



## Network Functions Virtualisation (NFV) Release 3; Management and Orchestration; Os-Ma-Nfvo reference point - Interface and 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-IFA013ed311

---

---

**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/CommiteeSupportStaff.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 .....	17
Foreword.....	17
Modal verbs terminology.....	17
1 Scope .....	18
2 References .....	18
2.1 Normative references .....	18
2.2 Informative references.....	18
3 Definitions and abbreviations.....	19
3.1 Definitions .....	19
3.2 Abbreviations .....	19
4 Overview of interfaces and information elements associated to the Os-Ma-nfvo reference point.....	19
4.1 Introduction .....	19
4.2 Relation to other NFV group specifications .....	20
4.3 Conventions.....	20
5 Reference point and interface requirements .....	21
5.1 Introduction .....	21
5.2 Os-Ma-nfvo reference point requirements.....	21
5.3 Interface requirements.....	21
5.3.1 NSD Management interface requirements.....	21
5.3.2 NS Lifecycle Management interface requirements.....	22
5.3.3 Void .....	24
5.3.4 NS Performance Management interface requirements.....	24
5.3.5 NS Fault Management interface requirements.....	25
5.3.6 VNF Package Management interface requirements.....	26
5.3.7 NFVI Capacity Information interface .....	26
5.3.8 Policy Management interface requirements.....	26
5.3.9 VNF Snapshot Package Management interface requirements .....	27
6 OSS exposed interfaces .....	28
7 NFVO exposed interfaces .....	28
7.1 Introduction .....	28
7.2 NSD Management interface .....	28
7.2.1 Description.....	28
7.2.2 Upload NSD operation.....	29
7.2.2.1 Description.....	29
7.2.2.2 Input parameters.....	29
7.2.2.3 Output parameters .....	29
7.2.2.4 Operation results .....	29
7.2.3 Void .....	30
7.2.4 Void .....	30
7.2.5 Update NSD Info operation .....	30
7.2.5.1 Description .....	30
7.2.5.2 Input parameters.....	30
7.2.5.3 Output parameters .....	30
7.2.5.4 Operation results .....	30
7.2.6 Delete NSD operation.....	30
7.2.6.1 Description .....	30
7.2.6.2 Input parameters.....	31
7.2.6.3 Output parameters .....	31
7.2.6.4 Operation results .....	31
7.2.7 Query NSD Info operation.....	31
7.2.7.1 Description .....	31
7.2.7.2 Input parameters.....	32

7.2.7.3	Output parameters .....	32
7.2.7.4	Operation results .....	32
7.2.8	Upload PNFD operation .....	32
7.2.8.1	Description .....	32
7.2.8.2	Input parameters .....	33
7.2.8.3	Output parameters .....	33
7.2.8.4	Operation results .....	33
7.2.9	Update PNFD Info operation .....	33
7.2.9.1	Description .....	33
7.2.9.2	Input parameters .....	33
7.2.9.3	Output parameters .....	33
7.2.9.4	Operation results .....	33
7.2.10	Delete PNFD operation .....	34
7.2.10.1	Description .....	34
7.2.10.2	Input parameters .....	34
7.2.10.3	Output parameters .....	34
7.2.10.4	Operation results .....	34
7.2.11	Query PNFD Info operation .....	34
7.2.11.1	Description .....	34
7.2.11.2	Input parameters .....	35
7.2.11.3	Output parameters .....	35
7.2.11.4	Operation results .....	35
7.2.12	Subscribe operation .....	35
7.2.12.1	Description .....	35
7.2.12.2	Input parameters .....	36
7.2.12.3	Output parameters .....	36
7.2.12.4	Operation results .....	36
7.2.13	Notify operation .....	36
7.2.13.1	Description .....	36
7.2.14	Terminate Subscription operation .....	37
7.2.14.1	Description .....	37
7.2.14.2	Input parameters .....	37
7.2.14.3	Output parameters .....	37
7.2.14.4	Operation results .....	37
7.2.15	Query Subscription Info operation .....	37
7.2.15.1	Description .....	37
7.2.15.2	Input parameters .....	37
7.2.15.3	Output parameters .....	38
7.2.15.4	Operation results .....	38
7.2.16	Create NSD Info operation .....	38
7.2.16.1	Description .....	38
7.2.16.2	Input parameters .....	38
7.2.16.3	Output parameters .....	38
7.2.16.4	Operation results .....	39
7.2.17	Fetch NSD operation .....	39
7.2.17.1	Description .....	39
7.2.17.2	Input parameters .....	39
7.2.17.3	Output parameters .....	39
7.2.17.4	Operation results .....	39
7.2.18	Create PNFD Info operation .....	39
7.2.18.1	Description .....	39
7.2.18.2	Input parameters .....	40
7.2.18.3	Output parameters .....	40
7.2.18.4	Operation results .....	40
7.2.19	Fetch PNFD operation .....	40
7.2.19.1	Description .....	40
7.2.19.2	Input parameters .....	40
7.2.19.3	Output parameters .....	41
7.2.19.4	Operation results .....	41
7.3	NS Lifecycle Management interface .....	41
7.3.1	Description .....	41
7.3.2	Create NS Identifier operation .....	41

