



NFV Release 5 Description

Contents

Foreword.....	4
1 Scope.....	4
2 References.....	4
3 Definitions and abbreviations.....	5
3.1 Definitions.....	5
3.2 Abbreviations.....	5
4 Release overview.....	5
4.1 Introduction.....	5
4.2 Overview.....	6
4.3 Summary of past Releases.....	6
4.4 Specification work state.....	6
5 Release 5 features.....	7
5.1 Overview.....	7
5.2 Functional features.....	7
5.3 Security features.....	7
6 NFV Release 5 published deliverables.....	7
6.1 Introduction.....	7
6.2 Stage 1 and stage 2 Group Specifications.....	7
6.2.1 Newly published Group Specifications.....	7
6.2.2 Evolved/propagated published deliverables from a previous Release.....	7
6.3 Stage 3 Group Specifications.....	7
6.3.1 Newly published Group Specifications.....	7
6.3.2 Evolved/propagated published deliverables from a previous Release.....	7
6.3.3 Stage 3 publication packages.....	7
6.4 Other Group Specifications.....	8
6.4.1 Security specifications.....	8
6.4.2 Testing specifications.....	8
6.5 Newly published Group Reports.....	8
7 NFV Release 5 active Work Items of unpublished deliverables.....	8
7.1 Introduction.....	8
7.2 Work Items producing new specifications or reports.....	8
7.3 Work Items evolving/propagating previous Releases specifications and reports.....	9
Annex A: Release definition 10	
A.1 Introduction.....	10
A.2 Release 5 features overview.....	10
A.3 Features carried over from Release 4.....	10
A.3.1 Overview.....	10
A.3.2 Network connectivity integration and operationalization for NFV (NFV-Connect, FEAT19b).....	11
A.3.3 Multi-tenancy enhancements for NFV-MANO (M-Tenant, FEAT22).....	11
A.3.4 SBA for NFV-MANO (MANO-SBA, FEAT23).....	11
A.4 New features.....	11
A.4.1 NFV for vRAN (NFV4RAN, FEAT27).....	11
A.4.2 Fault management models (FM-models, FEAT28).....	11
A.4.3 Green NFV (Green-NFV, FEAT29).....	12
A.4.4 VNF configuration (VNFCONF, FEAT30).....	12
A.4.5 Flexible VNF deployment (FLEXDEP, FEAT31).....	12
A.4.6 Reliability for cloud-native VNF (REL_CNVNF, FEAT32).....	12
A.5 Extended Release 4 features.....	12
A.5.1 Enhanced container networking (NFV-Connect, FEAT19a).....	12
A.5.2 VNF generic management functions (VNF-OAM, FEAT24).....	13
A.6 Enhancement features.....	13
A.6.1 Introduction.....	13
A.6.2 NFV security hardening (enhancements) (ENH01).....	13

A.6.3 Specific technical enhancements (ENH02) 13

Annex B: Versioning of published deliverables14

B.1 Introduction..... 14

History15

Foreword

The present NFV Release 5 Description defines the set of features considered in the development of the NFV Release 5 and describes those that have been specified at least up to the level of requirements, architecture, interfaces and/or information model(s).

NFV Release 5 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 present document describes the NFV Release 5. It identifies the informative and normative work that ETSI ISG NFV plans to develop as part of Release 5. In addition, it documents the content of the Release 5, listing the specified features and the Group Specifications (GS) and Group Reports (GR) that comprise the Release.

The purpose of the Release Description is to also describe the normative work that ETSI ISG NFV has developed as part of Release 5 with the objective to specify a stable and internally aligned set of features.

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

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

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

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 5 (hereinafter referred also as Release 5 or the present Release) builds on top and leverages the results of ETSI ISG NFV documents published as part of the Release 4. The Release 5 introduces new features on top of the specified capabilities and features in previous Releases.

A high-level description of the main outcomes of the Release 5 is provided in clause 5. A high-level definition for each of the features which are considered during the development of current Release 5 work is also provided in Annex A. Clause 4.2 provides a statistical summary of the Release 5 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 summarizes the specification work state at each of the specification stages. 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 Description document version is delivered, the Release 5 is comprised of the following number of published deliverables:

- None has been published yet.

