



## **Network Functions Virtualisation (NFV); Terminology for Main Concepts in NFV**

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## Foreword

This Group Report (GR) has been produced by ETSI Industry Specification Group (ISG) Network Functions Virtualisation (NFV).

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## Modal verbs terminology

In the present document "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

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## Executive summary

The present document collects selected terms and abbreviations from different NFV specifications and reports in order to provide a common reference and facilitate shared understanding.

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## Introduction

ETSI NFV has produced a number of specifications and reports over the years since its creation. According to ETSI Drafting Rules, each of these specifications and reports contains its own terms and abbreviations clause. The present document was created to host terms and abbreviations that are thought to be common to multiple NFV deliverables to constitute a single source and facilitate common references.

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# 1 Scope

The present document provides terms and abbreviations for NFV in order to achieve a "common language" across all the ISG NFV deliverables.

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## 2 References

### 2.1 Normative references

Normative references are not applicable in the present document.

### 2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

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

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] ETSI Directives: Annex 1: "Definitions in relation to the member categories of ETSI".

[i.2] ETSI TR 121 905: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); LTE; 5G; Vocabulary for 3GPP Specifications (3GPP TR 21.905)".

[i.3] IETF RFC 2330: "Framework for IP Performance Metrics".

[i.4] IETF RFC 6390: "Guidelines for Considering New Performance Metric Development".

[i.5] ISO/IEC 15939:2007: "Systems and software engineering - Measurement process".

[i.6] NIST Special Publication 500-307: "Cloud Computing Service Metrics Description".

NOTE: Available at <http://www.nist.gov/itl/cloud/upload/RATAX-CloudServiceMetricsDescription-DRAFT-20141111.pdf>.

[i.7] Recommendation ITU-T Y.3500: "Information technology - Cloud computing - Overview and vocabulary".

[i.8] ETSI GS NFV-MAN 001: "Network Functions Virtualisation (NFV); Management and Orchestration".

[i.9] Void.

[i.10] Void.

[i.11] NIST Special Publication 800-146: "Cloud Computing Synopsis and Recommendations", 2012.

NOTE: Available at <https://nvlpubs.nist.gov/nistpubs/legacy/sp/nistspecialpublication800-146.pdf>.

[i.12] ETSI GS NFV-REL 001: "Network Functions Virtualisation (NFV); Resiliency Requirements".

## 3 Definition of terms, symbols and abbreviations

### 3.1 Terms

0-9

Void.

#### A to B

**administrative domain:** collection of systems and networks operated by a single organization or administrative authority

NOTE: The components which make up the domain are assumed to interoperate with a significant degree of mutual trust among them based on a stable trust relationship, while a transient, specific trust relationship is established for interoperating with components in other domains.

**affinity of virtualised network resources:** persistent policy that forces Virtual Links (VLs) to share the same connectivity (virtual or physical)

NOTE 1: "Persistent" is used here and in the following terms to indicate that the affinity remains in effect until a change is requested by the consumer.

NOTE 2: This may be stipulated to ensure the same transmission characteristics (such as delay) for VLs.

**alarm:** information about a specific condition requiring attention

NOTE: An alarm does or does not represent an error.

**alarm notification:** message used to report an alarm

**allocate virtualised resource:** operation that creates an instance of a virtualised resource, involving the assignment of NFVI resources

NOTE 1: Virtualised resources can include virtualised compute resources, virtualised network resources or virtualised storage resources.

NOTE 2: Throughout the present document the term "instantiated virtualised resource" is used to describe an instance of a virtualised resource.

**anti-affinity of virtualised network resources:** persistent policy that forces Virtual Links (VLs) to not share any connectivity (virtual or physical)

NOTE: This may be stipulated to ensure that VLs do not fail at the same time.

**area affinity:** policy that qualifies an affinity (or anti-affinity) policy with respect to location restrictions

NOTE: Affinity and anti-affinity can be used to support availability, survivability and performance needs with respect to virtualised resources.

EXAMPLE: The anti-affinity policy of having virtualised compute resources on different compute nodes can be further restricted by mandating to locate the compute nodes on different shelves, racks, bays, sites, geographic areas or similar restriction.

#### C

**Composite Network Service (CNS):** network service containing at least one network service

**compute domain:** domain within the NFVI that includes servers and storage

**compute node:** abstract definition of a server

**consumable virtualised resource:** virtualised resource that can be requested for reservation and/or allocation

NOTE: Virtualised resources comprise compute, network and storage resources

EXAMPLE: A volume or object based virtual storage.