7.3.2.1	Description .....	41
7.3.2.2	Input parameters .....	42
7.3.2.3	Output parameters .....	42
7.3.2.4	Operation results .....	42
7.3.3	Instantiate NS operation.....	42
7.3.3.1	Description .....	42
7.3.3.2	Input parameters .....	43
7.3.3.3	Output parameters .....	44
7.3.3.4	Operation results .....	44
7.3.4	Scale NS operation.....	45
7.3.4.1	Description .....	45
7.3.4.2	Input parameters .....	45
7.3.4.3	Output parameters .....	45
7.3.4.4	Operation results .....	46
7.3.5	Update NS operation.....	46
7.3.5.1	Introduction .....	46
7.3.5.2	Input parameters .....	47
7.3.5.3	Output parameters .....	50
7.3.5.4	Operation results .....	50
7.3.6	Query NS operation .....	51
7.3.6.1	Description .....	51
7.3.6.2	Input parameters .....	51
7.3.6.3	Output parameters .....	51
7.3.6.4	Operation results .....	52
7.3.7	Terminate NS operation.....	52
7.3.7.1	Description .....	52
7.3.7.2	Input parameters .....	52
7.3.7.3	Output parameters .....	52
7.3.7.4	Operation results .....	53
7.3.8	Delete NS Identifier operation.....	53
7.3.8.1	Description .....	53
7.3.8.2	Input parameters .....	53
7.3.8.3	Output parameters .....	53
7.3.8.4	Operation results .....	53
7.3.9	Heal NS operation.....	54
7.3.9.1	Description .....	54
7.3.9.2	Input parameters .....	54
7.3.9.3	Output parameters .....	54
7.3.9.4	Operation results .....	54
7.3.10	Get Operation Status operation.....	55
7.3.10.1	Description .....	55
7.3.10.2	Input parameters .....	55
7.3.10.3	Output Parameters .....	55
7.3.10.4	Operation results .....	55
7.3.11	Subscribe operation.....	55
7.3.11.1	Description .....	55
7.3.11.2	Input parameters .....	56
7.3.11.3	Output parameters .....	56
7.3.11.4	Operation results .....	56
7.3.12	Notify operation.....	56
7.3.12.1	Description .....	56
7.3.13	Terminate Subscription operation.....	57
7.3.13.1	Description .....	57
7.3.13.2	Input parameters .....	57
7.3.13.3	Output parameters .....	57
7.3.13.4	Operation results .....	57
7.3.14	Query Subscription Info operation.....	57
7.3.14.1	Description .....	57
7.3.14.2	Input parameters .....	57
7.3.14.3	Output parameters .....	58
7.3.14.4	Operation results .....	58
7.4	Void.....	58

