ETSI ISG NFV: WORK PROGRAM AND RELEASES OVERVIEW

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Outline

- PART 1: ETSI ISG NFV Overview
  - ETSI NFV Releases overview
  - ETSI NFV ongoing work

- PART 2: NFV Release 2
  - What does it contain?
  - Maintenance, API development, etc.

- PART 3: NFV Release 3
  - What will it contain?
  - Overview of the features and specification work.

PART 1: ETSI ISG NFV OVERVIEW

ETSI NFV Releases overview

Release 1

- Focus: the feasibility of NFV.
- Delivered the baseline studies and specifications.
- Set the NFV Architecture:
  - Infrastructure (NFVI),
  - Virtualized network functions (VNF),
  - Integration of the VNFs into Network Services (NS), and
  - NFV Management and Orchestration (NFV-MANO) aspects at different layers.

Release 2

- Focus: interoperability of NFV solutions.
- Details requirements and specification of interfaces and descriptors.
- Realizes the interoperability of solutions based on the NFV Architecture, detailing
  - VNF Package and VNF and NS Descriptors,
  - Acceleration,
  - Internal and external NFV-MANO interfaces.

Release 3

- Focus: feature enriching the NFV Architectural Framework, readying NFV for deployment and operation.
- Interfaces, modeling, etc. to support new features such as (not exhaustive list):
  - Policy framework,
  - VNF snapshot,
  - NFV-MANO management,
  - Licensing,
  - Multi-site,
  - Cloud-native support,
  - Etc.

ETSI NFV ongoing work

- Release 2 maintenance:
  - Third round (1H2018) is underway.
- Release 2 new specifications:
  - Some stage 3 specification, e.g., VNFD and NSD descriptors, NSD file structure.
  - Specific technical gaps, such as performance measurements, and security enhancements for VNF Packaging and APIs.
  - Testing specifications, including API conformance testing.
- Release 3 work:
  - Few remaining informative/study works.
  - Most of the stage 2 normative specification. Based on a feature set, whereby features may deliver new specifications or evolve current Release 2 specifications.

ESSENTIAL MAINTENANCE WORK IN PROGRESS

REL. 3 AHEAD

ETSI NFV technical work: Release 3 next steps

- 17 features have been considered (see later in the presentation) as part of Release 3 work.

- Current work focuses on "stage 2 level" specification, but specification will continue with "stage 3 work", testing, and maintenance.

2) Stage 2 level specification is expected to be completed in 2018 and 2019.

2018 **2019 and beyond**

Feasibility, studies…

Stage 2

Stage 3

Other (e.g., testing…)

REL. 3 AHEAD
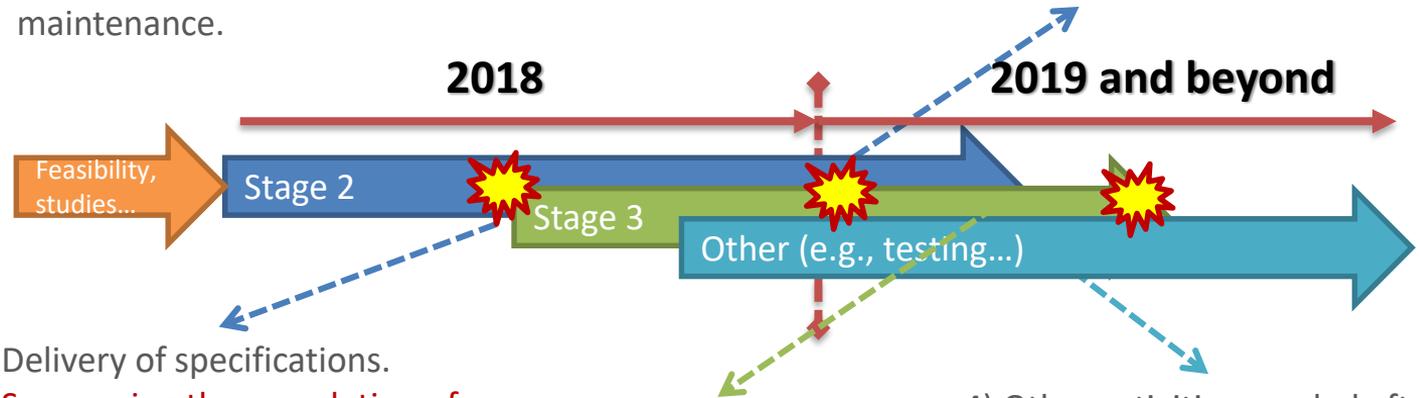
1) Delivery of specifications. Sequencing the completion of features and providing input for Stage 3 to start. 6-month delivery cadence.

3) Stage 3 work to be further developed in 2019.

4) Other activities needed after specification outcomes, e.g., testing, plugtests, etc.