**consumer:** role played by a functional block or function that consumes certain functions exposed by another functional block or function

**consumer VNF:** VNF that consumes services

**container image registry:** function that stores container images and makes them available to other functions

**container infrastructure service:** service that provides runtime environment for one or more container virtualisation technologies

NOTE: Container infrastructure service can run on top of a bare metal or hypervisor-based virtualisation.

**container infrastructure service instance:** instance providing runtime execution environment for container

**container infrastructure service management:** function that manages one or more container infrastructure services

NOTE: The container infrastructure service management provides mechanisms for lifecycle management of the managed container infrastructure object, which are hosting application components as services or functions.

**containerized workload:** VNF or VNF component designed to be deployed and managed on Container Infrastructure Service (CIS) instances

## D

**deployment flavour:** specific deployment configuration that describes a specific deployment (of a Network Service or VNF) supporting specific KPIs (such as capacity and performance)

## E

**error:** discrepancy between a computed, observed, or measured value or condition and a true, specified, or theoretically correct value or condition

NOTE 1: Error is a consequence of a fault.

NOTE 2: See ETSI GS NFV-REL 001 [i.12].

## F

**failure:** deviation of the service from fulfilling its functionality

NOTE: Adapted from ETSI GS NFV-REL 001 [i.12].

**fault:** adjudged or hypothesized cause of an error

NOTE: See ETSI GS NFV-REL 001 [i.12].

**field replaceable unit:** unit of hardware resources designed for easy replacement during the operational life of a network element

## G

Void.

## H

**hypervisor:** software which partitions the underlying physical resources of a compute node, creates Virtual Machines, and isolates them from each other

NOTE: The hypervisor is software running either directly on top of the hardware (bare metal hypervisor) or running on top of a hosting operating system (hosted hypervisor). The abstraction of resources comprises all those entities inside a computer/server which are accessible, like processor, memory/storage, NICs.

## I

**infrastructure domain:** administrative domain that provides virtualised infrastructure resources such as compute, network, and storage or a composition of those resources via a service abstraction to another Administrative Domain, and is responsible for the management and orchestration of those resources

NOTE: This term is from ETSI GS NFV-MAN 001 [i.8].

**infrastructure network domain:** domain within the NFVI that includes all networking that interconnects compute/storage infrastructure resource

NOTE: It pre-exists the realization of VNFs.

**infrastructure resource:** resource provided by the infrastructure that can be used by virtualisation containers

NOTE: Infrastructure resource can either be a virtualised compute, storage, or network resource.

**infrastructure resource group:** logical resource collection grouping virtual resource instances assigned to a tenant along with software images

## J to K

Void.

## L

**lifecycle management:** set of functions required to manage the instantiation, maintenance and termination of a VNF or NS

## M

**managed container infrastructure object:** object managed and exposed by the container infrastructure service management, representing the desired and actual state of a containerized workload, including its requested and allocated infrastructure resources and applicable policies

**managed container infrastructure object package:** aggregate of declarative descriptor and configuration files for multiple managed container infrastructure objects

**measurement:** set of operations having the object of determining a measured value or measurement result

NOTE: The actual instance or execution of operations leading to a Measured Value. (Based on the term "Measurement" in ISO/IEC 15939 [i.5], as cited in NIST Special Publication 500-307 [i.6]).

**metric:** quantity produced in an assessment of performance and/or reliability of the network, which has an intended utility and is carefully specified to convey the exact meaning of a measured value

NOTE: This definition of term is consistent with that of Performance Metric in IETF RFC 2330 [i.3] and IETF RFC 6390 [i.4].

EXAMPLE: Packet transfer performance or reliability of a network.

**multi-site network service:** network service whose constituent Network Functions/NSs are deployed in more than one site

**multi-tenancy:** feature where physical, virtual or service resources are allocated in such a way that multiple tenants and their computations and data are isolated from and inaccessible by each other

NOTE: This definition of term has been specialized from the term "multi-tenancy" as defined in Recommendation ITU-T Y.3500 [i.7].

## N

**namespace:** logical grouping for a particular set of identifiers, resources, policies and authorizations

**namespace quota:** upper limit on specific types of resources that can be used by one or more Managed Container Infrastructure Objects within the scope of a namespace

**Nested Network Service (NNS):** network service that is part of a composite network service

NOTE: A Composite Network Service is a Network Service containing at least one Network Service.