7.5	NS Performance Management interface.....	58
7.5.1	Description.....	58
7.5.2	Create PM Job operation.....	59
7.5.2.1	Description.....	59
7.5.2.2	Input parameters.....	59
7.5.2.3	Output parameters.....	60
7.5.2.4	Operation results.....	60
7.5.3	Delete PM Jobs operation.....	60
7.5.3.1	Description.....	60
7.5.3.2	Input parameters.....	60
7.5.3.3	Output parameters.....	60
7.5.3.4	Operation results.....	60
7.5.4	Subscribe operation.....	61
7.5.4.1	Description.....	61
7.5.4.2	Input parameters.....	61
7.5.4.3	Output parameters.....	61
7.5.4.4	Operation results.....	61
7.5.5	Notify operation.....	61
7.5.5.1	Description.....	61
7.5.6	Query PM Job operation.....	62
7.5.6.1	Description.....	62
7.5.6.2	Input parameters.....	62
7.5.6.3	Output parameters.....	62
7.5.6.4	Operation results.....	62
7.5.7	Create Threshold operation.....	62
7.5.7.1	Description.....	62
7.5.7.2	Input parameters.....	63
7.5.7.3	Output parameters.....	63
7.5.7.4	Operation results.....	63
7.5.8	Delete Thresholds operation.....	63
7.5.8.1	Description.....	63
7.5.8.2	Input parameters.....	64
7.5.8.3	Output parameters.....	64
7.5.8.4	Operation results.....	64
7.5.9	Query Threshold operation.....	64
7.5.9.1	Description.....	64
7.5.9.2	Input parameters.....	64
7.5.9.3	Output parameters.....	64
7.5.9.4	Operation results.....	65
7.6	NS Fault Management interface.....	65
7.6.1	Description.....	65
7.6.2	Subscribe operation.....	65
7.6.2.1	Description.....	65
7.6.2.2	Input parameters.....	65
7.6.2.3	Output parameters.....	65
7.6.2.4	Operation results.....	66
7.6.3	Notify operation.....	66
7.6.3.1	Description.....	66
7.6.4	Get Alarm List operation.....	66
7.6.4.1	Description.....	66
7.6.4.2	Input parameters.....	66
7.6.4.3	Output parameters.....	67
7.6.4.4	Operation results.....	67
7.6.5	Terminate Subscription operation.....	67
7.6.5.1	Description.....	67
7.6.5.2	Input parameters.....	67
7.6.5.3	Output parameters.....	67
7.6.5.4	Operation results.....	67
7.6.6	Query Subscription Info operation.....	68
7.6.6.1	Description.....	68
7.6.6.2	Input parameters.....	68
7.6.6.3	Output parameters.....	68

