v0.3.0 (2021-02)

NFV Release 4 Definition

Contents

Foreword

The adoption by the ETSI ISG NFV of specific Features follows the ISG working procedures, in particular, with the formal approval of an ISG Work Item.

The NFV Release 4 Definition will be updated according to the Work Items and deliverables that are approved by the ETSI ISG NFV.

NFV Release 4 deliverables are a subset of the whole ETSI ISG NFV's work programme. In addition to the release dependent specifications, the ETSI ISG NFV several other reports and guidelines. All NFV deliverables are available at ETSI's "Search and Browse Standards" tool [1].

NOTE: In case of discrepancies between the contents of the present document and the ETSI NFV Group Specifications/Reports, the latter source of information takes precedence.

1 Scope

The purpose of the Release Definition is to identify the informative and normative work that ETSI ISG NFV plans to develop as part of Release 4.

Stage 1 and 2 development of Release 4 features is expected to finalize in 2021.

The present document describes the specification objectives of Release 4 and lists the features which are part of the Release.

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, "Search and Browse Standards".

NOTE: Available online: http://www.etsi.org/standards-search.

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

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

[4] ETSI NFV, "NFV Release 2 Description".

NOTE: Available online: https://docbox.etsi.org/ISG/NFV/Open/Other/ReleaseDocumentation/

[5] ETSI NFV, "NFV Release 3 Description".

NOTE: Available online: https://docbox.etsi.org/ISG/NFV/Open/Other/ReleaseDocumentation/

[6] ETSI NFV, "Feature tracking: ENH01 Security enhancements".

NOTE: Available online: https://nfvprivatewiki.etsi.org/index.php?title=Feature_Tracking#ENH01:_Security_enhancements

[7] ETSI NFV, "Feature tracking: ENH02 Special technical enhancements".

NOTE: Available online: https://nfvprivatewiki.etsi.org/index.php?title=Feature_Tracking#ENH02:_Special_technical_enhancements

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions in [2], and the following apply:

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

Feature: functionality which represents added value to the system for a defined set of users

NOTE: A user could be a network operator, service provider, VNF provider, or some other defined actor.

Function: the abstract concept of a particular piece of functionality in a device, entity or service

Functionality: sum of actions or any aspect an item can do

NOTE: Functionality can be associated to diverse items, including devices, entities, services and/or features.

Release: a set of deliverables that specify a well-defined, stable and internally consistent set of functions

NOTE: A Release differs from the previous Release by having added and/or improved functionality introduced as a result of standardization work.

Release Definition: the ensemble of Features of a particular Release

Release Description: the description of specification outputs delivered by the Release

3.2 Abbreviations

For the purposes of the present document, the abbreviations in [2], and the following abbreviations apply:

ISG   Industry Specification Group
GR   Group Report
GS   Group Specification
WI   Work Item

4 Release overview

4.1 Introduction

ETSI ISG NFV Release 4 (hereinafter referred also as Release 4 or the present Release) builds on top and leverages the results of ETS ISG NFV documents published as part of the Release 3. The Release 4 introduces new features on top of the specified capabilities and features in previous Releases.

A high-level description for each of the features comprising the current Release 4 work is provided in clause 5. Clause 4.2 provides a statistical summary of the Release 4 in terms of number of specifications and reports published to date. Clause 4.3 summarizes the capabilities and features that have been specified in past Releases and clause 4.4 introduces the main technical areas to be covered in Release 4. Clause 6 lists the published GR and GS comprising Release 4, while clause 7 lists the ongoing work items.

4.2 Overview

At the time the present Definition document version is delivered, the Release 4 is comprised of the following number of published deliverables:

- 4 Group Specifications, among which:

    + 2 new specifications.

    + 2 specifications evolved from Release 3.

- 1 Group Reports, among which:

    + 1 new reports.

    + 0 reports evolved from Release 3.

4.3 Summary of past Releases

The Release 3 was built upon the capabilities and features specified as part of the NFV Release 2. The Release 2 specified requirements, information models, data models and interface protocols to enable interoperable implementations of the NFV Architectural Framework [3]. The Release 3 added the following major architectural changes:

- Addition of the Or-Or reference point in between two NFVO (Feature "NFV-MANO admin domains").

- Exposure by the NFV-MANO functional blocks of new interfaces for policy management (feature "Policy management framework").

- Exposure by the NFV-MANO functional blocks of new interfaces for the management of NFV-MANO functional blocks (feature "Management of NFV-MANO").