PART 2: NFV RELEASE 2

Release 2: what does it contain?

- Release 2 is comprised of specifications delivered by different ETSI NFV working groups:
  - Interfaces and Architecture (IFA) working group.
  - SOLutions (SOL) working group.
  - Testing (TST) working group.

NFV-IFA specs: stage 2 level requirements, architecture, interfaces and information model.
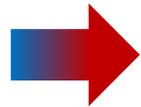
NFV-SOL specs: stage 3 level protocols, API, data models and "artifacts".
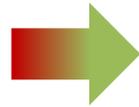
NFV-TST specs: specific metrics, testing, benchmarking.

Release 2 specifications

| IFA 005 | IFA 008 | ... | TST 008 |

| SOL 001 | SOL 002 | ... | SOL 005 |

| TST 007 | ... | TST 010 |

Release 2: what does it contain?

From design

to runtime
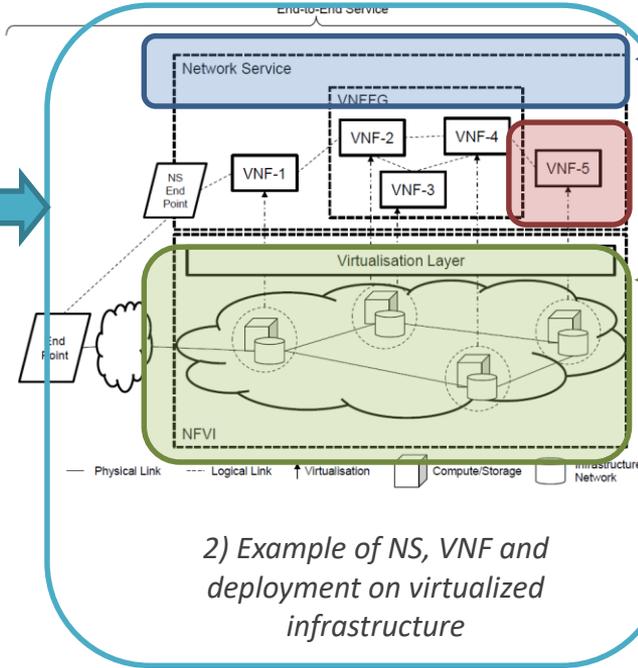
through NFV-MANO
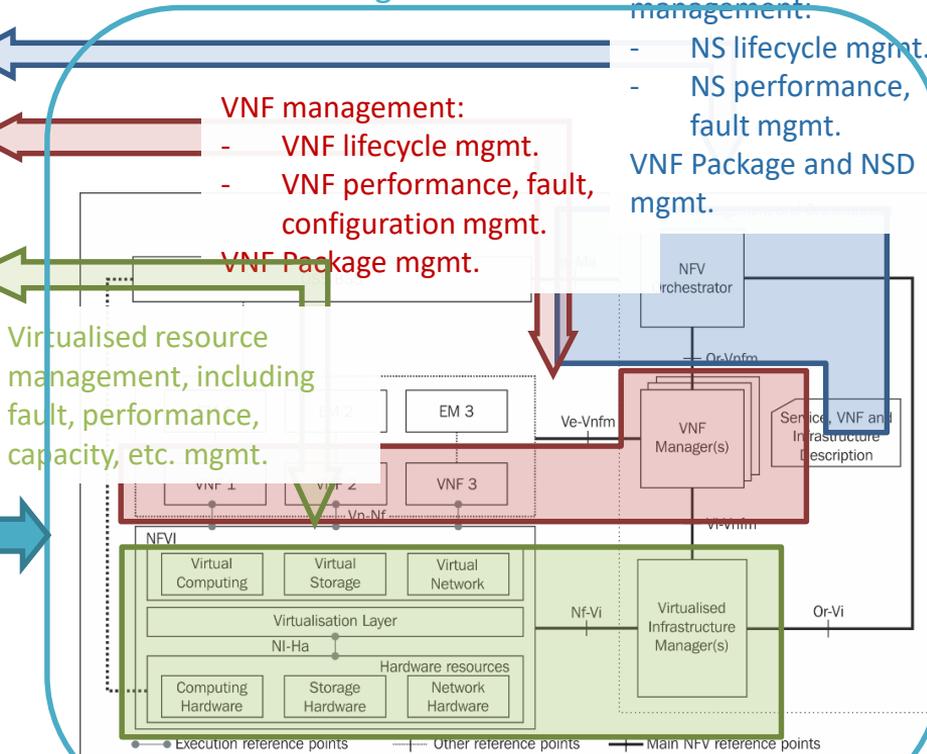
Network Service management:
- NS lifecycle mgmt.
- NS performance, fault mgmt.

VNF Package and NSD mgmt.

