - Interface and Information Model Specification	R02.CAP04 R02.CAP05 R02.CAP08

ETSI GS NFV-IFA 008 v2.5.1	v2.4.1 v2.3.1 v2.1.1	Network Functions Virtualisation (NFV) Release 2; Management and Orchestration; Ve-Vnfm reference point - Interface and Information Model Specification	R02.CAP04 R02.CAP05
ETSI GS NFV-IFA 010 v2.5.1	v2.4.1 v2.3.1 v2.2.1 v2.1.1	Network Functions Virtualisation (NFV) Release 2; Management and Orchestration; Functional requirements specification	R02.CAP01 R02.CAP02 R02.CAP03 R02.CAP04 R02.CAP05 R02.CAP06 R02.CAP07 R02.CAP08 R02.CAP11 R02.CAP12
ETSI GS NFV-IFA 011 v2.6.1	v2.5.1 v2.4.1 v2.3.1 v2.1.1	Network Functions Virtualisation (NFV) Release 2; Management and Orchestration; VNF Descriptor and Packaging Specification	R02.CAP08 R02.CAP09
ETSI GS NFV-IFA 013 v2.5.1	v2.4.1 v2.3.1 v2.1.1	Network Functions Virtualisation (NFV) Release 2; Management and Orchestration; Os-Ma-Nfvo reference point - Interface and Information Model Specification	R02.CAP06 R02.CAP07 R02.CAP08
ETSI GS NFV-IFA 014 v2.6.1	v2.5.1 v2.4.1 v2.3.1 v2.1.1	Network Functions Virtualisation (NFV) Release 2; Management and Orchestration Network Service Templates Specification	R02.CAP10
ETSI GS NFV-IFA 027 v2.4.1	N/A	Network Functions Virtualisation (NFV) Release 2; Management and Orchestration; Performance Measurements Specification	R02.CAP03 R02.CAP05 R02.CAP07
ETSI GS NFV-TST 008 v2.5.1	v2.4.1 v2.1.1	Network Functions Virtualisation (NFV) Release 2; Testing; NFVI Compute and Network Metrics Specification	R02.CAP03

Table 5.1-2 lists the published GS that are also part of the NFV Rel-2 and specify the data models and interface protocols (Stage 3) corresponding to NFV Rel-2 capabilities.

Table 5.1-2: List of GS that specify data models and interface protocols corresponding to NFV Rel-2 capabilities.

GS Id. & version	Old versions	Full Title	Associated Stage 2 GS	Addressed capabilities(s)
ETSI GS NFV-SOL 001 v2.6.1	v2.5.1	Network Functions Virtualisation (NFV) Release 2; Protocols and Data Models; NFV Descriptors based on TOSCA	ETSI GS NFV-IFA 011, and ETSI GS NFV-IFA 014	R02.CAP09 R02.CAP10
ETSI GS NFV-SOL 002 v2.6.1	v2.5.1 v2.4.1 v2.3.1	Network Functions Virtualisation (NFV) Release 2; Protocols and Data Models; RESTful protocols specification for the Ve-Vnfm Reference Point	ETSI GS NFV-IFA 008	R02.CAP04 R02.CAP05
ETSI GS NFV-SOL 003 v2.6.1	v2.5.1 v2.4.1 v2.3.1	Network Functions Virtualisation (NFV) Release 2; Protocols and Data Models;	ETSI GS NFV-IFA 007	R02.CAP04 R02.CAP05 R02.CAP08

		RESTful protocols specification for the Or-Vnfm Reference Point		
ETSI GS NFV-SOL 004 v2.6.1	v2.5.1 v2.4.1 v2.3.1	Network Functions Virtualisation (NFV) Release 2; Protocols and Data Models; VNF Package specification	ETSI GS NFV-IFA 011	R02.CAP08 R02.CAP09
ETSI GS NFV-SOL 005 v2.6.1	v2.5.1 v2.4.1	Network Functions Virtualisation (NFV) Release 2; Protocols and Data Models; RESTful protocols specification for the Os-Ma-nfvo Reference Point	ETSI GS NFV-IFA 013	R02.CAP06 R02.CAP07 R02.CAP08
ETSI GS NFV-SOL 007 v2.6.1	v2.5.1	Network Functions Virtualisation (NFV) Release 2; Protocols and Data Models; Network Service Descriptor File Structure Specification	ETSI GS NFV-IFA 014	R02.CAP10
ETSI GS NFV-SOL 013 v2.6.1	N/A	Network Functions Virtualisation (NFV) Release 2; Protocols and Data Models; Specification of common aspects for RESTful NFV-MANO APIs	N/A	N/A (specification of common API aspects)

Table 5.1-3 lists the Group Reports (GR) that are also part of the NFV Rel-2. GRs are of informative nature and complement the normative specification(s) with additional information.