**network controller:** functional block that centralizes some or all of the control and management functionality of a network domain and optionally provides an abstract view of its domain to other functional blocks via well-defined interfaces

**network forwarding path:** ordered list of connection points forming a chain of NFs, along with policies associated to the list

**Network Function (NF):** functional block within a network infrastructure that has well-defined external interfaces and well-defined functional behaviour

**Network Functions Virtualisation (NFV):** principle of separating network functions from the hardware they run on by using virtualisation techniques

**Network Functions Virtualisation Infrastructure (NFVI):** totality of all hardware and software components that build up the environment in which VNFs are deployed

NOTE: The NFV-Infrastructure can span across several locations, e.g. places where data centres are operated. The network providing connectivity between these locations is regarded to be part of the NFV-Infrastructure.

**Network Functions Virtualisation Infrastructure (NFVI) component:** NFVI hardware resources that are not field replaceable, but are distinguishable as COTS components at manufacturing time

**Network Functions Virtualisation Infrastructure Node (NFVI-Node):** physical device(s) deployed and managed as a single entity, providing the NFVI Functions required to support the execution environment for VNFs

**Network Function Virtualisation Infrastructure Point of Presence (NFVI-PoP):** N-PoP where a Network Function is or could be deployed as Virtual Network Function (VNF)

**Network Functions Virtualisation Management and Orchestration (NFV-MANO):** functions collectively provided by NFVO, VNFM, and VIM

**Network Functions Virtualisation Management and Orchestration Architectural Framework (NFV-MANO Architectural Framework):** collection of all functional blocks (including those in NFV-MANO category as well as others that interwork with NFV-MANO), data repositories used by these functional blocks, and reference points and interfaces through which these functional blocks exchange information for the purpose of managing and orchestrating NFV

**Network Functions Virtualisation Orchestrator (NFVO):** functional block that manages the Network Service (NS) lifecycle and coordinates the management of NS lifecycle, VNF lifecycle (supported by the VNFM) and NFVI resources (supported by the VIM) to ensure an optimized allocation of the necessary resources and connectivity

**Network Interface Controller (NIC):** device in a compute node that provides a physical interface with the infrastructure network

**network operator:** operator of an electronics communications network or part thereof

NOTE: An association or organization of such network operators also falls within this category (as defined in ETSI Directives [i.1]).

**Network Point of Presence (N-PoP):** location where a Network Function is implemented as either a Physical Network Function (PNF) or a Virtual Network Function (VNF)

**Network Service (NS):** composition of Network Function(s) and/or Network Service(s), defined by its functional and behavioural specification

NOTE: The Network Service contributes to the behaviour of the higher layer service, which is characterized by at least performance, dependability, and security specifications. The end-to-end network service behaviour is the result of the combination of the individual network function behaviours as well as the behaviours of the network infrastructure composition mechanism.

**network service descriptor:** template that describes the deployment of a Network Service including service topology (constituent VNFs and the relationships between them, Virtual Links, VNF Forwarding Graphs) as well as network service characteristics such as SLAs and any other artefacts necessary for the Network Service on-boarding and lifecycle management of its instances

**network service orchestration:** subset of NFV Orchestrator functions that are responsible for network service lifecycle management

**network service provider:** type of service provider implementing the network service

**network stability:** ability of the NFV framework to maintain steadfastness while providing its function and resume its designated behaviour as soon as possible under difficult conditions, which can be excessive load or other anomalies not exceeding the design limits

**NF forwarding graph:** graph of logical links connecting NF nodes for the purpose of describing traffic flow between these network functions

**NF set:** collection of NFs with unspecified connectivity between them

**NFV framework:** totality of all entities, reference points, information models and other constructs defined by the specifications published by the ETSI ISG NFV

**NFV-MANO management service:** one or more capabilities offered by an NFV-MANO functional block for the support of its operations, administration and maintenance

**NFV-MANO service:** one or more capabilities offered via NFV-MANO functional blocks invoked using a defined interface

NOTE: This definition of term has been specialized from the term "cloud service" as defined in Recommendation ITU-T Y.3500 [i.7].

EXAMPLE: The VNFM offers a NFV-MANO service for VNF lifecycle management to the NFVO. The NFVO offers a NFV-MANO service for Network Service lifecycle management to OSS/BSS functions and uses the NFV-MANO service provided by the VNFM.

**NFV-MANO service interface:** interface, associated to an NFV-MANO service, over which operations can be invoked and/or notifications issued

**NFV-MANO service user:** natural person, or entity acting on their behalf, associated with an organization that uses NFV-MANO services

NOTE: This definition of term has been specialized from the term "cloud service user" as defined in Recommendation ITU-T Y.3500 [i.7].