NSD

VNF Package

VNFD

VNF management:
- VNF lifecycle mgmt.
- VNF performance, fault, configuration mgmt.
- VNF Package mgmt.

Virtualised resource management, including fault, performance, capacity, etc. mgmt.

1) NFV descriptors and packages

2) Example of NS, VNF and deployment on virtualized infrastructure

3) The ETSI NFV Architectural Framework

Release 2: maintenance work

- 2 rounds completed (1H2017, published as v2.3.1, and 2H2017, published as v2.4.1). 1H2018 maintenance is ongoing (targeting publication as v2.5.1).
- Main aspects addressed as part of maintenance:
  - Correction of bugs.
  - Feedback from open source projects, e.g., OpenStack gap analysis and alignment to NFV-IFA005 and NFV-IFA006, OSM information model feedback to NFV-IFA011 and NFV-IFA014, contributions to NFV-IFA011 and NFV-SOL 004 by companies participating in ONAP providing feedback, etc.
  - Alignment in between Stage 2 and 3 specifications.
- Capabilities changes developed during maintenance (not exhaustive):
  - Adding support for compute flavour management.
  - Merging of VNF and NS lifecycle change notifications into VNF and NS LCM interfaces, respectively.
  - Merging of VNF configuration and instance information mgmt. into VNF LCM interface.
  - Adding support for changing the external VNF connectivity.
  - Enhancements and consistency to alarm management within the fault management interfaces.

Release 2: API standardization process

The content of the NFV-SOL APIs is based on the related NFV-IFA specifications.
The NFV-SOL specifications are implementable representations of the design defined in the stage 2 specifications, not alternative solutions.

Stage 2
Requirements and information model

NFV-IFA 007 (Or-Vnfm)
NFV-IFA 008 (Ve-Vnfm)
NFV-IFA 013 (Os-Ma-nfvo)
NFV-IFA 011 (VNF Package, VNFD)
NFV-IFA 014 (NSD)

Mapping information model to data model

Defining protocol machinery for the operations specified in stage 2

Closing gaps left open in stage 2 (e.g. error handling, technical details)

Stage 3
Protocols and data model

NFV-SOL 003 (Or-Vnfm)
NFV-SOL 002 (Ve-Vnfm)
NFV-SOL 005 (Os-Ma-nfvo)
NFV-SOL 004 (VNF Packaging)
NFV-SOL 001 (VNFD, NSD) (in progress)

SOL API conventions

Testing
Benchmarking, interop, conformance

NFV-TST 007 (testing guidelines)
NFV-TST 010 (API conformance)

Release 2: API standardization process

https://nfvwiki.etsi.org/index.php?title=API_specifications#OpenAPIs

OpenAPI descriptions publically available for all APIs specified in GS NFV-SOL 002/003 (version 2.4.1)

- 1st publication of GS NFV-SOL 005 (version 2.4.1).
- Publication of revised versions of GS NFV-SOL 002/003 (Version 2.4.1)

- 1st publication of GS NFV-SOL 002 (version 2.3.1).
- 1st publication of GS NFV-SOL 003 (version 2.3.1).

July 2017

February 2018   March 2018

Release 2: more information and feedback!

- More information about Release 2 features:
  - https://docbox.etsi.org/ISG/NFV/Open/Other/NFV(16)000274r9_NFV_Release_2_Description_v15.pdf
- Ongoing work (drafts) publicly available here:
  - https://docbox.etsi.org/ISG/NFV/Open/Drafts/