NOTE 2: For any discrepancy on a specific aspect or specified feature between a GR and GS, the GS takes precedence.

Table 5.1-3: List of GR that comprise the NFV Rel-2.

GR Id. & version	Old versions	Full title	Description
ETSI GR NFV-IFA 015 v2.5.1	v2.4.1 v2.3.1 v2.1.2	Network Functions Virtualisation (NFV) Release 2; Management and Orchestration; Report on NFV Information Model	The NFV-IFA 015 provides an overall information model view taking as input the interface and information elements specified in the descriptor and interface specifications.
ETSI GR NFV-IFA 016 v2.5.1	v2.4.1 v2.1.1	Network Functions Virtualisation (NFV) Release 2; Information Modeling; Papyrus Guidelines	The NFV-IFA 016 provides the guidelines for the development of a protocol-neutral Unified Modeling Language (UML) information model for ETSI NFV based on Papyrus, and it used by ETSI NFV when building the NFV information model.
ETSI GR NFV-IFA 017 v2.5.1	v2.4.1 v2.1.1	Network Functions Virtualisation (NFV) Release 2; Information Modeling; UML Modeling Guidelines	The NFV-IFA 017 provides the guidelines for the development of a protocol-neutral Unified Modeling Language (UML) information model for ETSI NFV.
ETSI GR NFV-IFA 024 v2.1.1	N/A	Network Functions Virtualisation (NFV) Release 2; Information Modeling; Report on External Touchpoints related to NFV Information Model	The NFV-IFA 024 defines the touchpoints/relations between the NFV Information Model (see NFV-IFA 015) and the models from other organisations including: ONF, 3GPP and TM Forum.
ETSI GR NFV-TST 007 v2.5.1	v1.1.1	Network Functions Virtualisation (NFV) Release 2; Testing; Guidelines on Interoperability Testing for MANO	Testing aspects of other specified capabilities.

The ETSI GS NFV 003 on "NFV; Terminology for main concepts in NFV" includes terminology used across several NFV Releases. As a result, a number of terms and acronyms used in Release 2 documentation are defined and present in the ETSI GS NFV 003. The latest published version is:

- ETSI GS NFV 003 v1.4.1 "Network Functions Virtualisation (NFV); Terminology for Main Concepts in NFV".

5.2 Map of ETSI NFV specifications and the NFV Architectural Framework

NFV Release 2 documentation is, to a great extend, structured according to the NFV Architectural Framework, with some specifications mapping one to one to the reference points and functional blocks identified in the framework. Figure 5.2-1 illustrates a map of ETSI NFV specifications and ongoing work items to the NFV Architetural Framework.

- Specifications with requirements, information models and architecture (aka Stage 1 and 2) are depicted in red,
- Specifications and work items related to protocols and data models (aka Stage 3) are depicted in green, and
- Specifications and work items related to testing (aka Stage 4) are depicted in blue.