7.6.6.4	Operation results .....	68
7.6.7	Acknowledge Alarms operation .....	68
7.6.7.1	Description .....	68
7.6.7.2	Input parameters .....	69
7.6.7.3	Output parameters .....	69
7.6.7.4	Operation results .....	69
7.7	VNF Package management interface .....	69
7.7.1	Description .....	69
7.7.2	Upload VNF Package operation .....	70
7.7.2.1	Description .....	70
7.7.2.2	Input parameters .....	70
7.7.2.3	Output parameters .....	70
7.7.2.4	Operation results .....	70
7.7.3	Void .....	71
7.7.4	Void .....	71
7.7.5	Delete VNF Package operation .....	71
7.7.5.1	Description .....	71
7.7.5.2	Input parameters .....	71
7.7.5.3	Output parameters .....	71
7.7.5.4	Operation results .....	71
7.7.6	Query VNF Package Info operation .....	71
7.7.6.1	Description .....	71
7.7.6.2	Input parameters .....	72
7.7.6.3	Output parameters .....	72
7.7.6.4	Operation results .....	72
7.7.7	Subscribe operation .....	72
7.7.7.1	Description .....	72
7.7.7.2	Input parameters .....	73
7.7.7.3	Output parameters .....	73
7.7.7.4	Operation results .....	73
7.7.8	Notify operation .....	73
7.7.8.1	Description .....	73
7.7.9	Void .....	73
7.7.10	Fetch VNF Package operation .....	74
7.7.10.1	Description .....	74
7.7.10.2	Input parameters .....	74
7.7.10.3	Output parameters .....	74
7.7.10.4	Operation results .....	74
7.7.11	Fetch VNF Package Artifacts operation .....	74
7.7.11.1	Description .....	74
7.7.11.2	Input parameters .....	75
7.7.11.3	Output parameters .....	75
7.7.11.4	Operation results .....	75
7.7.12	Void .....	75
7.7.13	Terminate Subscription operation .....	75
7.7.13.1	Description .....	75
7.7.13.2	Input parameters .....	75
7.7.13.3	Output parameters .....	76
7.7.13.4	Operation results .....	76
7.7.14	Query Subscription Info operation .....	76
7.7.14.1	Description .....	76
7.7.14.2	Input parameters .....	76
7.7.14.3	Output parameters .....	76
7.7.14.4	Operation results .....	76
7.7.15	Create VNF Package Info operation .....	77
7.7.15.1	Description .....	77
7.7.15.2	Input parameters .....	77
7.7.15.3	Output parameters .....	77
7.7.15.4	Operation results .....	77
7.7.16	Update VNF Package Info operation .....	77
7.7.16.1	Description .....	77
7.7.16.2	Input parameters .....	78

7.7.16.3	Output parameters .....	78
7.7.16.4	Operation results .....	78
7.8	NFVI Capacity Information interface.....	78
7.8.1	Description.....	78
7.8.2	Query NFVI capacity operation.....	78
7.8.2.1	Description .....	78
7.8.2.2	Input parameters.....	79
7.8.2.3	Output parameters .....	79
7.8.2.4	Operation results .....	79
7.8.3	Subscribe operation.....	79
7.8.3.1	Description .....	79
7.8.3.2	Input parameters.....	80
7.8.3.3	Output parameters .....	80
7.8.3.4	Operation results .....	80
7.8.4	Terminate Subscription operation.....	80
7.8.4.1	Description .....	80
7.8.4.2	Input parameters.....	80
7.8.4.3	Output parameters .....	81
7.8.4.4	Operation results .....	81
7.8.5	Query Subscription Info operation.....	81
7.8.5.1	Description .....	81
7.8.5.2	Input parameters.....	81
7.8.5.3	Output parameters .....	81
7.8.5.4	Operation results .....	82
7.8.6	Notify operation.....	82
7.8.6.1	Description .....	82
7.9	Policy Management interface .....	82
7.9.1	Description.....	82
7.9.2	Transfer Policy operation.....	82
7.9.2.1	Description .....	82
7.9.2.2	Input parameters.....	83
7.9.2.3	Output parameters .....	83
7.9.2.4	Operation results .....	83
7.9.3	Delete Policy operation.....	83
7.9.3.1	Description .....	83
7.9.3.2	Input parameters.....	83
7.9.3.3	Output parameters .....	84
7.9.3.4	Operation results .....	84
7.9.4	Query Policy operation .....	84
7.9.4.1	Description.....	84
7.9.4.2	Input parameters.....	84
7.9.4.3	Output parameters .....	85
7.9.4.4	Operation results .....	85
7.9.5	Activate Policy operation.....	85
7.9.5.1	Description .....	85
7.9.5.2	Input parameters.....	85
7.9.5.3	Output parameters .....	85
7.9.5.4	Operation results .....	86
7.9.6	Deactivate Policy operation .....	86
7.9.6.1	Description .....	86
7.9.6.2	Input parameters.....	86
7.9.6.3	Output parameters .....	86
7.9.6.4	Operation results .....	86
7.9.7	Subscribe operation.....	86
7.9.7.1	Description .....	86
7.9.7.2	Input parameters.....	87
7.9.7.3	Output parameters .....	87
7.9.7.4	Operation results .....	87
7.9.8	Notify operation.....	87
7.9.8.1	Description .....	87
7.9.9	Terminate Subscription operation.....	88
7.9.9.1	Description.....	88