http://nfvwiki.etsi.org/index.php?title=NFV_Issue_Tracker
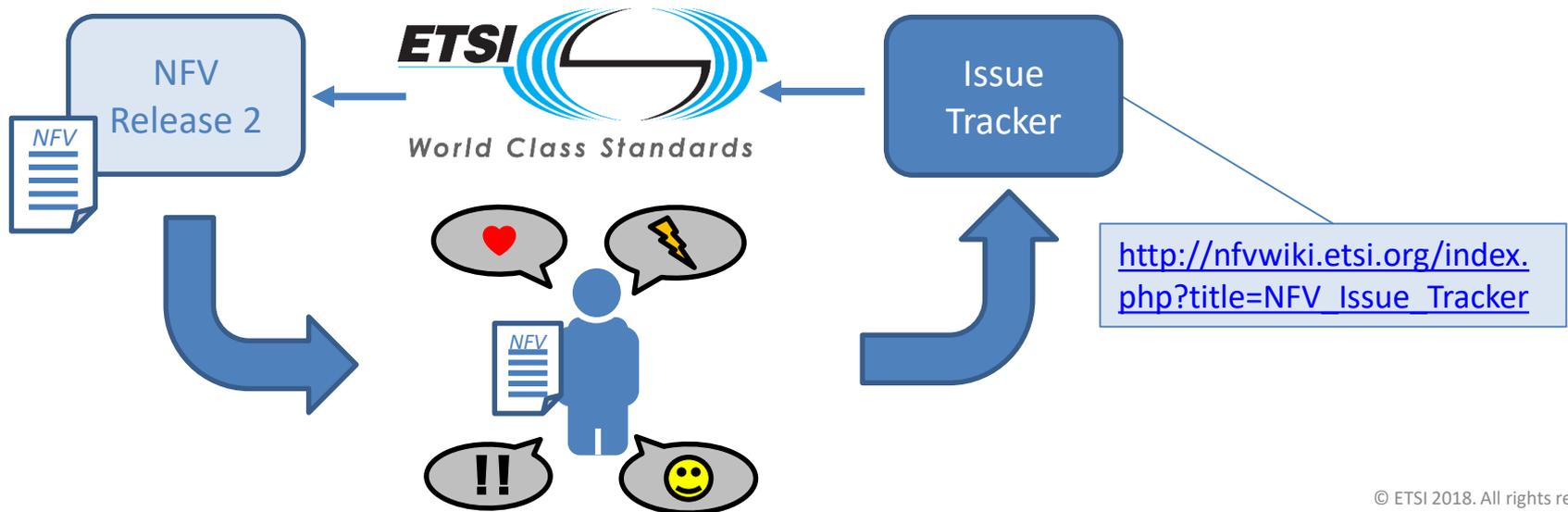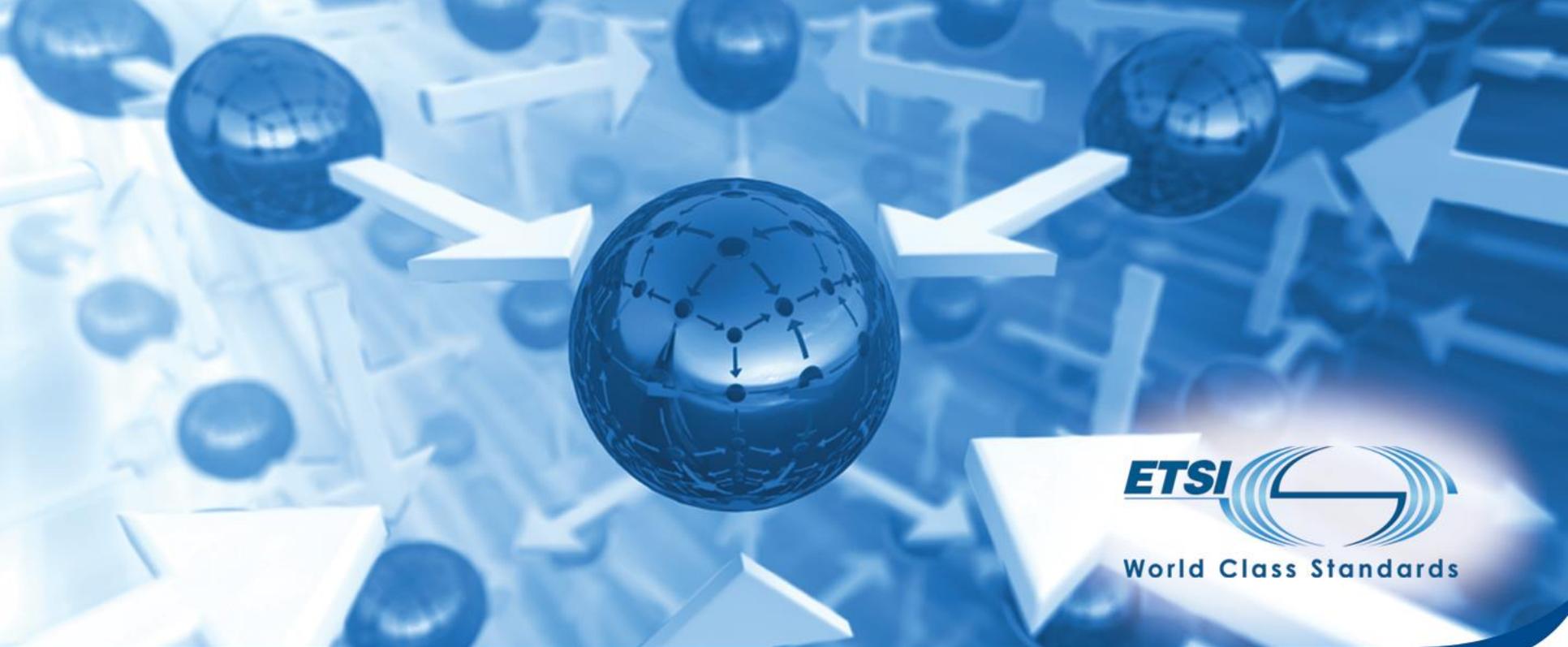
PART 3: NFV RELEASE 3

Release 3: overview

- 🌐 Main focus:
  - Enriching the NFV Architectural Framework, readying NFV for expansive deployment and enhanced operation.