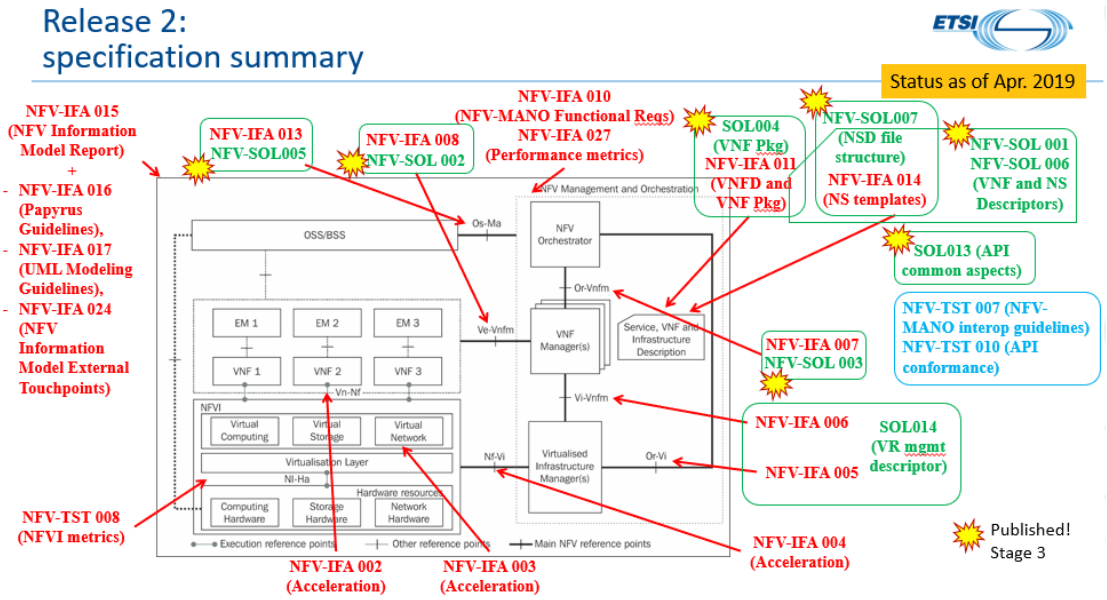

Figure 5.2-1: Map of ETSI NFV specifications and the NFV Architectural Framework.

6 Release associated active work items

6.1 Introduction

The clause 6 lists the active work items from which Rel-2 specifications or reports will be delivered.

NOTE: The list of work items does not reflect those specifications that have already been published once and are currently under maintenance, unless the previous published version had been Release independent, i.e., not associated to a specific Release.

6.2 Active work items

Table 6.2-1 lists the Work Items that will specify additional requirements, information model and interfaces (Stage 2) corresponding to NFV Rel-2 capabilities.

NOTE 1: The deliverables that will result from the Work Items listed in Table 6.2-1 will be published at a later time once the specification work has been completed.

Table 6.2-1: List of Work Items specifying additional information model and interfaces corresponding to NFV Rel-2 capabilities.

Work Item Id.	Full Title	Addressed capabilities(s)
None	None	None

Table 6.2-2 lists the active Work Items that will specify the data models and interface protocols (Stage 3) corresponding to NFV Rel-2 capabilities.

NOTE 2: The deliverables that will result from the Work Items listed in Table 6.2-2 will be published at a later time once the specification work has been completed.

Table 6.2-2: List of Work Items specifying data models and interface protocols corresponding to NFV Rel-2 capabilities.

Work Item Id.	Full Title	Associated Stage 2 GS	Addressed capabilities(s)
DGS/NFV-SOL006	Network Functions Virtualisation (NFV) Release 2; Protocols and Data Models; NFV Descriptors based on YANG Specification	ETSI GS NFV-IFA 011, and ETSI GS NFV-IFA 014	R02.CAP09 R02.CAP10
DGS/NFV-SOL014	Network Functions Virtualisation (NFV) Release 2; Protocols and Data Models; YAML data model specification for descriptor-based virtualised resource management	ETSI GS NFV-IFA 005, ETSI GS NFV-IFA 006, and ETSI GS NFV-IFA 011	R02.CAP01 R02.CAP02 R02.CAP03 R02.CAP08 R02.CAP09 R02.CAP11

Table 6.2-3 lists the Work Items that will specify additional requirements related to security aspects corresponding to NFV Rel-2 capabilities.

NOTE 3: The deliverables that will result from the Work Items listed in Table 6.2-3 will be published at a later time once the specification work has been completed.

Table 6.2-3: List of Work Items specifying additional requirement related to security aspects corresponding to NFV Rel-2 capabilities.

Work Item Id.	Full Title	Addressed capabilities(s)
DGS/NFV-SEC021	Network Functions Virtualisation (NFV) Release 2; Security; VNF Package Security Specification	R02.CAP08 R02.CAP09 Security aspects of other specified capabilities.
DGS/NFV-SEC022	Network Functions Virtualisation (NFV) Release 2; Security; Access Token Specification for API Access	Security aspects of other specified capabilities.

Table 6.2-4 lists the Work Items that will specify testing aspects and conformance corresponding to NFV Rel-2 capabilities.