- Definition of the Wide Area Infrastucture Management (WIM) and exposure of interfaces for multi-site network connectivity management (feature "Management and connectivity of multi-site services").

The Release 2 Description [4] provides details about the capabilities that had been specified in the Release 2. The Release 3 Description [5] deals the new features that had been specified in the Release 3.

4.4 Release 4 technical areas

The ETSI NFV Release 4 aims to specify around the following technical areas.

A) NFVI evolution, focusing on:

   A.1) Enhancements to support lightweight virtualization technologies,

   A.2) Optimizing NFVI abstraction for reducing the coupling of VNFs to infrastructure, and

   A.3) Optimizing networking integration into the infrastructure fabric and ease the connectivity for VNFs and NS.

B) Enhancing NFV automation and capabilities, focusing on:

   B.1) Improving life-cycle management and orchestration,

   B.2) Simplification of VNF and NS management aspects leveraging virtualization, and

   B.3) Handling advances in autonomous networking.

C) Evolving the NFV-MANO framework, focusing on:

   C.1) Optimizing internal NFV-MANO capabilities exposure and usage.

D) Operationalization, focusing on:

   D.1) Simplification of NFV to ease development and deployment of sustainable NFV based solutions,

   D.2) Verification (and certification) procedures and mechanisms, and

   D.3) Operationalization, integration and use of NFV with other management and network frameworks.

In addition to the above technical areas, additional aspects about security hardening of NFV (enhancements), and other specific technical enhancements are necessary to maximize the impact of virtualization and future NFV deployments.

Within the areas of work that are introduced above, the following more specific top-level ("umbrella") features are derived as described in the following clauses.

5 Release 4 features

5.1 Overview

The candidate new features introduced as part of the Release 4 are listed in Table 5.1-1.

Table 5.1-1: Release 4 features

Feature name	Acronym	FEAT id	Notes
NFV-MANO upgrade	SWUP-MANO	FEAT01	Carried over from Release 3.
MEC in NFV	MECinNFV	FEAT12	Carried over from Release 3.
Licensing management	LIC	FEAT13	Carried over from Release 3.
Cloud-native VNFs and Container Infrastructure management	CNNFV	FEAT17	Carried over from Release 3.
Security management	SECMM	FEAT18	Carried over from Release 3
Network connectivity integration and operationalizatoin for NFV	NFV-Connect	FEAT19	New feature
NFV-MANO automation and autonomous networks	Auto	FEAT20	New feature
NFV enhancemetns for 5G	5GNFV	FEAT21	New feature
Multi-tenancy enhancements for NFV-MANO	M-Tenant	FEAT22	New feature
SBA for NFV-MANO	MANO-SBA	FEAT23	New feature
VNF generic management functions	VNF-OAM	FEAT24	New feature
Continuous VNF integration	VNF-CI	FEAT25	New feature
Policy Management Models	Policy-model	FEAT26	New feature

5.2 Features carried over from Release 3

5.2.1 Overview

This clause introduces areas of work that were not completed in Release 3 timeframe and are included in Release 4.

Minor adaptations on the scope from Release 3 may be done as part of the Release definition.

References to feature identifiers (e.g., FEAT01) are provided referring the Annex B of the NFV Release 3 Definition document.

Clause 6 lists current open work items and published specifications and the specific features that are covered in their scope where available.

5.2.2 NFV-MANO upgrades (SWUP-MANO, FEAT01)

The feature was started in Release 3 as FEAT01.

The scope of the feature covers the following areas:

- Update and upgrade of NFV-MANO software components in an NFV context (or environment).

- Identification of use cases for update and upgrade of NFV-MANO.

- Identification of the required set of update/upgrade controlling functions to facilitate software updates/upgrades.

- Specification of requirements for software update/upgrade controlling functions.

The "technical areas" covered by this feature are: C.1), D.2) and D.3).

5.2.3   MEC in NFV (MECinNFV, FEAT12)

The feature was started in Release 3 as FEAT12.

The scope of the remaining work of the feature covers the following areas:

- Enhancement support for multi-access edge computing (MEC) in NFV deployments

- Support coordination of NFV-MANO with consumers (in particular MEC) for graceful termination / stop support

- Enhancements on the placement and network constraints during resource allocation for network service and VNF instances

The "technical areas" covered by this feature are: B.2), B.3), D.1) and D.3).

5.2.4   Licensing management (LIC, FEAT13)

The feature was started in Release 3 as FEAT13, based on ETSI GR NFV-EVE 010.