- 🌐 The intersection among

NS, VNF and VR operational framework

Advances in virtualization

NFV Release 3

Additional operational features

Support for future and next generation networks
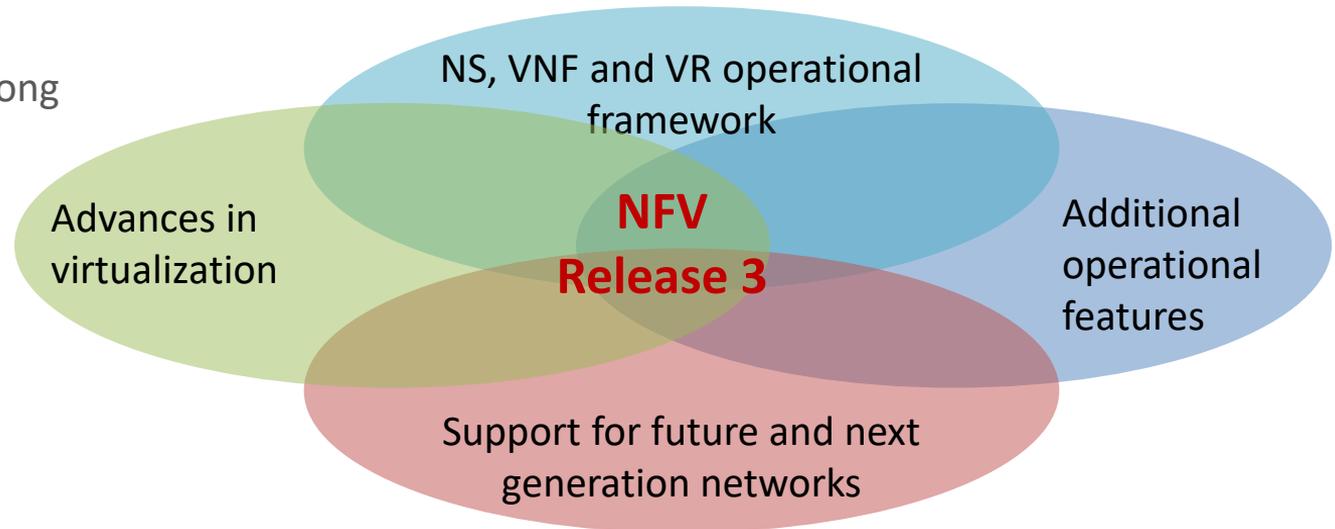
Release 3: WIs and features from Stage 1&2 perspective

Completed: underlined
Evolved: in **bold**

(*): ongoing in Rel. 2
(**): normative work is part of evolved work items

NOTE: not a full complete list due to lack of space

ETSI — World Class Standards

Network Service LCM and Descriptor (**NFV-IFA013/014**)

VNF LCM, Packaging and Descriptor (**NFV-IFA007/008/011**)

Virtualised Resource management (**NFV-IFA005/006**)

Information Modeling (**NFV-IFA015/016/017**)

Metrics and Performance (NFV-IFA027 (*), **NFV-TST008**)

Rel. 2: base operational and automation framework, evolved with…

1) Advances in virtualization

Cloud-native VNF (NFV-EVE011)

NFVI aspects: Hardware environment (NFV-EVE007)

PaaS support for cloud-native (NFV-IFA029)

Acceleration (NFV-IFA018/IFA019)

Hypervisor (NFV-EVE001)

2) Support for future network technologies

Network Slicing to NFV concepts (NFV-EVE012/NFV-REL010)

MEC in NFV (**)

NFV licensing (NFV-EVE010, **)

3) Additional operational features

NFV software update and upgrade (NFV-REL006, **)

Policy management framework (NFV-IFA023, **)

VNF snapshotting (NFV-TST005, **)

Charging, billing and accounting (NFV-EVE008, **)

NFV-MANO management (NFV-IFA021/031, **)

Security management (NFV-IFA026)

Multi administrative NFV-MANO (NFV-IFA028/030, **)

Connectivity for multi-site (NFV-IFA022/032, **)

Service availability (**)

Host reservation (**)

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Release 3: feature-based specification

- 17 candidate features, including Release 3 definition features and small enhancements.
  - The specification progress various among the different features.
  - 6-month delivery cadence.
- The Release 3 Description will contain the set of specified Release 3 features.
  - Arriving soon, once Stage 2 specification is completed for some of the features, and updated later on.
- Release 3 specification progress and plans are publicly available on the NFV Public Wiki.
- Refer also to Release 3 Definition Annex B for a summary of work, impacted specifications and tracking about the considered features.