NOTE 4: The deliverables that will result from the Work Items listed in Table 6.2-4 will be published at a later time once the specification work has been completed.

Table 6.2-4: List of Work Items specifying additional requirement related to testing corresponding to NFV Rel-2 capabilities.

Work Item Id.	Full Title	Addressed capabilities(s)
DGS/NFV-TST010	Network Functions Virtualisation (NFV) Release 2; Testing; API Conformance Testing Specification	Testing aspects of other specified capabilities.

History

Document history		
Version	**Date**	**Changes**
v1.0	2016.09.23	First public version.
v1.1	2017.03.06	Updates from NFV#16 and NFV#17: • Addition of IFA016, IFA017 and IFA024 as part of Release 2. • Addition of TST008 and IFA027 as part of ongoing Release 2. • Removed NOTE 2 in clause 5 with the formal approval and publication of IFA015, IFA016, IFA017 and IFA024. • Updates in several clauses when referring about the number of GS/GR composing the Release 2, and also the ongoing work items.
v1.2	2017.06.09	Updates after NFV#18: • Moved the published TST008 from Table 5-1 (ongoing work items) to Table 5-1 (list of GS that comproise the NFV Rel-2). • Added the version number to published deliverables.
v1.3	2017.09.08	Additional updates after NFV#18: • Updates to capabilities description based on the changes introduced during the 1H2017 release maintenance. • Created two sub-clauses for clause 5: a) one for published deliverables, b) another one for active work items. • Updated the list of published deliverables from maintenance (Table 5.1-1). • Updated the list of newly published deliverables (Table 5.1-2). • Changed order in the tables of the newly clause 5.2. • Updated the list of active work items (Table 5.2-2). • Updated the current number of published document in clause 4.1.
v1.4	2017.12.04	Updates after NFV#19: • Added work item NFV-SEC021 to Table 5.2-1. • Added work item NFV-SOL006 to Table 5.2-2. • Clause 5.1: added a reference to the latest published version of NFV003 on NFV terminology.
v1.5	2018.02.26	Updates after NFV#20: • Clause 4.1: updated the description of published and ongoing work items. • Clause 4.2: Added bullet point to cover “generic security requirement”. • Updated list of published maintenance deliverables in Tables 5.1-1, 5.1-2, and 5.1-3. • Moved active security work items into new Table 5.2-3. Added new entry for SEC022 work item from approval of NWI in NFV(17)000338r5. • Moved completed SOL005 work item from Table 5.2-2 to 5.1-2. • Added new table 5.2-4 for ongoing/active testing related work items. Added new entry for TST010 work item from approval of NWI in NFV(17)000322r4.
v1.6	2018.05.14	Updates after NFV#21: • Clause 5.2: Added the new entries for the new work items SOL007 (Table 5.2-2) and TST007 (Table 5.2-4) approved at and after NFV#21 (corresponding contributions NFV(18)000066r1 and NFV(18)000025r2). • Foreword: updated the statement about the GS to be published at a later time. There have been already many GS of Stage 3 published since then. • Clause 4.1: updated the number of ongoing active work items. • Moved the clause 5.2 under a new Clause 6 dedicted to “active work items”. Clauses and tables were renumbered accordingly.

v1.7	2018.09.17	Updates after NFV#22: • Clause 4.1: updated the number of completed documents and ongoing work items. • Clause 5.1: added more introduction and a NOTE 1 to explain about the different versioning existent in the Release 2 specification set. • Clause 5.1: update the list of published specifications to the latest version. • Clause 6.2: IFA027 was moved from Table 6.2-1 to Table 5.1-1, as it has been completed. TST007 moved from Table 6.2-4 to 5.1-3.
v1.7.1	2018.11.28	Updates after NFV#23: • Table 6.2-1: added SOL013.
v1.8.0	2019.04.08	Updates after NFV#25: • Table 5.1-1: updated the IFA011 and IFA014 with the latest maintenance versions. • Table 5.1-2: updated the table with latest maintenance versions. SOL001, SOL007 and SOL013 have been added to the table too. • Table 6.2-2: delete the entries of SOL001, SOL007 and SOL013, as these have been completed. The SOL014 work item approved at NFV#24 has been added to the table. • Clause 5.2: new clause depicting a map of specs with the architectural framework. • Clause 4.1: The number of published documents has been updated.