

ETSI GS NFV-IFA 007 v2.5.1 (2018-08)



GROUP SPECIFICATION

Network Functions Virtualisation (NFV) Release 2; Management and Orchestration; Or-Vnfm reference point - Interface and Information Model Specification

Network Functions Virtualisation (NFV) Management and Orchestration reference point - Interface Information Model Specification

Disclaimer

The present document has been produced and approved by the Network Functions Virtualisation (NFV) ETSI Industry Specification Group (ISG) and represents the views of those members who participated in this ISG. It does not necessarily represent the views of the entire ETSI membership.

Reference
RGS/NFV-IFA007ed251

Keywords
interface, management, MANO, NFV,
orchestration, virtualisation

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

The present document can be downloaded from:
<http://www.etsi.org/standards-search>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the only prevailing document is the print of the Portable Document Format (PDF) version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status.
Information on the current status of this and other ETSI documents is available at

<https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx>

If you find errors in the present document, please send your comment to one of the following services:
<https://portal.etsi.org/People/CommitteeSupportStaff.aspx>

Copyright Notification

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.
The copyright and the foregoing restriction extend to reproduction in all media.

© ETSI 2018.
All rights reserved.

DECT™, PLUGTESTS™, UMTS™ and the ETSI logo are trademarks of ETSI registered for the benefit of its Members.
3GPP™ and **LTE™** are trademarks of ETSI registered for the benefit of its Members and
of the 3GPP Organizational Partners.

oneM2M logo is protected for the benefit of its Members.
GSM® and the GSM logo are trademarks registered and owned by the GSM Association.

Contents

Intellectual Property Rights	14
Foreword.....	14
Modal verbs terminology.....	14
1 Scope	14
2 References	14
2.1 Normative references	14
2.2 Informative references.....	15
3 Definitions and abbreviations.....	15
3.1 Definitions	15
3.2 Abbreviations	16
4 Overview of interfaces and information elements associated to the Or-Vnfm reference point	16
4.1 Introduction	16
4.2 Relation to other NFV Group Specifications.....	16
4.3 Conventions.....	17
5 Reference point and interface requirements	18
5.1 Introduction	18
5.2 Or-Vnfm reference point requirements	18
5.3 Interface requirements	18
5.3.1 VNF Package Management interface requirements.....	18
5.3.2 VNF Lifecycle Operation Granting interface requirements.....	19
5.3.3 Virtualised Resources Management interfaces requirements.....	19
5.3.3.1 Virtualised Resources Information Management interfaces requirements.....	19
5.3.3.2 Virtualised Resources Management interfaces requirements.....	20
5.3.3.3 Virtualised Resources Reservation Management interface requirements	20
5.3.3.4 Virtualised Resources Reservation Change Notification interface requirements.....	20
5.3.3.5 Virtualised Resources Change Notification interfaces requirements	21
5.3.3.6 Virtualised Resources Performance Management interface requirements	21
5.3.3.7 Virtualised Resources Fault Management interface requirements	22
5.3.3.8 Virtualised Resources Quota Management interfaces requirements	22
5.3.3.9 Virtualised Resources Quota Change Notification interface requirements	22
5.3.3.10 Virtualised Resources Quota Available Notification interface requirements.....	23
5.3.4 VNF Lifecycle Management interface requirements	23
5.3.5 Void	24
5.3.6 VNF Performance Management interface requirements.....	24
5.3.7 VNF Fault Management interface requirements.....	25
5.3.8 Void	26
5.3.9 VNF Indicator interface requirements	26
6 NFVO exposed interfaces	26
6.1 Introduction	26
6.2 VNF Package Management interface	26
6.2.1 Description.....	26
6.2.2 Query VNF Package Info operation	27
6.2.2.1 Description.....	27
6.2.2.2 Input parameters.....	27
6.2.2.3 Output parameters	27
6.2.2.4 Operation results	27
6.2.3 Subscribe operation.....	28
6.2.3.1 Description.....	28
6.2.3.2 Input parameters.....	28
6.2.3.3 Output parameters	28
6.2.3.4 Operation results	28
6.2.4 Notify operation.....	28
6.2.4.1 Description.....	28