**NFVO-C:** NFVO that manages a composite NS instance that has one or more nested NS instances as constituents which are managed by an NFVO in another administrative domain

**NFVO-N:** NFVO that manages an NS instance which is used as a nested NS of a composite NS instance managed by an NFVO in another administrative domain

**NFV-Resource (NFV-Res):** resource within the NFVI that can be used by the NS/VNF to allow for their execution

**NFV security controller:** trusted security management entity that provides secure dynamic delivery of security policies and services into the NFV system

**NFV security services agent:** entity responsible for securely receiving the security monitoring policy and implementing the same

**NS healing:** procedure that includes all virtualisation related corrective actions to repair a faulty Network Service (NS) instance including components/functionalities which make up the instance, and have been associated with this fault situation

NOTE 1: In a virtualised environment network service healing focuses only on the virtualised components/functionalities. In case of a NS consisting of virtualised and non-virtualised parts a procedure able to handle both parts is needed. This will be done in connection with components/functionalities that are located outside the virtualised environment.

NOTE 2: "Virtualisation related corrective actions" refers to action(s) toward virtualised resource(s) and associated NS instance.

**node affinity for virtualised compute resources:** persistent policy that forces virtualised compute resources to be on the same compute node

NOTE 1: "Persistent" is used here and in the following terms to indicate that the affinity remains in effect until a change is requested by the consumer.

NOTE 2: This is to avoid cases where, for example, virtualised compute resource are initially on the same compute node but then later moved to separate nodes by the provider without any requested policy change from the consumer.

**node affinity for virtualised storage resources:** persistent policy that forces virtualised storage resources to be on the same storage node

**node anti-affinity for virtualised compute resources:** persistent policy that forces each virtualised compute resource to be on different compute nodes

**node anti-affinity for virtualised storage resources:** persistent policy that forces each virtualised storage resources to be on different storage nodes

## O

**OS container:** virtualisation container utilizing a shared Operating System (OS) kernel of its host

NOTE: The host providing the shared OS kernel can be a physical compute node or another virtualisation container.

## P

**PaaS Service:** modular service or a function provided by PaaS to Consumer VNFs

NOTE: A PaaS service can be a VNF common service or a VNF dedicated service.

**path:** data communications feature of a communication system describing the sequence and identity of system components visited by packets, where the components of the path may be either logical or physical

NOTE: Examples of physical components include a physical switch or a network interface of a host, and an example of a logical component is a virtual network switch. Paths can be unidirectional or bi-directional. Paths can be further characterized as data plane or control plane when serving these classes of traffic, and as packet payload-agnostic or payload processing (as in the case of transcoding, compression, or encryption).

**permitted allowance:** constraint in terms of resource capacity, used by the NFVO to control resource consumption by VNFMs in relation with VNF lifecycle operation granting

NOTE: Permitted allowances are maintained by the NFVO and can vary in granularity (VNFM, VNF, group of VNFs, NS, etc.).

**Physical Network Function (PNF):** implementation of a NF via a tightly coupled software and hardware system

**Physical Network Function Descriptor (PNFD):** template that describes the connectivity requirements of connection point(s) attached to a physical network function

NOTE: It is used by the NFVO to integrate PNF(s) into an NS.

**Platform as a Service (PaaS):** capability provided to the consumer to deploy onto the cloud infrastructure consumer-created or -acquired applications

NOTE: Cloud Computing Services are typically offered to consumers in one of three service models NIST SP 800-146 [i.11], page 2-1 - Infrastructure as a Service (IaaS), Platform as a Service (PaaS) or Software as a Service (SaaS). In particular for PaaS, the consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, or storage, platform services, but has control over the deployed applications and possibly over application hosting environment configurations.

## Q

**quota:** upper limit on specific types of resources, usually used to prevent excessive resource consumption in the VIM by a given consumer

NOTE: Quota is enforced by the VIM.

## R

**reliability:** probability that an item can perform a required function under stated conditions for a given time interval

**resiliency:** ability of the NFV framework to limit disruption and return to normal or at a minimum acceptable service delivery level in the face of a fault, failure, or an event that disrupts the normal operation

**resource pool:** logical grouping of NFVI hardware and software resources

NOTE 1: A resource pool can be solely based on a certain resource type (e.g. compute, storage, networking) or include a combination of them, and can span zero, one or multiple resource zones.

NOTE 2: An NFVI resource can be part of none, one or more than one resource pool.

**resource zone:** set of NFVI hardware and software resources logically grouped according to physical isolation and redundancy capabilities or to certain administrative policies for the NFVI

NOTE: The same resource cannot be part of two different resource zones.