Release 3 Definition (continuously updated, latest version v0.9.0 Feb. 2018).

Annex B: NFV Release 3 candidate features for additional normative work

The ETSI ISG NFV assessed at NFV#19 the input of Release 3 features that required additional normative work, considering the two cases as listed below:

- evolving/propagating NFV Release 2 deliverables (refer to NFV Release 2 Description) into NFV Release 3, and

- creating new deliverables.

Table B-1 lists the set of candidate features that are considered for the Work Item Descriptions (WID).

NOTE: The table B-1 will be updated reflecting the status and specification progress of the features.

Table B-1: NFV Release 3 candidate features for additional normative work.

Candidate feature #	Title	Related Feature(s) in the present Definition	New normative specifications? (or current ones impacted)	Status (candidate/completed) and additional notes
feat_01	REL to IFA Feature MANOMOD REL006 MANO software modification	R03.F10: Updated and upgrade of NFV software (SWUP)	New GS: Yes, could be combined in normative spec for new normative IFA021 spec	Candidate
feat_02	REL to IFA Feature VNFMOD REL006 VNF software modification	R03.F10: Updated and upgrade of NFV software (SWUP)	New GS: No Impacted GS: could be addressed in IFA010, IFA013.	Candidate
feat_03	REL to IFA Feature NFVIMOD REL006	R03.F10: Updated and upgrade of NFV	New GS: No Impacted GS:	Candidate

More information

- NFV Technology Page (information) **http://www.etsi.org/nfv**
- NFV Portal (working area) **http://portal.etsi.org/nfv**
- NFV Proofs of Concept (information) **http://www.etsi.org/nfv-poc**
- NFV Plugtest (information & registration) **http://www.etsi.org/nfvplugtest**
- Open Area:
  - Published Docs:
    https://docbox.etsi.org/ISG/NFV/Open/Publications_pdf
  - Working Drafts http://docbox.etsi.org/ISG/NFV/Open/Drafts/
  - Issue tracker http://nfvwiki.etsi.org/index.php?title=NFV_Issue_Tracker
  - Detailed Release 3 specification progress can be found at:
    https://nfvwiki.etsi.org/index.php?title=Feature_Tracking
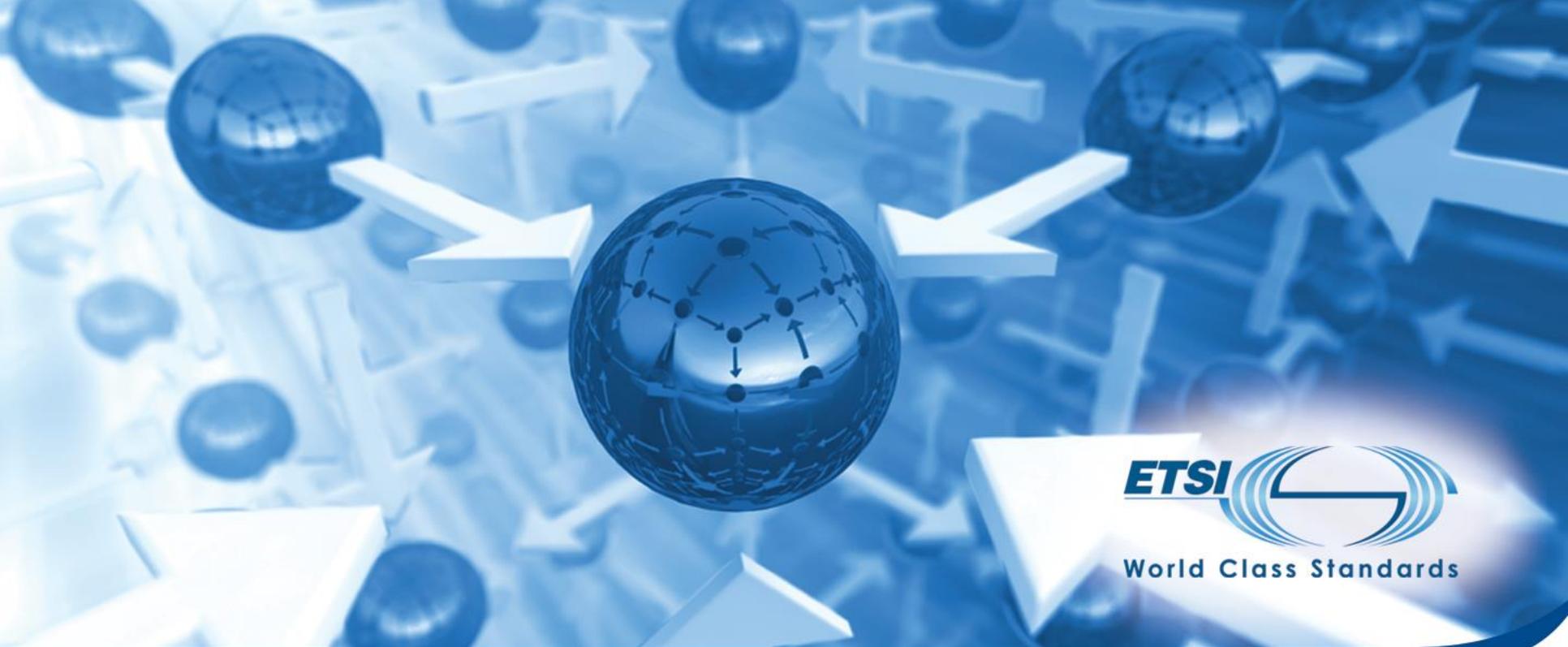
BACKUP SLIDES