6.2.5	Void	29
6.2.6	Fetch VNF Package operation	29
6.2.6.1	Description	29
6.2.6.2	Input parameters	29
6.2.6.3	Output parameters	29
6.2.6.4	Operation results	29
6.2.7	Fetch VNF Package Artifacts operation	30
6.2.7.1	Description	30
6.2.7.2	Input parameters	30
6.2.7.3	Output parameters	30
6.2.7.4	Operation results	30
6.2.8	Terminate Subscription operation	31
6.2.8.1	Description	31
6.2.8.2	Input parameters	31
6.2.8.3	Output parameters	31
6.2.8.4	Operation results	31
6.2.9	Query Subscription Info operation	31
6.2.9.1	Description	31
6.2.9.2	Input parameters	31
6.2.9.3	Output parameters	32
6.2.9.4	Operation results	32
6.3	VNF Lifecycle Operation Granting interface	32
6.3.1	Description	32
6.3.2	Grant VNF Lifecycle Operation operation	32
6.3.2.1	Description	32
6.3.2.2	Input parameters	33
6.3.2.3	Output parameters	35
6.3.2.4	Operation results	36
6.4	Virtualised Resources Management interfaces in indirect mode	36
6.4.1	Introduction	36
6.4.2	Virtualised Compute interfaces	37
6.4.2.1	Virtualised Compute Resources Management interface	37
6.4.2.2	Virtualised Compute Resources Change Notification interface	37
6.4.2.3	Virtualised Compute Resources Information Management interface	37
6.4.3	Virtualised Network interfaces	37
6.4.3.1	Virtualised Network Resources Management interface	37
6.4.3.2	Virtualised Network Resources Change Notification interface	38
6.4.3.3	Virtualised Network Resources Information Management interface	38
6.4.4	Virtualised Storage interfaces	38
6.4.4.1	Virtualised Storage Resources Management interface	38
6.4.4.2	Virtualised Storage Resources Change Notification interface	39
6.4.4.3	Virtualised Storage Resources Information Management interface	39
6.4.5	Virtualised Resource Performance Management interface	39
6.4.6	Virtualised Resource Fault Management interface	40
6.4.7	Virtualised Resources Quota Management interfaces	40
6.4.7.1	Virtualised Compute Resources Quota Management interface	40
6.4.7.2	Virtualised Network Resources Quota Management interface	40
6.4.7.3	Virtualised Storage Resources Quota Management interface	40
6.4.7.4	Virtualised Resources Quota Change Notification interface	40
6.4.8	Virtualised Resource Reservation interfaces	41
6.4.8.1	Virtualised Compute Resources Reservation Management interface	41
6.4.8.2	Virtualised Network Resources Reservation Management interface	41
6.4.8.3	Virtualised Storage Resources Reservation Management interface	41
6.4.8.4	Virtualised Resources Reservation Change Notification interface	41
6.5	Virtualised Resources Quota Available Notification interface	41
6.5.1	Description	41
6.5.2	Subscribe operation	42
6.5.2.1	Description	42
6.5.2.2	Input parameters	42
6.5.2.3	Output parameters	42
6.5.2.4	Operation results	42
6.5.3	Notify operation	42

6.5.3.1	Description	42
6.5.4	Terminate Subscription operation.....	43
6.5.4.1	Description	43
6.5.4.2	Input parameters.....	43
6.5.4.3	Output parameters	43
6.5.4.4	Operation results	43
6.5.5	Query Subscription Info operation.....	43
6.5.5.1	Description	43
6.5.5.2	Input parameters.....	44
6.5.5.3	Output parameters	44
6.5.5.4	Operation results	44
7	VNFM exposed interfaces.....	44
7.1	Introduction	44
7.2	VNF Lifecycle Management interface	44
7.2.1	Description.....	44
7.2.2	Create VNF Identifier operation.....	45
7.2.2.1	Description	45
7.2.2.2	Input parameters.....	45
7.2.2.3	Output parameters	45
7.2.2.4	Operation results	46
7.2.3	Instantiate VNF operation.....	46
7.2.3.1	Description	46
7.2.3.2	Input parameters.....	46
7.2.3.3	Output parameters	47
7.2.3.4	Operation results	47
7.2.4	Scale VNF operation.....	47
7.2.4.1	Description	47
7.2.4.2	Input parameters.....	49
7.2.4.3	Output parameters	49
7.2.4.4	Operation results	49
7.2.5	Scale VNF to Level operation.....	50
7.2.5.1	Description	50
7.2.5.2	Input parameters.....	50
7.2.5.3	Output parameters	50
7.2.5.4	Operation results	51
7.2.6	Change VNF Flavour operation.....	51
7.2.6.1	Description	51
7.2.6.2	Input parameters.....	51
7.2.6.3	Output parameters	52
7.2.6.4	Operation results	52
7.2.7	Terminate VNF operation.....	52
7.2.7.1	Description	52
7.2.7.2	Input parameters.....	53
7.2.7.3	Output parameters	53
7.2.7.4	Operation results	54
7.2.8	Delete VNF Identifier operation	54
7.2.8.1	Description	54
7.2.8.2	Input parameters.....	54
7.2.8.3	Output parameters	54
7.2.8.4	Operation results	54
7.2.9	Query VNF operation	55
7.2.9.1	Description	55
7.2.9.2	Input parameters.....	55
7.2.9.3	Output parameters	55
7.2.9.4	Operation results	55
7.2.10	Heal VNF operation.....	55
7.2.10.1	Description	55
7.2.10.2	Input parameters.....	56
7.2.10.3	Output parameters	56
7.2.10.4	Operation results	56
7.2.11	Operate VNF operation.....	56