EXAMPLE 1: Physical isolation can be achieved for example using a separate power supply, network equipment or physical building sites.

EXAMPLE 2: One example of resource zones are the Availability Zones in OpenStack.

## S

**scaling:** ability to dynamically extend/reduce resources granted to the Virtualised Network Function (VNF) as needed

NOTE: This includes scaling up/down and scaling out/in.

**scaling out/in:** ability to scale by adding/removing resource instances (e.g. VM)

**scaling up/down:** ability to scale by changing allocated resource, e.g. increase/decrease memory, CPU capacity or storage size

**service:** component of the portfolio of choices offered by service providers to a user, a functionality offered to a user

NOTE 1: As defined in ETSI TR 121 905 [i.2].

NOTE 2: A user can be an end-customer, a network or some intermediate entity.

**Service Access Point (SAP):** connection point where an NS can be accessed

NOTE: A SAP can either provide access to an NS, e.g. to an end-user, or interconnect different NS.

**service consumer:** person, device or company consuming a service provided by a service provider

**service continuity:** continuous delivery of service in conformance with service's functional and behavioural specification and SLA requirements

NOTE: Service continuity applies to any initiated transaction or session till its full completion even in the event of intervening exceptions or anomalies, whether scheduled or unscheduled, malicious, intentional or unintentional.

**Service Level Agreement (SLA):** negotiated agreements between two or more parties, recording a common understanding about the service and/or service behaviour (e.g. availability, performance, service continuity, responsiveness to anomalies, security, serviceability, operation) offered by one party to another, and the measurable target values characterizing the level of services

NOTE: The scope of the above term does not include business aspects of the SLA.

**service provider:** company or organization, making use of an electronics communications network or part thereof to provide a service or services on a commercial basis to third parties

NOTE: As defined in ETSI Directives [i.1].

**service resource:** logical resource that can be used directly in a network service

NOTE: A service resource can be a NS, VNF, PNF, VNFFG or NFP.

**service resource group:** logical resource collection that groups a subset of service resource instances assigned to a tenant

NOTE: A service resource group can include NS, VNF, PNF, VNFFG and NFP.

**software rollback:** software modification process that reverts the system from the newly deployed software version to the previously deployed software version

**software update:** software modification process for bug fixes or enhancements without adding, modifying or removing functionality, interfaces or protocols

**software upgrade:** software modification process aimed at adding, modifying or removing functionality, interfaces or protocols

## T

**tenant:** one or more NFV-MANO service users sharing access to a set of physical, virtual or service resources

NOTE 1: This definition of term has been specialized from the term "tenant" as defined in Recommendation ITU-T Y.3500 [i.7].

NOTE 2: The "tenant" concept in NFV should not be confused with the "tenant" (aka "project") concept in OpenStack. The OpenStack implementation covers a subset of the overall functionalities required by multi-tenancy in NFV.

**tenant domain:** domain that provides VNFs, and combinations of VNFs into Network Services, and is responsible for their management and orchestration, including their functional configuration and maintenance at application level

**trust domain:** collection of entities that share a set of security policies

## U

**user service:** component of the portfolio of choices offered by service providers to the end-users/customers/subscribers

## V

**virtual link:** set of connection points along with the connectivity relationship between them and any associated target performance metrics (e.g. bandwidth, latency, QoS)

NOTE: The virtual link can interconnect two or more entities (e.g. VNF components, VNFs, or PNFs) and it is supported by one or more Virtual Network (VN) of the NFVI.

**Virtual Machine (VM):** virtualised computation environment that behaves very much like a physical computer/server

NOTE: A VM has all its ingredients (processor, memory/storage, interfaces/ports) of a physical computer/server and is generated by a Hypervisor, which partitions the underlying physical resources and allocates them to VMs. Virtual Machines are capable of hosting a VNF Component (VNFC) instance.

**virtual network:** virtual network routes information among the network interfaces of VM instances and physical network interfaces, providing the necessary connectivity

NOTE: The virtual network is bounded by its set of permissible network interfaces.

**Virtual Security Function (VSF):** security enabling function within the NFV architectural framework

**virtualisation container:** partition of a compute node that provides an isolated virtualised computation environment

NOTE: Examples of virtualisation container includes virtual machine and OS container.

**Virtualisation Deployment Unit (VDU):** construct that can be used in an information model, supporting the description of the deployment and operational behaviour of a VNFC

NOTE: In the presence of a hypervisor, the main characteristic of a VDU is that a single VNF or VNF subset instance created based on the construct can be mapped to a single VM. A VNF may be modelled using one or multiple such constructs, as applicable.