NFV Release 2 specification summary

Refer to continuous updates on the Release 2 Description (latest version v1.5 Feb 2018).

- **Published Release 2 documentation:** 20 Group Specification (GS) and Group Report (GR).
  - 12 Stage 2 GS (11 from IFA, 1 from TST).
  - 4 Stage 3 GS (SOL).
  - 4 Stage 2 GR (IFA).
- **Ongoing Release 2 work items** (refer to Release 2 Description): 6 WI.
  - 1 Stage 2 GS draft (NFV-IFA027).
  - 3 Stage 3 GS drafts (NFV-SOL001/006/007).
  - 2 GS drafts related to security (NFV-SEC021/022).
  - 1 GS draft related to conformance testing (NFV-TST010).
- **2 rounds of maintenance completed** (1H2017 and 2H2017), **and 1 round now ongoing** for 1H2018:
  - 19 maintenance work items.

First round: published as v2.3.1
Second round: v2.4.1
Third round (target): v2.5.1

NFV Release 2: stage 2 and stage 3 specification summary

(*) Release 2 Stage 3 work items in **"green"**

Status as of Apr. 2018

NFV-IFA 015 (NFV Information Model Report) +
- **NFV-IFA 016 (Papyrus Guidelines),**
- **NFV-IFA 017 (UML Modeling Guidelines),**
- **NFV-IFA 024 (NFV Information Model External Touchpoints)**

NFV-IFA 013 NFV-SOL005

NFV-IFA 010 (NFV-MANO Functional Reqs)

SOL004 (VNF Packaging) NFV-IFA 011 (VNF Pkg)

NFV-SOL007 (NSD file structure) NFV-IFA 014 (NS templates)

NFV-SOL 001 NFV-SOL 006 (VNF and NS Descriptors)

NFV-IFA 007 NFV-SOL 003

NFV-IFA 008 NFV-SOL 002

NFV-IFA 006

NFV-IFA 005

NFV-TST 008 (NFVI metrics)
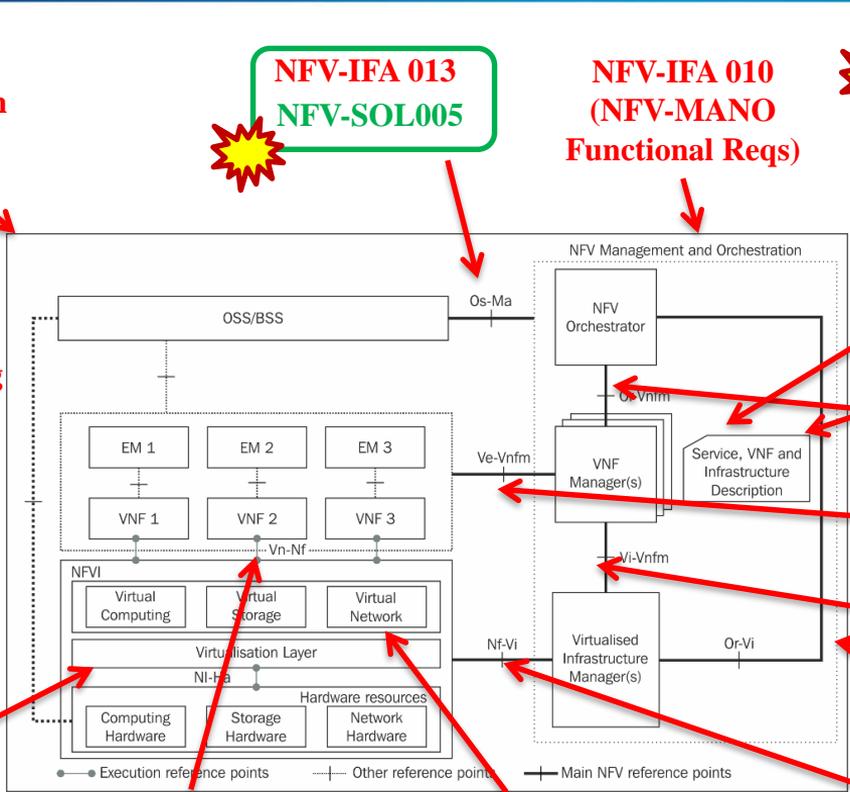
NFV-IFA 002 (Acceleration)

NFV-IFA 003 (Acceleration)

NFV-IFA 004 (Acceleration)

Published!