7.2.11.1	Description	56
7.2.11.2	Input parameters.....	58
7.2.11.3	Output parameters	58
7.2.11.4	Operation results	59
7.2.12	Modify VNF Information operation	59
7.2.12.1	Description	59
7.2.12.2	Input parameters.....	59
7.2.12.3	Output parameters	59
7.2.12.4	Operation results	60
7.2.13	Get Operation Status operation	60
7.2.13.1	Description	60
7.2.13.2	Input parameters.....	60
7.2.13.3	Output parameters	60
7.2.13.4	Operation results	61
7.2.14	Subscribe operation.....	61
7.2.14.1	Description	61
7.2.14.2	Input parameters.....	61
7.2.14.3	Output parameters	61
7.2.14.4	Operation results	61
7.2.15	Notify operation.....	62
7.2.15.1	Description	62
7.2.16	Terminate Subscription operation.....	62
7.2.16.1	Description	62
7.2.16.2	Input parameters.....	62
7.2.16.3	Output parameters	62
7.2.16.4	Operation results	62
7.2.17	Query Subscription Info operation	63
7.2.17.1	Description	63
7.2.17.2	Input parameters.....	63
7.2.17.3	Output parameters	63
7.2.17.4	Operation results	63
7.2.18	Change External VNF Connectivity operation.....	63
7.2.18.1	Description	63
7.2.18.2	Input parameters.....	64
7.2.18.3	Output parameters	64
7.2.18.4	Operation results	64
7.3	Void.....	65
7.4	VNF Performance Management interface	65
7.4.1	Description.....	65
7.4.2	Create PM Job operation.....	65
7.4.2.1	Description	65
7.4.2.2	Input parameters.....	66
7.4.2.3	Output parameters	66
7.4.2.4	Operation results	66
7.4.3	Delete PM Jobs operation	67
7.4.3.1	Description	67
7.4.3.2	Input parameters.....	67
7.4.3.3	Output parameters	67
7.4.3.4	Operation results	67
7.4.4	Subscribe operation.....	67
7.4.4.1	Description	67
7.4.4.2	Input parameters.....	68
7.4.4.3	Output parameters	68
7.4.4.4	Operation results	68
7.4.5	Notify operation.....	68
7.4.5.1	Description	68
7.4.6	Query PM Job operation.....	68
7.4.6.1	Description	68
7.4.6.2	Input parameters.....	69
7.4.6.3	Output parameters	69
7.4.6.4	Operation results	69
7.4.7	Create Threshold operation.....	69