7.9.9.2	Input parameters .....	88
7.9.9.3	Output parameters .....	88
7.9.9.4	Operation results .....	88
7.9.10	Query Subscription Info operation.....	88
7.9.10.1	Description .....	88
7.9.10.2	Input parameters.....	88
7.9.10.3	Output parameters .....	89
7.9.10.4	Operation results .....	89
7.10	VNF Snapshot Package Management interface .....	89
7.10.1	Description.....	89
7.10.2	Create VNF Snapshot Package Info operation.....	89
7.10.2.1	Description .....	89
7.10.2.2	Input parameters.....	89
7.10.2.3	Output parameters .....	90
7.10.2.4	Operation results .....	90
7.10.3	Build VNF Snapshot Package operation.....	90
7.10.3.1	Description .....	90
7.10.3.2	Input parameters.....	90
7.10.3.3	Output parameters .....	91
7.10.3.4	Operation results .....	91
7.10.4	Upload VNF Snapshot Package operation.....	91
7.10.4.1	Description .....	91
7.10.4.2	Input parameters.....	91
7.10.4.3	Output parameters .....	92
7.10.4.4	Operation results .....	92
7.10.5	Extract VNF Snapshot Package operation .....	92
7.10.5.1	Description .....	92
7.10.5.2	Input parameters.....	93
7.10.5.3	Output parameters .....	93
7.10.5.4	Operation results .....	93
7.10.6	Fetch VNF Snapshot Package operation.....	93
7.10.6.1	Description .....	93
7.10.6.2	Input parameters.....	93
7.10.6.3	Output parameters .....	94
7.10.6.4	Operation results .....	94
7.10.7	Fetch VNF Snapshot Package Artifacts operation.....	94
7.10.7.1	Description .....	94
7.10.7.2	Input parameters.....	94
7.10.7.3	Output parameters .....	94
7.10.7.4	Operation results .....	95
7.10.8	Query VNF Snapshot Package Information operation.....	95
7.10.8.1	Description .....	95
7.10.8.2	Input parameters.....	95
7.10.8.3	Output parameters .....	96
7.10.8.4	Operation results .....	96
7.10.9	Delete VNF Snapshot Package operation .....	96
7.10.9.1	Description .....	96
7.10.9.2	Input parameters.....	96
7.10.9.3	Output parameters .....	96
7.10.9.4	Operation results .....	96
8	Information elements exchanged.....	97
8.1	Introduction .....	97
8.2	Information elements related to NSD Management .....	97
8.2.1	Introduction.....	97
8.2.2	NsdInfo information element .....	97
8.2.2.1	Description .....	97
8.2.2.2	Attributes.....	97
8.2.3	Pnfd information element .....	98
8.2.3.1	Description .....	98
8.2.3.2	Attributes.....	98
8.2.4	PnfdInfo information element.....	98