**Virtualised CPU (vCPU):** virtualised CPU created for a VM by a hypervisor

NOTE: In practice, a vCPU can be a time sharing of a real CPU and/or in the case of multi-core CPUs, it can be an allocation of one or more cores to a VM. It is also possible that the hypervisor emulates a CPU instruction set such that the vCPU instruction set is different to the native CPU instruction set (emulation will significantly impact performance).

**Virtualised Infrastructure Manager (VIM):** functional block that is responsible for controlling and managing the NFVI compute, storage and network resources, usually within one operator's Infrastructure Domain (e.g. NFVI-PoP)

**Virtualised Network Function (VNF):** implementation of an NF that can be deployed on a Network Function Virtualisation Infrastructure (NFVI)

**Virtualised Network Function Component (VNFC):** internal component of a VNF providing a VNF Provider a defined sub-set of that VNF's functionality, with the main characteristic that a single instance of this component maps 1:1 against a single instance of an atomic deployable unit

NOTE: An instance of an atomic deployable unit is represented by a single VM for hypervisor-based virtualisation, or represented by one or a set of OS containers for OS virtualisation.

**Virtualised Network Function Component (VNFC) instance:** instance of a VNFC deployed in a specific atomic deployable unit instance

NOTE: A VNFC instance has a lifecycle dependency with its parent VNF instance

**Virtualised Network Function Descriptor (VNFD):** configuration template that describes a VNF in terms of its deployment and operational behaviour, and is used in the process of VNF on-boarding and managing the lifecycle of a VNF instance

**Virtualised Network Function Instance (VNF Instance):** run-time instantiation of the VNF software, resulting from completing the instantiation of its components and of the connectivity between them, using the VNF deployment and operational information captured in the VNFD, as well as additional run-time instance-specific information and constraints

**Virtualised Network Function Manager (VNFM):** functional block that is responsible for the lifecycle management of VNF

**Virtualised Network Function Package (VNF Package):** archive that includes a VNFD, the software image(s) associated with the VNF, as well as additional artefacts, e.g. to check the integrity and to prove the validity of the archive

**Virtualised NIC (vNIC):** virtualised NIC created for a VM by a hypervisor

**virtualised resource migration:** process of relocating the virtualised resource from one physical node to another physical node

NOTE: Examples of physical nodes are compute nodes and storage nodes.

**Virtualised Storage (vStorage):** virtualised non-volatile storage allocated to a VM

**virtual Switch (vSwitch):** Ethernet switch implemented as a software application in a compute node that enables communication between virtualisation containers within the compute node and between virtualisation containers and the NICs of the compute node

NOTE 1: When the virtualisation container is a VM, the vSwitch interconnects vNICs of VMs with each other and with the NIC of the compute node.

NOTE 2: In previous versions of the present document the term was referred as "virtualised Switch".

**VNF component:** See Virtualised Network Function Component (VNFC).

**VNFC instance:** See Virtualised Network Function Instance (VNF Instance).

**VNFC snapshot:** replication of a VNFC instance at a specific point in time, capturing its full or partial state (such as state and content of the disks, memory and devices attached to the VNFC instance plus the infrastructure configuration of the VNFC instance)

**VNFC snapshot package:** collection of files representing a VNFC Snapshot which can be physically stored and transferred

**VNF descriptor:** See Virtualised Network Function Descriptor (VNFD).

**VNF Forwarding Graph (VNFFG):** NF forwarding graph where at least one node is a VNF

**VNF healing:** procedure that includes all virtualisation-related corrective actions to repair a faulty VNF, and/or its VNFC instances and internal VNF Virtual Link(s)

NOTE: "Virtualisation related corrective actions" refers to the corrective action(s) toward virtualised resources and associated VNF/VNFC instance(s), and/or internal VNF Virtual Link(s).

**VNF instance:** See Virtualised Network Function Instance (VNF Instance).

**VNF lifecycle operation granting:** permission to perform a VNF lifecycle management operation and the resource management operations necessary to complete it, if any apply

**VNF manager:** See Virtualised Network Function Manager (VNFM).

**VNF package:** See Virtualised Network Function Package (VNF Package).

**VNF provider:** person or company that provides the VNF

NOTE: This includes, but is not limited to vendor, integrator or in-house developer.

**VNF Snapshot:** replication of a VNF instance at a specific point in time, containing a consistent set of VNFC snapshots of all VNFC instances associated to the VNF instance, the VNF Descriptor and the VNF runtime information (including state and settings of Virtual Links and Connection Points associated to this VNF).