7.4.7.1	Description	69
7.4.7.2	Input parameters.....	69
7.4.7.3	Output parameters	70
7.4.7.4	Operation results	70
7.4.8	Delete Thresholds operation	70
7.4.8.1	Description	70
7.4.8.2	Input parameters.....	70
7.4.8.3	Output parameters	71
7.4.8.4	Operation results	71
7.4.9	Query Threshold operation	71
7.4.9.1	Description	71
7.4.9.2	Input parameters.....	71
7.4.9.3	Output parameters	71
7.4.9.4	Operation results	71
7.4.10	Terminate Subscription operation.....	72
7.4.10.1	Description	72
7.4.10.2	Input parameters.....	72
7.4.10.3	Output parameters	72
7.4.10.4	Operation results	72
7.4.11	Query Subscription Info operation.....	72
7.4.11.1	Description	72
7.4.11.2	Input parameters.....	72
7.4.11.3	Output parameters	73
7.4.11.4	Operation results	73
7.5	VNF Fault Management interface	73
7.5.1	Description.....	73
7.5.2	Subscribe operation.....	73
7.5.2.1	Description	73
7.5.2.2	Input parameters.....	74
7.5.2.3	Output parameters	74
7.5.2.4	Operation results	74
7.5.3	Notify operation.....	74
7.5.3.1	Description	74
7.5.4	Get Alarm List operation.....	75
7.5.4.1	Description	75
7.5.4.2	Input parameters.....	75
7.5.4.3	Output parameters	75
7.5.4.4	Operation results	75
7.5.5	Terminate Subscription operation.....	75
7.5.5.1	Description	75
7.5.5.2	Input parameters.....	76
7.5.5.3	Output parameters	76
7.5.5.4	Operation results	76
7.5.6	Query Subscription Info operation.....	76
7.5.6.1	Description	76
7.5.6.2	Input parameters.....	76
7.5.6.3	Output parameters	76
7.5.6.4	Operation results	77
7.5.7	Acknowledge alarms operation.....	77
7.5.7.1	Description	77
7.5.7.2	Input parameters.....	77
7.5.7.3	Output parameters	77
7.5.7.4	Operation results	77
7.6	Void.....	78
7.7	VNF Indicator interface.....	78
7.7.1	Description.....	78
7.7.2	Subscribe operation.....	78
7.7.2.1	Description	78
7.7.2.2	Input parameters.....	78
7.7.2.3	Output parameters	78
7.7.2.4	Operation results	79
7.7.3	Notify operation.....	79

7.7.3.1	Description	79
7.7.4	Get Indicator Value operation.....	79
7.7.4.1	Description	79
7.7.4.2	Input parameters.....	79
7.7.4.3	Output parameters	79
7.7.4.4	Operation results	80
7.7.5	Terminate Subscription operation.....	80
7.7.5.1	Description	80
7.7.5.2	Input parameters.....	80
7.7.5.3	Output parameters	80
7.7.5.4	Operation results	80
7.7.6	Query Subscription Info operation.....	80
7.7.6.1	Description	80
7.7.6.2	Input parameters.....	81
7.7.6.3	Output parameters	81
7.7.6.4	Operation results	81
8	Information elements exchanged.....	81
8.1	Introduction	81
8.2	Information elements and notifications related to VNF Package Management	82
8.2.1	Introduction.....	82
8.2.2	VnfPkgInfo information element.....	82
8.2.2.1	Description	82
8.2.2.2	Attributes.....	82
8.2.3	Vnfd information element.....	83
8.2.3.1	Description	83
8.2.3.2	Attributes.....	83
8.2.4	VnfPackageOnBoardingNotification	83
8.2.4.1	Description	83
8.2.4.2	Trigger Conditions	83
8.2.4.3	Attributes.....	83
8.2.5	VnfPackageChangeNotification	83
8.2.5.1	Description	83
8.2.5.2	Trigger Conditions	84
8.2.5.3	Attributes.....	84
8.2.6	VnfPackageSoftwareImageInformation information element	84
8.2.6.1	Description	84
8.2.6.2	Attributes.....	84
8.2.7	SoftwareImageInformation information element.....	84
8.2.7.1	Description	84
8.2.7.2	Attributes.....	85
8.2.8	VnfPackageArtifactInformation information element	85
8.2.8.1	Description	85
8.2.8.2	Attributes.....	85
8.2.9	Void	85
8.3	Information elements related to VNF Lifecycle Operation Granting	85
8.3.1	Introduction.....	85
8.3.2	ResourceDefinition information element.....	85
8.3.2.1	Description	85
8.3.2.2	Attributes.....	86
8.3.3	GrantInfo information element	86
8.3.3.1	Description	86
8.3.3.2	Attributes.....	86
8.3.4	ZoneInfo information element	87
8.3.4.1	Description	87
8.3.4.2	Attributes.....	87
8.3.5	ZoneGroupInfo information element	88
8.3.5.1	Description	88
8.3.5.2	Attributes.....	88
8.3.6	PlacementConstraint information element	88
8.3.6.1	Description	88
8.3.6.2	Attributes.....	88