Release 2: Stage 2 published documents (for reference)

ID	Title
Functional requirements	
ETSI GS NFV-IFA 010 v2.4.1	MANO; Functional requirements specification
Acceleration (with interfaces)	
ETSI GS NFV-IFA 002 v2.4.1	Acceleration Technologies: VNF Interfaces Specification
ETSI GS NFV-IFA 003 v2.4.1	Acceleration Technologies; vSwitch Benchmarking and Acceleration Specification
ETSI GS NFV-IFA 004 v2.4.1	Acceleration Technologies; Management aspects Specification
NFV-MANO reference points and interfaces	
ETSI GS NFV-IFA 005 v2.4.1	MANO; Or-Vi reference point - Interface and Information Model Specification
ETSI GS NFV-IFA 006 v2.4.1	MANO; Vi-Vnfm reference point - Interface and Information Model Specification
ETSI GS NFV-IFA 007 v2.4.1	MANO; Or-Vnfm reference point - Interface and Information Model Specification
ETSI GS NFV-IFA 008 v2.4.1	MANO; Ve-Vnfm reference point - Interface and Information Model Specification
ETSI GS NFV-IFA 013 v2.4.1	MANO; Os-Ma-Nfvo reference point - Interface and Information Model Specification

Release 2: Stage 2 published documents (for reference)

ID	Title
Descriptors and artefacts	
ETSI GS NFV-IFA 011 v2.4.1	MANO; VNF Descriptor and Packaging Specification
ETSI GS NFV-IFA 014 v2.4.1	MANO; Network Service Templates Specification
Information Modeling	
ETSI GR NFV-IFA 015 v2.4.1	MANO; Report on NFV Information Model
ETSI GR NFV-IFA 016 v2.4.1	IM; Papyrus Guidelines
ETSI GR NFV-IFA 017 v2.4.1	IM; UML Modeling Guidelines
ETSI GR NFV-IFA 024 v2.1.1	IM; Report on External Touchpoints related to NFV Information Model
Metrics, measurements	
ETSI GS NFV-TST 008 v2.4.1	Testing; NFVI Compute and Network Metrics Specification

Release 2: Stage 3 published documents (for reference)

[Link to documents (search tool)](#)

ID	Title
NFV-MANO APIs	
ETSI GS NFV-SOL 002 v2.4.1	Protocols and Data Models; RESTful protocols specification for the Ve-Vnfm Reference Point
ETSI GS NFV-SOL 003 v2.4.1	Protocols and Data Models; RESTful protocols specification for the Or-Vnfm Reference Point
ETSI GS NFV-SOL 005 v2.4.1	Protocols and Data Models; RESTful protocols specifications for the Os-Ma-nfvo Reference Point
Artefacts	
ETSI GS NFV-SOL 004 v2.4.1	Protocols and Data Models; VNF Package specification

NFV Release 3 specification summary

Refer to continuous updates of the Release 3 Definition (latest version v0.9.0 Feb 2018).

- **Published Release 3 documentation:** 14 Group Specification (GS) and Group Report (GR).
  - 3 Stage 1/2 GS (NFV-EVE001, NFV-EVE007, NFV-REL006)
  - 2 Stage 2 GS (NFV-IFA018, NFV-IFA019).
  - 3 GS on security (NFV-SEC012, NFV-SEC013, NFV-SEC014).
  - 8 GR (NFV-EVE008, NFV-EVE010, NFV-EVE012, NFV-IFA021, NFV-IFA022, NFV-IFA023, NFV-IFA028, NFV-TST005)
- **Ongoing Release 3 work items** (refer to Release 3 Definition): 27 WI.
  - Propagated/evolved Rel. 2 deliverable drafts:
    - 9 Stage 2 GS (NFV-IFA002/005/006/007/008/010/011/013/014, NFV-TST008).
    - 3 GR (NFV-IFA015/016/017).
  - 2 Stage 1/2 GS draft (NFV-EVE011, NFV-REL009).
  - 5 Stage 2 GS draft (NFV-IFA012, NFV-IFA026, NFV-IFA030/031/032).
  - 2 GR draft (NFV-IFA029, NFV-REL010).
  - 1 GS draft on testing/benchmarking (NFV-TST009).
  - 2 GS drafts on security (NFV-SEC019, NFV-SEC020).

EVE: 1	IFA: 18
REL: 2	SEC: 2
SOL: 0	TST: 2
total ongoing WI: 25	