8.2.4.1	Description .....	98
8.2.4.2	Attributes .....	99
8.2.5	Nsd information element .....	99
8.2.5.1	Description .....	99
8.2.5.2	Attributes .....	99
8.2.6	NsdOnBoardingNotification .....	99
8.2.6.1	Description .....	99
8.2.6.2	Trigger Conditions .....	99
8.2.6.3	Attributes .....	100
8.2.7	NsdChangeNotification .....	100
8.2.7.1	Description .....	100
8.2.7.2	Trigger Conditions .....	100
8.2.7.3	Attributes .....	100
8.2.8	NsdDeletionNotification .....	100
8.2.8.1	Description .....	100
8.2.8.2	Trigger Conditions .....	100
8.2.8.3	Attributes .....	101
8.2.9	PnfdOnBoardingNotification .....	101
8.2.9.1	Description .....	101
8.2.9.2	Trigger Conditions .....	101
8.2.9.3	Attributes .....	101
8.2.10	PnfdDeletionNotification .....	101
8.2.10.1	Description .....	101
8.2.10.2	Trigger Conditions .....	101
8.2.10.3	Attributes .....	102
8.3	Information elements and notifications related to NS Lifecycle Management .....	102
8.3.1	Introduction .....	102
8.3.2	Information elements and notifications related to NS Lifecycle Changes .....	102
8.3.2.1	Introduction .....	102
8.3.2.2	NsLcmOperationOccurrenceNotification .....	102
8.3.2.2.1	Description .....	102
8.3.2.2.2	Trigger conditions .....	102
8.3.2.2.3	Attributes .....	103
8.3.2.3	AffectedVnf information element .....	104
8.3.2.3.1	Description .....	104
8.3.2.3.2	Attributes .....	104
8.3.2.4	AffectedPnf information element .....	104
8.3.2.4.1	Description .....	104
8.3.2.4.2	Attributes .....	105
8.3.2.5	AffectedVirtualLink information element .....	105
8.3.2.5.1	Description .....	105
8.3.2.5.2	Attributes .....	105
8.3.2.6	AffectedVnffg information element .....	105
8.3.2.6.1	Description .....	105
8.3.2.6.2	Attributes .....	105
8.3.2.7	AffectedNs information element .....	106
8.3.2.7.1	Description .....	106
8.3.2.7.2	Attributes .....	106
8.3.2.8	AffectedSap information element .....	106
8.3.2.8.1	Description .....	106
8.3.2.8.2	Attributes .....	106
8.3.2.9	NsIdentifierCreationNotification .....	107
8.3.2.9.1	Description .....	107
8.3.2.9.2	Trigger conditions .....	107
8.3.2.9.3	Attributes .....	107
8.3.2.10	NsIdentifierDeletionNotification .....	107
8.3.2.10.1	Description .....	107
8.3.2.10.2	Trigger conditions .....	107
8.3.2.10.3	Attributes .....	107
8.3.2.11	NsChangeNotification .....	108
8.3.2.11.1	Description .....	108
8.3.2.11.2	Trigger conditions .....	108

8.3.2.11.3	Attributes .....	108
8.3.3	Information elements related to NsInfo .....	109
8.3.3.1	Introduction .....	109
8.3.3.2	NsInfo information element .....	109
8.3.3.2.1	Description .....	109
8.3.3.2.2	Attributes .....	109
8.3.3.3	VnfInfo information element .....	110
8.3.3.3.1	Description .....	110
8.3.3.3.2	Attributes .....	110
8.3.3.4	InstantiatedVnfInfo information element .....	111
8.3.3.4.1	Description .....	111
8.3.3.4.2	Attributes .....	112
8.3.3.5	VnfcResourceInfo information element .....	113
8.3.3.5.1	Description .....	113
8.3.3.5.2	Attributes .....	113
8.3.3.6	VnfVirtualLinkResourceInfo information element .....	113
8.3.3.6.1	Description .....	113
8.3.3.6.2	Attributes .....	113
8.3.3.7	VirtualStorageResourceInfo information element .....	114
8.3.3.7.1	Description .....	114
8.3.3.7.2	Attributes .....	114
8.3.3.8	ResourceHandle information element .....	114
8.3.3.8.1	Description .....	114
8.3.3.8.2	Attributes .....	114
8.3.3.9	PnfInfo information element .....	115
8.3.3.9.1	Description .....	115
8.3.3.9.2	Attributes .....	115
8.3.3.10	NsVirtualLinkInfo information element .....	115
8.3.3.10.1	Description .....	115
8.3.3.10.2	Attributes .....	115
8.3.3.11	NsLinkPortInfo information element .....	116
8.3.3.11.1	Description .....	116
8.3.3.11.2	Attributes .....	116
8.3.3.12	SapInfo information element .....	116
8.3.3.12.1	Description .....	116
8.3.3.12.2	Attributes .....	116
8.3.3.13	VnffgInfo information element .....	117
8.3.3.13.1	Description .....	117
8.3.3.13.2	Attributes .....	117
8.3.3.14	PnfExtCpInfo information element .....	117
8.3.3.14.1	Description .....	117
8.3.3.14.2	Attributes .....	117
8.3.3.15	NfpInfo information element .....	118
8.3.3.15.1	Description .....	118
8.3.3.15.2	Attributes .....	118
8.3.3.16	NsScaleInfo information element .....	118
8.3.3.16.1	Description .....	118
8.3.3.16.2	Attributes .....	118
8.3.3.17	VnfExtCpInfo information element .....	119
8.3.3.17.1	Description .....	119
8.3.3.17.2	Attributes .....	119
8.3.3.18	ExtVirtualLinkInfo information element .....	119
8.3.3.18.1	Description .....	119
8.3.3.18.2	Attributes .....	119
8.3.3.19	ExtManagedVirtualLinkInfo information element .....	120
8.3.3.19.1	Description .....	120
8.3.3.19.2	Attributes .....	120
8.3.3.20	VnfLinkPortInfo information element .....	120
8.3.3.20.1	Description .....	120
8.3.3.20.2	Attributes .....	120
8.3.3.21	ScaleInfo information element .....	121
8.3.3.21.1	Description .....	121