8.3.7	VimConstraint information element	89
8.3.7.1	Description	89
8.3.7.2	Attributes	89
8.3.8	ConstraintResourceRef information element	89
8.3.8.1	Description	89
8.3.8.2	Attributes	90
8.3.9	VimAssets information element	90
8.3.9.1	Description	90
8.3.9.2	Attributes	90
8.3.10	VimComputeResourceFlavour information element	90
8.3.10.1	Description	90
8.3.10.2	Attributes	91
8.3.11	VimSoftwareImage information element	91
8.3.11.1	Description	91
8.3.11.2	Attributes	91
8.4	Information elements and notifications related to Virtualised Resources Management in indirect mode	92
8.4.1	Introduction	92
8.4.2	Information elements related to Virtualised Compute	92
8.4.2.1	Introduction	92
8.4.2.2	ComputeResourceWithRpInfo information element	92
8.4.2.2.1	Description	92
8.4.2.2.2	Attributes	92
8.4.2.3	ComputeResourceWithRpId information element	92
8.4.2.3.1	Description	92
8.4.2.3.2	Attributes	92
8.4.2.4	VirtualComputeResourceWithRpInfo information element	93
8.4.2.4.1	Description	93
8.4.2.4.2	Attributes	93
8.4.3	Information elements related to Virtualised Network	93
8.4.3.1	Introduction	93
8.4.3.2	NetworkResourceWithRpInfo information element	93
8.4.3.2.1	Description	93
8.4.3.2.2	Attributes	93
8.4.3.3	NetworkResourceWithRpId information element	93
8.4.3.3.1	Description	93
8.4.3.3.2	Attributes	94
8.4.3.4	VirtualNetworkResourceWithRpInfo information element	94
8.4.3.4.1	Description	94
8.4.3.4.2	Attributes	94
8.4.4	Information elements related to Virtualised Storage	94
8.4.4.1	Introduction	94
8.4.4.2	StorageResourceWithRpInfo information element	94
8.4.4.2.1	Description	94
8.4.4.2.2	Attributes	94
8.4.4.3	StorageResourceWithRpId information element	95
8.4.4.3.1	Description	95
8.4.4.3.2	Attributes	95
8.4.4.4	VirtualStorageResourceWithRpInfo information element	95
8.4.4.4.1	Description	95
8.4.4.4.2	Attributes	95
8.4.5	Notifications related to changes of virtualised resources	95
8.4.5.1	Introduction	95
8.4.5.2	VirtualisedResourceWithRpChangeNotification	96
8.4.5.2.1	Description	96
8.4.5.2.2	Trigger conditions	96
8.4.5.2.3	Attributes	96
8.4.5.3	InformationWithRpChangeNotification	96
8.4.5.3.1	Description	96
8.4.5.3.2	Trigger conditions	96
8.4.5.3.3	Attributes	96
8.4.6	Notifications related to Virtualised Resource Performance Management	97
8.4.6.1	Introduction	97