The scope of the feature covers the following areas:

- 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.

The feature specification work scope encompasses:

- 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.

The "technical areas" covered by this feature are: B.1), B.3), D.1) and D.3).

5.2.5   Cloud-native VNFs and Container Infrastructure management (CNNFV, FEAT17)

The feature was started in Release 3 as FEAT17, based on ETSI GS NFV-EVE 011 and ETSI GR NFV-IFA 029.

The scope of the feature covers the following areas:

- NFV Architecture support for VNFs which follow "cloud-native" design principles.

- Enhance NFV-MANO capabilities to support container technologies based on ETSI GR NFV-IFA 029.

- Enhance NFV-MANO capabilities for container management and orchestration

- Enhance information model for containerized VNFs both using bare metal or nested virtualization technologies

The "technical areas" covered by this feature are: A.1), A.2), B.2) and C.1).

5.2.6   Security management (SECMM, FEAT18)

The feature was started in Release 3 as FEAT18.

The scope of the feature covers the following areas:

- Security management and monitoring for NFV for planning, enforcement and monitoring targeting at holistic security policies and functions.

- Enhancements to current NFV Architectural for NFV Security Management.

- Secure sensitive components in the NFV framework.

- Secure hosts on which sensitive components will be hosted.

- Secure 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.

The "technical areas" covered by this feature are: C.1) and D.3).

5.3 New features

5.3.1 Network connectivity integration and operationalization for NFV (NFV-Connect, FEAT19)

The scope of the feature covers the following areas:

- The integration of NFV/SDN for overlay virtual networking in the context of dynamic, multi-site and more granular network function services.

- Exposure of high-performance overlay network capabilities to network functions.

- Simplification of network connectivity exposed and offered to the VNF. Support of dynamic routing capabilities in the network.

- Enabling more dynamic network provisioning and reconfiguration "end-to-end", within and across sites.

The "technical areas" covered by this feature are: A.2), and A.3).

5.3.2 NFV-MANO automation and autonomous networks (Auto, FEAT20)

The scope of the feature covers the following areas:

- NFV-MANO support for managing autonomous networks.

- Enabling higher level of automation for NFV-MANO.

- Intent-based principles for external exposure network services management.

The "technical areas" covered by this feature are: B.1), B.3), and C.1).

5.3.3 NFV enhancements for 5G (5GNFV, FEAT21)

The scope of the feature covers the following areas:

- NFV support for deploying 5G networks, capabilities and associated requirements.

- 5G network capabilities and features interworking and relationship with NFV.

- Determine and profile how NFV can support 5G deployments.

The "technical areas" covered by this feature are: A.1) and D.3).

5.3.4 Multi-tenancy enhancements for NFV-MANO (M-Tenant, FEAT22)

The scope of the feature covers the following areas:

- Multi-tenancy technology to share IT resources securely among multiple tenants that use the cloud.

- Virtualization-based features as a means to isolate tenants.

- Association/disassociation of tenancy and NFV-MANO objects.

The "technical areas" covered by this feature are: B.1), and C.1).

5.3.5 SBA for NFV-MANO (MANO-SBA, FEAT23)

The scope of the feature covers the following areas:

- Service exposure to 3rd party access for selected NFV-MANO services.

- Assess steps in the SBA transformation (different steps have different levels of complexity), such as NFV-MANO service independence, modularization, data separation/split, exposure, dynamic registration and discovery of services.

- Optimal routing of service requests to NFV-MANO service instances, including load balancing and failover management

- Enabling new interface consumers (e.g., policy engines, license managers, AI-based systems, etc.).

The "technical areas" covered by this feature are: B.1) and C.1).

5.3.6 VNF generic management functions (VNF-OAM, FEAT24)

The scope of the feature covers the following areas:

- Definition of a set of common management functions for VNFs to ease their provisioning, connectivity, configuration and monitoring on a virtualized platform.

- Reducing dependencies of the VNF from underlying resources, hosts and network, thus realizing a full network function decoupling from the infrastructure.

- VNFs reusing generic and common management functionality provided as virtualization platform functionalities.

- Leveraging PaaS capabilities as a means for providing common management functions.

The "technical areas" covered by this feature are: A.2), B.2) and D.1).

5.3.7 Continuous VNF integration (VNF-CI, FEAT25)

The scope of the feature covers the following areas:

- Optimization of the VNF Package structure and VNF.