**VNF-related resource management in direct mode:** mode of operation where the VNFM invokes on the VIM Virtualised Resources Management operations

NOTE 1: Resource reservation and quota management operations are out of the scope of this mode of operation, with the exception of query reservations and query quota.

NOTE 2: Virtualised Resources Management operations include allocation, migration, scaling, update, query, operation and termination of virtualised resources.

**VNF-related resource management in indirect mode:** mode of operation where the VNFM invokes on the NFVO Virtualised Resources Management operations and the NFVO in turn invokes them towards the VIM

NOTE 1: Resource reservation and quota management operations are out of the scope of this mode of operation, with the exception of query reservations and query quota.

NOTE 2: Virtualised Resources Management operations include allocation, migration, scaling, update, query, operation and termination of virtualised resources.

**VNF set:** collection of VNFs with unspecified connectivity between them

**VNF Snapshot Package:** collection of files representing a VNF Snapshot which can be physically stored and transferred

## W to Z

Void.

## 3.2 Symbols

Void.

## 3.3 Abbreviations

### 0-9

5GCN            5G Core Network

### A

AAA            Authentication, Authorization and Accounting  
API            Application Programming Interface

### B

BGP            Border Gateway Protocol  
BIOS           Basic Input/Output System  
BSS            Business Support System

### C

CIS            Container Infrastructure Service  
CIR            Container Image Registry  
CISM          Container Infrastructure Service Management  
CDN           Content Delivery Network  
CNS           Composite Network Service  
COTS          Commercial Off The Shelf  
CON           CONformance  
CP            Connection Point  
CPD           CP Descriptor

CPU Central Processing Unit  
 CRUD Create, Read, Update, and Delete

## D

DF Deployment Flavour  
 DHCP Dynamic Host Configuration Protocol  
 DUT Device Under Test

## E

EM (Network) Element Manager

## F

FB Functional Block  
 FCAPS Fault, Configuration, Accounting, Performance and Security  
 FM Fault Management  
 FUT Function Under Test

## G

Void.

## H

HTML Hypertext Markup Language  
 HTTP Hypertext Transfer Protocol  
 HTTPS HTTP Secure

## I

IFS Interoperable Features Statement  
 IMS IP Multimedia Subsystem  
 I/O Input/Output  
 IOP InterOPerability  
 IP Internet Protocol  
 ISF Infrastructure Security Function  
 ISM Infrastructure Security Manager  
 IT Information Technology  
 IUT Implementation Under Test

## J

Void.

## K

KPI Key Performance Indicator

## L

LAN Local Area Network  
 LCM Life Cycle Management

## M

|       |   |
|-------|---|
| MAC   | Medium/Media Access Control                     |
| MANO  | Management and Orchestration                    |
| MCIO  | Managed Container Infrastructure Object         |
| MCIOP | Managed Container Infrastructure Object Package |
| MME   | Mobility Management Entity                      |
| MMI   | Man-Machine Interface                           |
| MPLS  | Multi-Protocol Label Switching                  |

## N

|           |  |
|-----------|--|
| N-PoP     | Network Point of Presence  |
| NAT       | Network Address Translation                                      |
| NETCONF   | Network Configuration Protocol                                   |
| NF        | Network Function   |
| NFP       | Network Forwarding Path  |
| NFPD      | Network Forwarding Path Descriptor                               |
| NFV       | Network Functions Virtualisation                                 |
| NFV-Res   | NFV Resource   |
| NFVI      | NFV Infrastructure   |
| NFV-MANO  | Network Functions Virtualisation Management and Orchestration    |
| NFVI-Node | Network Functions Virtualisation Infrastructure Node             |
| NFVI-PoP  | Network Function Virtualisation Infrastructure Point of Presence |
| NFVO      | Network Functions Virtualisation Orchestrator                    |
| NFV-SC    | NFV Security Controller  |
| NIC       | Network Interface Controller                                     |
| NNS       | Nested Network Service   |
| NS        | Network Service  |
| NSD       | Network Service Descriptor                                       |
| NSM       | NFV Security Manager   |

## O

|      |   |
|------|---|
| OAM  | Operations, Administration and Management |
| ONF  | Open Networking Foundation                |
| OS   | Operating System                          |
| OSPF | Open Shortest Path First                  |
| OSS  | Operation Support System                  |