8.4.6.2	PerformanceInformationWithRpAvailableNotification	97
8.4.6.2.1	Description	97
8.4.6.2.2	Trigger conditions	97
8.4.6.2.3	Attributes	97
8.4.6.3	ThresholdCrossedWithRpNotification.....	97
8.4.6.3.1	Description	97
8.4.6.3.2	Trigger conditions	97
8.4.6.3.3	Attributes	97
8.4.7	Information elements and notifications related to Virtualised Resource Fault Management	98
8.4.7.1	Introduction.....	98
8.4.7.2	AlarmWithRpInfo information element.....	98
8.4.7.2.1	Description	98
8.4.7.2.2	Attributes	98
8.4.7.3	AlarmWithRpNotification.....	98
8.4.7.3.1	Description	98
8.4.7.3.2	Trigger conditions	98
8.4.7.3.3	Attributes	99
8.4.7.4	AlarmClearedWithRpNotification	99
8.4.7.4.1	Description	99
8.4.7.4.2	Trigger conditions	99
8.4.7.4.3	Attributes	99
8.4.8	Information elements and notifications related to Virtualised Resources Quota	99
8.4.8.1	Introduction.....	99
8.4.8.2	VirtualComputeQuotaWithRpInfo information element.....	100
8.4.8.2.1	Description	100
8.4.8.2.2	Attributes	100
8.4.8.3	VirtualNetworkQuotaWithRpInfo information element	100
8.4.8.3.1	Description	100
8.4.8.3.2	Attributes	100
8.4.8.4	VirtualStorageQuotaWithRpInfo information element.....	100
8.4.8.4.1	Description	100
8.4.8.4.2	Attributes	100
8.4.8.5	VirtualisedResourceQuotaWithRpChangeNotification.....	101
8.4.8.5.1	Description	101
8.4.8.5.2	Trigger conditions	101
8.4.8.5.3	Attributes	101
8.4.9	Information elements and notifications related to Virtualised Resources Reservation.....	101
8.4.9.1	Introduction.....	101
8.4.9.2	ReservedVirtualComputeWithRpInfo information element	101
8.4.9.2.1	Description	101
8.4.9.2.2	Attributes	102
8.4.9.3	ReservedVirtualNetworkWithRpInfo information element	102
8.4.9.3.1	Description	102
8.4.9.3.2	Attributes	102
8.4.9.4	ReservedVirtualStorageWithRpInfo information element.....	102
8.4.9.4.1	Description	102
8.4.9.4.2	Attributes	102
8.4.9.5	VirtualisedResourceReservationWithRpChangeNotification	103
8.4.9.5.1	Description	103
8.4.9.5.2	Trigger conditions	103
8.4.9.5.3	Attributes	103
8.5	Information elements related to VNF Lifecycle Management	103
8.5.1	Introduction.....	103
8.5.2	VnfiInfo information element	103
8.5.2.1	Description	103
8.5.2.2	Attributes.....	103
8.5.3	InstantiatedVnfiInfo information element.....	104
8.5.3.1	Description	104
8.5.3.2	Attributes.....	105
8.5.4	VnfciResourceInfo information element.....	105
8.5.4.1	Description.....	105
8.5.4.2	Attributes.....	106

8.5.5	VnfVirtualLinkResourceInfo information element.....	106
8.5.5.1	Description	106
8.5.5.2	Attributes.....	106
8.5.6	VirtualStorageResourceInfo information element	107
8.5.6.1	Description	107
8.5.6.2	Attributes.....	107
8.5.7	ResourceHandle information element.....	107
8.5.7.1	Description	107
8.5.7.2	Attributes.....	108
8.5.8	ScaleInfo information element.....	108
8.5.8.1	Description	108
8.5.8.2	Attributes.....	108
8.5.9	ExtVirtualLinkInfo information element.....	109
8.5.9.1	Description	109
8.5.9.2	Attributes.....	109
8.5.10	ExtManagedVirtualLinkInfo information element	109
8.5.10.1	Description	109
8.5.10.2	Attributes.....	109
8.5.11	VnfLinkPortInfo information element.....	110
8.5.11.1	Description	110
8.5.11.2	Attributes.....	110
8.5.12	VnfExtCpInfo information element.....	110
8.5.12.1	Description	110
8.5.12.2	Attributes.....	110
8.5.13	ExtLinkPortInfo information element.....	111
8.5.13.1	Description	111
8.5.13.2	Attributes.....	111
8.5.14	VnfcCpInfo information element.....	111
8.5.14.1	Description	111
8.5.14.2	Attributes.....	111
8.5.15	CpProtocolInfo information element.....	112
8.5.15.1	Description	112
8.5.15.2	Attributes.....	112
8.6	Information elements and notifications related to VNF Lifecycle Changes.....	112
8.6.1	Introduction.....	112
8.6.2	VnfLcmOperationOccurrenceNotification	112
8.6.2.1	Description	112
8.6.2.2	Trigger conditions	113
8.6.2.3	Attributes.....	113
8.6.3	AffectedVnfc information element.....	114
8.6.3.1	Description	114
8.6.3.2	Attributes.....	114
8.6.4	AffectedVirtualLink information element	115
8.6.4.1	Description	115
8.6.4.2	Attributes.....	115
8.6.5	AffectedVirtualStorage information element.....	116
8.6.5.1	Description	116
8.6.5.2	Attributes.....	116
8.6.6	Void	117
8.6.7	VnfIdentifierCreationNotification	117
8.6.7.1	Description	117
8.6.7.2	Trigger conditions	117
8.6.7.3	Attributes.....	117
8.6.8	VnfIdentifierDeletionNotification	117
8.6.8.1	Description	117
8.6.8.2	Trigger conditions	118
8.6.8.3	Attributes.....	118
8.7	Information elements and notifications related to VNF Performance Management	118
8.7.1	Introduction.....	118
8.7.2	ObjectSelection information element.....	118
8.7.2.1	Description	118
8.7.2.2	Attributes.....	118