- Test execution of test functions and feedback to VNF provider/developer.

- VNF/VNFC software component update/upgrade supporting continuous development and integration paradigms.

The "technical areas" covered by this feature are: A.2), D.1), and D.2).

5.3.8 Policy management models (Policy-model, FEAT26)

The scope of the feature covers the following areas:

- Analyse existing policy information and data models and identify solutions that potentially could be applied to NFV-MANO.

- Clarify the main alternative for policy management (between NFV-MANO and OSS/BSS).

- Determine the objectives and management alternatives for policy management applicable to NFV-MANO.

- Identify policy expression information model applicable to NFV-MANO.

- Identify policy expression data model applicable to NFV-MANO.

NOTE 1: The specification of a policy engine, with its procedures, interfaces and handling of the input events, goals and output/actions is not in scope of this feature.

NOTE 2: The specification of interfaces as part of the policy framework is part of the Release 3.

The "technical areas" covered by this feature are: B.1), B.3), and D.3).

5.4 Enhancement features

5.4.1 Introduction

This clause introduces areas of work in which specific technical and security enhancements are expected to be specified.

5.4.2 NFV security hardening (enhancements) (ENH01)

The scope of the feature covers different technical working areas to enhance the ETSI NFV specifications and the already specified past Releases features/capabilities with the required security levels.

NOTE: The list of possible security enhancements is not determined in the present Release definition. Updates and tracking of this type of enhancements are available on the feature tracking wiki pages [6].

5.4.3 Specific technical enhancements (ENH02)

The scope of the feature covers different technical working areas to enhance the ETSI NFV specifications and the already specified past Releases features/capabilities with specific technical enhancements which are considered of low complexity and not addressed already by other Release 4 features.

NOTE: The list of possible technical enhancements is not determined in the present Release definition. Updates and tracking of this type of enhancements are available on the feature tracking wiki pages [7].

6 NFV Release 4 published deliverables

6.1 Introduction

The present clause 6 lists the published deliverables (Group Specifications and Group Reports) associated to the Release 4. The NFV Release 4 is comprised of multiple specification and reports, which can be categorized according to different specification stages (stage 1, stage 2, etc.) and 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.

NOTE 2: The present clause 6 only lists GS and GR that contain the specification of features listed in clause 5.

6.2 Stage 1 and stage 2 Group Specifications

6.2.1 Newly published Group Specifications

The published new specifications associated to the Release 4 are listed in Table 6.2.1-1.

Table 6.2.1-1: Newly published stage 1 and stage 2 Group Specifications

Id.	Version(s)	Title	Related feature(s)
ETSI GS NFV-IFA 040	V4.1.1	Network Functions Virtualisation (NFV) Release 4; Management and Orchestration; Requirements for service interfaces and object model for OS container management and orchestration specification	FEAT17: Cloud-native VNFs and Container Infrastructure management

6.2.2 Evolved/propagated published deliverables from a previous Release

The published deliverables associated to the Release 4 that have been evolved/propagated from a previous Release are listed in table 6.2.2-1.

Table 6.2.2-1: Published stage 1 and stage 2 deliverables evolved/propagated from a previous Release

Id.	Version(s)	Title	Related feature(s)
ETSI GS NFV-IFA 010	V4.1.1	Network Functions Virtualisation (NFV) Release 4; Management and Orchestration; Functional requirements specification	FEAT17: Cloud-native VNFs and Container Infrastructure management
ETSI GS NFV-IFA 011	V4.1.1	Network Functions Virtualisation (NFV) Release 4; Management and Orchestration; VNF Descriptor and Packaging Specification	FEAT17: Cloud-native VNFs and Container Infrastructure management

6.3 Stage 3 Group Specifications

6.3.1 Newly published Group Specifications

None currently published.

6.3.2 Evolved/propagated published deliverables from a previous Release

None currently published.

6.4 Other Group Specifications

6.4.1 Security specifications

The published new deliverables of Release 4 specifying security aspects are listed in table 6.4.1-1.

Table 6.4.1-1: Published deliverables related to security

Id.	Version(s)	Title	Related feature(s)
ETSI GS NFV-IFA 033	V4.1.1	Network Functions Virtualisation (NFV) Release 4; Management and Orchestration; Sc-Or, Sc-Vnfm, Sc-Vi reference points – Interface and Information Model Specification	FEAT18: Security management

6.4.2 Testing specifications

None currently published.

6.5 Newly published Group Reports

The newly published reports associated to the Release 4 are listed in Table 6.5-1.