## P

|      |   |
|------|---|
| PaaS | Platform as a Service                         |
| PICS | Protocol Implementation Conformance Statement |
| PM   | Performance Management                        |
| PNF  | Physical Network Function                     |
| PNFD | Physical Network Function Descriptor          |
| PoP  | Point of Presence                             |
| PSF  | Physical Security Function                    |

## Q

|     |                     |
|-----|---------------------|
| QE  | Qualified Equipment |
| QF  | Qualified Function  |
| QoS | Quality of Service  |

## R

|          |  |
|----------|--|
| RBAC     | Role-Based Access Control                              |
| RESTCONF | Representational State Transfer Configuration Protocol |
| RPC      | Remote Procedure Call                                  |

## S

|        |   |
|--------|---|
| SAL    | Service Availability Level              |
| SAP    | Service Access Point                    |
| SAPD   | Service Access Point Descriptor         |
| SDN    | Software Defined Networking             |
| SEM    | Security Element Manager                |
| SFC    | Service Function Chaining               |
| SIP    | Session Initiation Protocol             |
| SLA    | Service Level Agreements                |
| SP     | Service Provider                        |
| SR-IOV | Single Root Input/Output Virtualisation |
| SSA    | Security Services Agent                 |
| SUT    | System Under Test                       |
| SW     | SoftWare                                |

## T

|       |   |
|-------|---|
| TCP   | Transmission Control Protocol                                   |
| TD    | Test Description  |
| TOSCA | Topology and Orchestration Specification for Cloud Applications |
| TPM   | Trusted Platform Module (TCG)                                   |
| TSS   | Test Suite Structure  |

## U

|      |                            |
|------|----------------------------|
| UML® | Unified Modelling Language |
|------|----------------------------|

## V

|          |   |
|----------|---|
| VA       | Virtual Application                     |
| vCPU     | Virtualised CPU                         |
| VDU      | Virtualisation Deployment Unit          |
| VIM      | Virtualised Infrastructure Manager      |
| VL       | Virtual Link                            |
| VLAN     | Virtual LAN                             |
| VLD      | Virtual Link Descriptor                 |
| VM       | Virtual Machine                         |
| VN       | Virtual Network                         |
| VNF      | Virtualised Network Function            |
| VNFC     | Virtualised Network Function Component  |
| VNFCI    | VNF Component Instance                  |
| VNFD     | Virtualised Network Function Descriptor |
| VNFFG    | VNF Forwarding Graph                    |
| VNFFGD   | VNFFG Descriptor                        |
| VNFI     | VNF Instance                            |
| VNFM     | Virtualised Network Function Manager    |
| VNI      | VXLAN Network Identifier                |
| vNIC     | Virtualised NIC                         |
| VPN      | Virtual Private Network                 |
| VR       | Virtualised Resource                    |
| vRouter  | virtual Router                          |
| VSF      | Virtual Security Function               |
| vStorage | virtualised Storage                     |

vSwitch      virtualised Switch  
VXLAN      Virtual eXtensible LAN

## W

WAN      Wide Area Network  
WIM      WAN Infrastructure Manager

## X

XML      eXtensible Markup Language  
XPath      XML Path Language

## Y

YANG      Yet Another Next Generation

## Z

Void.

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## Annex A: Bibliography

ETSI GS NFV-EVE 011: "Network Functions Virtualisation (NFV) Release 3; Virtualised Network Function; Specification of the Classification of Cloud Native VNF Implementations".

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## Annex B: Change History

| <b>Date</b>    | <b>Version</b> | <b>Information about changes</b>  |
|----------------|----------------|---|
| March 2020     | 1.5.2          | Early draft   |
| June 2020      | 1.5.3          | Addition of contribution NFVEVE(20)000062r1 with REL changes  |
| September 2020 | 1.5.4          | Incorporating contributions NFVEVE(20)000122 and NFVEVE(20)000126, with editorial fixes   |
| January 2021   | 1.5.5          | Incorporating contribution NFVEVE(20)000150 and NFVEVE(21)000003<br>Incorporating NFVEVE(21)000010 and the online change to the vNIC term |

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## History

| <b>Document history</b> |               |                                |
|-------------------------|---------------|--------------------------------|
| V1.1.1                  | October 2013  | Publication as ETSI GS NFV 003 |
| V1.2.1                  | December 2014 | Publication as ETSI GS NFV 003 |
| V1.3.1                  | January 2018  | Publication as ETSI GS NFV 003 |
| V1.4.1                  | August 2018   | Publication as ETSI GS NFV 003 |
| V1.5.1                  | January 2020  | Publication                    |
| V1.6.1                  | March 2021    | Publication                    |