8.7.3	PmJob information element	119
8.7.3.1	Description	119
8.7.3.2	Attributes	119
8.7.4	Threshold information element	120
8.7.4.1	Description	120
8.7.4.2	Attributes	120
8.7.5	PerformanceReport information element	120
8.7.5.1	Description	120
8.7.5.2	Attributes	120
8.7.6	PerformanceReportEntry information element	121
8.7.6.1	Description	121
8.7.6.2	Attributes	121
8.7.7	PerformanceValueEntry information element	121
8.7.7.1	Description	121
8.7.7.2	Attributes	121
8.7.8	PerformanceInformationAvailableNotification	121
8.7.8.1	Description	121
8.7.8.2	Trigger Conditions	121
8.7.8.3	Attributes	121
8.7.9	ThresholdCrossedNotification	122
8.7.9.1	Description	122
8.7.9.2	Trigger Condition	122
8.7.9.3	Attributes	122
8.8	Information elements and notifications related to VNF Fault Management	122
8.8.1	Introduction	122
8.8.2	AlarmNotification	122
8.8.2.1	Description	122
8.8.2.2	Trigger conditions	123
8.8.2.3	Attributes	123
8.8.3	AlarmClearedNotification	123
8.8.3.1	Description	123
8.8.3.2	Trigger conditions	123
8.8.3.3	Attributes	123
8.8.4	Alarm information element	124
8.8.4.1	Description	124
8.8.4.2	Attributes	124
8.8.5	FaultyResourceInfo information element	125
8.8.5.1	Description	125
8.8.5.2	Attributes	125
8.8.6	AlarmListRebuiltNotification	125
8.8.6.1	Description	125
8.8.6.2	Trigger conditions	125
8.8.6.3	Attributes	125
8.9	Void	125
8.10	Information elements and notifications related to VNF Indicators	126
8.10.1	Introduction	126
8.10.2	IndicatorValueChangeNotification	126
8.10.2.1	Description	126
8.10.2.2	Trigger conditions	126
8.10.2.3	Attributes	126
8.10.3	IndicatorInformation information element	126
8.10.3.1	Description	126
8.10.3.2	Attributes	126
8.11	Notifications related to Virtualised Resources Quota	127
8.11.1	Introduction	127
8.11.2	VirtualisedResourceQuotaAvailableNotification	127
8.11.2.1	Description	127
8.11.2.2	Trigger Conditions	127
8.11.2.3	Attributes	127
8.12	Information elements and notifications related to multiple interfaces	127
8.12.1	Introduction	127
8.12.2	ExtVirtualLinkData information element	127

8.12.2.1	Description	127
8.12.2.2	Attributes.....	128
8.12.2a	ExtLinkPortData information element.....	128
8.12.2a.1	Description.....	128
8.12.2a.2	Attributes.....	128
8.12.3	VnfExtCpData information element	128
8.12.3.1	Description.....	128
8.12.3.2	Attributes.....	128
8.12.3a	VnfExtCpConfig information element.....	129
8.12.3a.1	Description.....	129
8.12.3a.2	Attributes.....	129
8.12.4	ExtManagedVirtualLinkData information element	130
8.12.4.1	Description.....	130
8.12.4.2	Attributes.....	130
8.12.5	VimConnectionInfo information element.....	130
8.12.5.1	Description	130
8.12.5.2	Attributes.....	130
Annex A (informative): Examples of VNF connectivity patterns		132
A.1	Introduction	132
A.2	Example of a VNF with two different types of external connections points	132
A.3	Example of changing VNF connectivity	133
Annex B (informative): Authors & contributors.....		134
Annex C (informative): Change History		136
History		146

iTeh STANDARD PREVIEW
Full standard:
<https://standards.iteh.ai/catalog/standards/sis/15902fc-43c2-4fe7-bfea-3d0b5d96d78a/etsi-gs-nf-ifa-007-v25.1-2018-08>
(Standards.iteh.ai)