Table 6.5-1: Newly published Group Reports

Id.	Version(s)	Title	Related feature(s)
ETSI GR NFV-REL 011	V4.1.1	Network Functions Virtualisation (NFV) Release 4; Management and Orchestration; Report on NFV-MANO software modification	FEAT01: NFV-MANO upgrades

7 NFV Release 4 active Work Items of unpublished deliverables

7.1 Introduction

The present clause 7 lists the active Work Items associated to the Release 4.

Clause 7.2 lists the Work Items that will produce new specifications and reports (i.e., complete new deliverables). Clause 7.3 lists the Work Items that will produce a new version of a specification or report that has been published in a previous Release and which is evolved/propagated in order to document the needed Release 4 features.

7.2 Work Items producing new specifications or reports

The current Work Items associated to the Release 4 and that will produce new specification or reports are listed in Table 7.2-1.

NOTE: For tracking purposes, Work Items listed in Table 7.2-1 include both informative and normative work. The final list of Release-dependent deliverables will be listed within the Release Description upon publication of the deliverables..

Table 7.2-1: NFV Release 4 Work Items producing new specification or reports.

Work Item	Full Title	Type	Related Feature(s)
DGR/NFV-EVE018	Network Functions Virtualisation (NFV); Evolution and Ecosystem; Report on Multi-tenancy in NFV	Report	FEAT22: Multi-tenancy enhancements for NFV-MANO
DGR/NFV-EVE019	Network Functions Virtualisation (NFV) Release 4; Architectural Framework; Report on VNF generic OAM functions	Report	FEAT24: VNF generic management functions
DGR/NFV-IFA034	Network Functions Virtualisation (NFV) Release 3; Management and Orchestration; Report on Architectural enhancement for VNF License Management support and use of VNF licenses	Report	FEAT13: Licensing management
DGR/NFV-IFA035	Network Functions Virtualisation (NFV) Release 4; Architectural Framework; Report on network connectivity integration and operationalization for NFV	Report	FEAT19: Network connectivity integration and operationalization
DGS/NFV-IFA036	Network Functions Virtualisation (NFV) Release 4; Management and Orchestration; Specification of requirements for the management and orchestration of container cluster nodes	Specification	FEAT17: Cloud-native and Container Infrastructure management
DGR/NFV-IFA037	Network Functions Virtualisation (NFV) Release 4; Architectural Framework; Report on further NFV support for 5G	Report	FEAT21: NFV enhancements for 5G
DGR/NFV-IFA038	Network Functions Virtualisation (NFV) Release 4; Architectural Framework; Report on network connectivity for container based VNF	Report	FEAT19: Network connectivity integration and operationalization
DGR/NFV-IFA039	Network Functions Virtualisation (NFV) Release 4; Architectural Framework; Report on Service Based Architecture (SBA) design	Report	FEAT23: SBA for NFV-MANO
DGR/NFV-IFA041	Network Functions Virtualisation (NFV) Release 4; Management and Orchestration; Report on enabling autonomous management in NFV-MANO	Report	FEAT20: NFV-MANO automation and autonomous networks
DGR/NFV-IFA042	Network Functions Virtualisation (NFV) Release 4; Management and Orchestration; Report on policy information and data models for NFV-MANO	Report	FEAT26: Policy management models
DGR/NFV-REL013	Network Functions Virtualisation (NFV) Release 4; Reliability; Report on cognitive use of operations data for reliability	Report	N/A

Work Item	Full Title	Type	Related Feature(s)
DGS/NFV-SEC023	Network Functions Virtualisation (NFV) Release 4; Security; Container Security Specification	Specification	FEAT17: Cloud-native and Container Infrastructure management
DGS/NFV-SEC024	Network Functions Virtualisation (NFV) Release 4; Security; Security Management Specification	Specification	FEAT18: Security management
DGS/NFV-SEC025	Network Functions Virtualisation (NFV) Release 4; Security; Secure End-to-End VNF and NS management specification	Specification	FEAT18: Security management
DGS/NFV-SEC026	Network Functions Virtualisation (NFV) Release 4; Security; Isolation and trust domain specification	Specification	FEAT18: Security management
DGR/NFV-SEC027	Network Functions Virtualisation (NFV) Release 4; Security; Report on security assurance of NFVI	Report	N/A
DGS/NFV-SOL018	Network Functions Virtualisation (NFV) Release 4; Protocols and Data Models; Profiling specification of protocol and data model solutions for OS container management and orchestration	Specification	FEAT17: Cloud-native and Container Infrastructure management

7.3 Work Items evolving/propagating Release 3 specifications and reports

A set of deliverables from Release 3 are evolved/propagated into the Releaes 4. The corresponding Work Items are listed in Table 7.3-1. These Work Items will produce a new version of a previously published specification or report.