4.3 Summary of past Releases

The Release 4 was built upon the capabilities and features specified as part of the NFV Release 2 and Release 3.

The Release 2 specified requirements, information models, data models and interface protocols to enable interoperable implementations of the NFV Architectural Framework [3]. The Release 2 Description [4] provides details about the capabilities that had been specified in the Release 2.

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 Infrastructure Management (WIM) and exposure of interfaces for multi-site network connectivity management (feature "Management and connectivity of multi-site services").

The Release 3 Description [5] details the new features that had been specified in the Release 3.

The Release 4 adds the following major architectural extensions:

- Addition of Container Infrastructure Services Management (CISM) and Container Image Registry (CIR) to support VNF deployments based on OS containers.

NOTE: Release 4 specification work is currently work in progress. Updates to the list of architectural extensions are expected once the specification work is completed, at least at stage 2 level.

The Release 4 Description [8] details the new features that had been specified in the Release 4.

4.4 Specification work state

Table 4.4-1 summarizes the status of the specification work at different stages. Annex B describes the meaning of the "state" of the specification work.

Table 4.4-1: Specification work state within the present Release.

Stage	Meaning	State	Additional notes
Informative (stage 0)	Informative work within a Release used to study new use cases and technical features.	Open	None
Stage 1/2	Normative work: Service and business requirements Architecture, interfaces and information models.	Open	None
Stage 3	Normative work on protocols and data models. Informative work on studying potential profiling of existing solutions.	Not started	None
Stage 4	Normative work on testing specifications for protocols and data models.	Not started	None

5 Release 5 features

5.1 Overview

Editor's Note: The specification of functional features is ongoing. None has been completed yet at the stage 2 level.

5.2 Functional features

Editor's Note: The specification of functional features is ongoing. None has been completed yet at the stage 2 level.

5.3 Security features

Editor's Note: The specification of features is ongoing. None specific to security has been completed yet.

6 NFV Release 5 published deliverables

6.1 Introduction

The present clause 6 lists the published deliverables (Group Specifications and Group Reports) associated to the Release 5. The NFV Release 5 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

None currently published.

6.2.2 Evolved/propagated published deliverables from a previous Release

None currently published.

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.

6.3.3 Stage 3 publication packages

Editor's Note: content is FFS.

6.4 Other Group Specifications

6.4.1 Security specifications

None currently published.

6.4.2 Testing specifications

None currently published.

6.5 Newly published Group Reports

None currently published.

7 NFV Release 5 active Work Items of unpublished deliverables

7.1 Introduction

The present clause 7 lists the active Work Items associated to the Release 5.

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 5 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) Release 5; Evolution and Ecosystem; Report on Multi-tenancy in NFV	Report	FEAT22: Multi-tenancy enhancements for NFV-MANO
DGR/NFV-EVE020	Network Functions Virtualisation (NFV) Release 5; Evolution and Ecosystem; Report on NFV support for Network Function Connectivity eXtensions	Report	TBD
DGR/NFV-EVE021	Network Functions Virtualisation (NFV) Release 5; Evolution and Ecosystem; Report on energy efficiency aspects for NFV	Report	FEAT29: Green NFV
DGR/NFV-EVE022	Network Functions Virtualisation (NFV) Release 5; Architectural Framework; Report on VNF configuration	Report	FEAT30: VNF configuration
DGR/NFV-IFA035	Network Functions Virtualisation (NFV) Release 5; Architectural Framework; Report on network connectivity integration and operationalization for NFV	Report	FEAT19b: Network connectivity integration and operationalization for NFV
DGR/NFV-IFA039	Network Functions Virtualisation (NFV) Release 5; Architectural Framework; Report on Service Based Architecture (SBA) design	Report	FEAT23: SBA for NFV-MANO
DGR/NFV-IFA043	Network Functions Virtualisation (NFV) Release 5; Architectural Framework; Report on enhanced container networking	Report	FEAT19a: Enhanced container networking