Table 7.3-1: NFV Release 4 Work Items of propagated/evolved Release 3 deliverables.

Work Item	Full Title	Type	Related Feature(s)
RGS/NFV-IFA 005ed421	Network Functions Virtualisation (NFV) Release 4; Management and Orchestration; Or-Vi reference point - Interface and Information Model Specification	Specification	N/A
RGS/NFV-IFA 006ed421	Network Functions Virtualisation (NFV) Release 4; Management and Orchestration; Vi-Vnfm reference point - Interface and Information Model Specification	Specification	N/A
RGS/NFV-IFA 007ed421	Network Functions Virtualisation (NFV) Release 4; Management and Orchestration; Or-Vnfm reference point - Interface and Information Model Specification	Specification	N/A
RGS/NFV-IFA 008ed421	Network Functions Virtualisation (NFV) Release 4; Management and Orchestration; Ve-Vnfm reference point - Interface and Information Model Specification	Specification	N/A
RGS/NFV-IFA 013ed421	Network Functions Virtualisation (NFV) Release 4; Management and Orchestration; Os-Ma-Nfvo reference point - Interface and Information Model Specification	Specification	N/A
RGS/NFV-IFA 014ed421	Network Functions Virtualisation (NFV) Release 4; Management and Orchestration Network Service Templates Specification	Specification	N/A

Work Item	Full Title	Type	Related Feature(s)
RGR/NFV-IFA 015ed421	Network Functions Virtualisation (NFV) Release 4; Management and Orchestration; Report on NFV Information Model	Report	N/A
RGR/NFV-IFA 024ed421	Network Functions Virtualisation (NFV) Release 4; Information Modeling; Report on External Touchpoints related to NFV Information Model	Report	N/A
RGS/NFV-IFA 026ed421	Network Functions Virtualisation (NFV) Release 4; Management and Orchestration; Architecture enhancement for Security Management Specification	Specification	N/A
RGS/NFV-IFA 030ed421	Network Functions Virtualisation (NFV) Release 4; Management and Orchestration; Multiple Administrative Domain Aspect Interfaces Specification	Specification	N/A
RGS/NFV-IFA 031ed421	Network Functions Virtualisation (NFV) Release 4; Management and Orchestration; Requirements and interfaces specification for management of NFV-MANO	Specification	N/A
RGS/NFV-IFA 032ed421	Network Functions Virtualisation (NFV) Release 4; Management and Orchestration; Interface and Information Model Specification for Multi-Site Connectivity Services	Specification	N/A
RGS/NFV-SEC012ed421	Network Functions Virtualisation (NFV) Release 4; Security; System architecture specification for execution of sensitive NFV components	Specification	N/A
RGS/NFV-SOL001ed421	Network Functions Virtualisation (NFV) Release 4; Protocols and Data Models; NFV descriptors based on TOSCA specification	Specification	FEAT17: Cloud-native and Container Infrastructure management

History

<table>
<tr><th colspan="3">Document history</th></tr>
<tr><th>Version</th><th>Date</th><th>Changes</th></tr>
<tr><td>0.0.1</td><td>Feb. 2020</td><td>First draft.</td></tr>
<tr><td>0.1.0</td><td>Feb. 2020</td><td>First version uploaded to the Portal.</td></tr>
<tr><td>0.2.0</td><td>Jul. 2020</td><td>Changes after NFV#30e:
- Addition of new FEAT26 on "Policy management models".
- Update the list of work items: mark DGS/NFV-IFA033 and DGS/NFV-IFA040 as completed (with a note), and add new DGR/NFV-IFA042</td></tr>
<tr><td>0.3.0</td><td>Feb. 2021</td><td>General: delete references to current/ongoing work items in the feature definitions (clause 5), since the work items are already listed in the talbes of clause 7.
- Move to the tables in clause 6 the published documents: IFA040, IFA010, IFA011, IFA033 and REL011.
- Update the list of ongoing work items in clause 7: REL013, SEC025, SEC06, SEC027, SOL018, and SOL001ed421.
- Update the target edition versions of several work items in clause 7.</td></tr>
</table>