Work Item	Full Title	Type	Related Feature(s)
DGR/NFV-IFA044	Network Functions Virtualisation (NFV) Release 5; Management and Orchestration; Report on Flexible VNF Deployment	Report	FEAT31: Flexible VNF deployment
DGS/NFV-IFA045	Network Functions Virtualisation (NFV) Release 5; Management and Orchestration; Faults and alarms modelling specification	Specification	FEAT28: Fault management models
DGR/NFV-IFA046	Network Functions Virtualisation (NFV) Release 5; Architectural Framework; Report on NFV support for virtualization of RAN	Report	FEAT27: NFV for vRAN
DGR/NFV-REL013	Network Functions Virtualisation (NFV) Release 5; Reliability; Report on cognitive use of operations data for reliability	Report	TBD
DGR/NFV-REL014	Network Functions Virtualisation (NFV) Release 5; Reliability; Report on evaluating reliability for cloud-native VNFs	Report	FEAT32: Reliability for cloud-native VNF

7.3 Work Items evolving/propagating previous Releases specifications and reports

None currently opened.

Annex A: Release definition

A.1 Introduction

The present annex defines the set of features that the ETSI NFV plans to develop as part of the Release 5 work programme. Clause A.2 provides an overview of the candidate Release 5 features. Clauses A.3 through A.6 provide high-level definition and scopes of the features.

The list of Release 5 features is comprised of:

- New Release 5 features: features that consider new scope of technical work.
- Extended Release 4 features: features that consider extending scope of existing previous Releases (e.g., Release 4) features.
- Features carried over from Release 4: features that are carried over from Release 4 in their current scope of technical work and without extensions. This group includes features that had not been completed in Release 4 and their development will now be considered in the context of the Release 5 work programme.
- Enhancement features: specific technical and security enhancements of lower specification complexity.

The list of features is derived from the feature proposals submitted to the ISG NFV in May and June 2021.

A.2 Release 5 features overview

The candidate new features introduced as part of the Release 5 are listed in table A.2-1.

Table A.2-1: Release 5 features and enhancement features

Feature name	Acronym	FEAT id	Notes
Enhanced container networking	NFV-Connect	FEAT19a	Extended Release 4 feature.
Network connectivity integration and operationalization for NFV	NFV-Connect	FEAT19b	Carried over from Release 4.
Multi-tenancy enhancements for NFV-MANO	M-Tenant	FEAT22	Carried over from Release 4.
SBA for NFV-MANO	MANO-SBA	FEAT23	Carried over from Release 4.
VNF generic management functions	VNF-OAM	FEAT24	Extended Release 4 feature.
NFV for vRAN	NFV4RAN	FEAT27	New feature
Fault management models	FM-models	FEAT28	New feature
Green NFV	Green-NFV	FEAT29	New feature
VNF configuration	VNFCONF	FEAT30	New feature
Flexible VNF deployment	FLEXDEP	FEAT31	New feature
Reliability for cloud-native VNF	REL_CNVNF	FEAT32	New feature

A.3 Features carried over from Release 4

A.3.1 Overview

This clause introduces areas of work that were not completed in Release 4 timeframe and are included in Release 5.

Minor adaptations on the scope from Release 4 may be done as part of the Release definition.

Clause 7 lists current open work items and published specifications and the specific features that are covered in their scope where available.

A.3.2 Network connectivity integration and operationalization for NFV (NFV-Connect, FEAT19b)

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.

A.3.3 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.

A.3.4 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.).

A.4 New features

A.4.1 NFV for vRAN (NFV4RAN, FEAT27)

The scope of the feature covers the following areas:

- Analyse vRAN use cases and mapping to current NFV concepts and NFV architectural framework.
- Profile and extend NFV capabilities to enhance the support for vRAN use cases and deployments.
- Handle further acceleration and other NFVI/Cloud/Platform capabilities in consideration for the virtualization of RAN network functions.
- Analyse NFVI provisioning and HW management in the NFV context considering RAN use cases such as smaller footprints, many remote sites, etc.
- Coordination and collaboration with other SDOs on exchange of requirements and on activities on how NFV and NFV-MANO can support virtualization of RAN.

A.4.2 Fault management models (FM-models, FEAT28)

The scope of the feature covers the following areas:

- Extend the information and data model of Alarms to address unspecified model elements and define applicable values to ensure proper processing of failure information and interoperability in between producers and consumers of the alarms.
- Enrich the fault management interfaces to exchange fault related closed loops information/results between different layers.
- Enable automated fault detection and performance degradation analysis with standardized metrics.

A.4.3 Green NFV (Green-NFV, FEAT29)

The scope of the feature covers the following areas:

- Analyse aspects of NFV (VNF design, NFV-MANO and VNF operation, deployment configuration of NFV-MANO, NFVI, etc.) that have impact on energy consumption and those that can enable smart energy NFV and power saving features.
- Identify design guidelines needed for optimizing energy consumption.
- Specify enhancements to specifications on interfaces and information model, augment exposed KPIs and metrics to enable resources orchestration and VNF/NS LCM to operate following power saving policies.

A.4.4 VNF configuration (VNFCONF, FEAT30)

The scope of the feature covers the following areas:

- Provide guidelines on the use of the configuration options available in the NFV framework and the types of configuration data applicable to each of these options.
- Specify related enhancements to the set of ETSI NFV specifications needed to improve interoperability between VNFs and independently-developed VNF configuration management functions and further facilitate automation of VNF configuration.

A.4.5 Flexible VNF deployment (FLEXDEP, FEAT31)

The scope of the feature covers the following areas:

- Extend and enhance NFV-MANO and VNFD to allow for the parameterization of VNF deployment flavours and reduce its number.
- Specify enhancements to VNF LCM interface and VNFD to enable selection of constituents and their resource requirements for flexible deployment of VNF.

A.4.6 Reliability for cloud-native VNF (REL_CNVNF, FEAT32)

The scope of the feature covers the following areas:

- Study and guidelines on evaluating reliability measurement aspects of cloud-native VNFs during VNF management processes. Identify additional reliability requirements gaps that cannot be fulfilled by the current solutions for VM-based VNFs.
- Specify functional and non-functional requirements related to reliability management during the operation and maintenance of cloud-native VNFs.
- Specify metrics for evaluating the reliability of cloud-native VNFs.

A.5 Extended Release 4 features

A.5.1 Enhanced container networking (NFV-Connect, FEAT19a)

This feature is a continuation and evolution of FEAT19 on "Network connectivity integration and operationalization for NFV". The evolved and specific scope of the feature covers enhancements on container networking, including:

- Analyse complex telecom specific use cases and solution for container networking, and profile open source container solutions.
- Enhance multiple network support and add more automation into container network management.
- Specify enhancements to support network policies for container networking.

NOTE: This work has been started as ETSI GR NFV-IFA 038.

A.5.2 VNF generic management functions (VNF-OAM, FEAT24)

This feature is a continuation and evolution of FEAT24 on "VNF generic management functions". The evolved scope of the feature covers the following areas:

- Analyse and specify enhancements to introduce more automation to VNF generic OAM functions on handling the various configuration, performance and fault monitoring processes.
- Further enhance the VNF configuration processes to enable sophisticated verification of various VNF types of configuration.
- Study and specify how to extend management capabilities of VNF generic OAM functions to cover full VNF management, including VNF application management aspects following known standards in this domain, while still remaining agnostic to the specific application functionality.

NOTE: This work has been started as ETSI GR NFV-EVE 019.

A.6 Enhancement features

A.6.1 Introduction

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

A.6.2 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].

A.6.3 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].

Annex B: Versioning of published deliverables

B.1 Introduction

Annex A in the ETSI NFV Release 3 Description (from v0.8.0) provides information about the versioning of the deliverables published by the ETSI ISG NFV.

Annex B in the same reference Release 3 Description document describes the meaning of the Release specification states.

History

Document history		
Version	Date	Changes
0.0.1	Feb. 2022	First draft reusing the Release 4 Description template and the content of the "Strawman of Release 5 Definition" from contribution NFV(21)000149r3.