8.3.3.21.2	Attributes .....	121
8.3.3.22	ExtLinkPortInfo information element .....	121
8.3.3.22.1	Description .....	121
8.3.3.22.2	Attributes .....	122
8.3.3.23	VnfcCpInfo information element .....	122
8.3.3.23.1	Description .....	122
8.3.3.23.2	Attributes .....	122
8.3.3.24	CpProtocolInfo information element .....	122
8.3.3.24.1	Description .....	122
8.3.3.24.2	Attributes .....	122
8.3.3.25	CpGroupInfo information element .....	123
8.3.3.25.1	Description .....	123
8.3.3.25.2	Attributes .....	123
8.3.3.26	CpPairInfo information element .....	124
8.3.3.26.1	Description .....	124
8.3.3.26.2	Attributes .....	124
8.3.3.27	VnfSnapshotInfo information element .....	124
8.3.3.27.1	Description .....	124
8.3.3.27.2	Attributes .....	124
8.3.3.28	VnfcSnapshotInfo information element .....	124
8.3.3.28.1	Description .....	124
8.3.3.28.2	Attributes .....	124
8.3.4	Information elements related to NS Lifecycle Management operations .....	125
8.3.4.1	Introduction .....	125
8.3.4.2	SapData information element .....	125
8.3.4.2.1	Description .....	125
8.3.4.2.2	Attributes .....	125
8.3.4.3	VnfInstanceData information element .....	125
8.3.4.3.1	Description .....	125
8.3.4.3.2	Attributes .....	126
8.3.4.4	VnfLocationConstraint information element .....	126
8.3.4.4.1	Description .....	126
8.3.4.4.2	Attributes .....	126
8.3.4.5	ParamsForVnf information element .....	126
8.3.4.5.1	Description .....	126
8.3.4.5.2	Attributes .....	126
8.3.4.6	ScaleNsData information element .....	127
8.3.4.6.1	Description .....	127
8.3.4.6.2	Attributes .....	127
8.3.4.7	ScaleNsByStepsData information element .....	128
8.3.4.7.1	Description .....	128
8.3.4.7.2	Attributes .....	128
8.3.4.8	ScaleNsToLevelData information element .....	128
8.3.4.8.1	Description .....	128
8.3.4.8.2	Attributes .....	128
8.3.4.9	ScaleVnfData information element .....	128
8.3.4.9.1	Description .....	128
8.3.4.9.2	Attributes .....	129
8.3.4.10	ScaleToLevelData information element .....	129
8.3.4.10.1	Description .....	129
8.3.4.10.2	Attributes .....	130
8.3.4.11	ScaleByStepData information element .....	130
8.3.4.11.1	Description .....	130
8.3.4.11.2	Attributes .....	130
8.3.4.12	InstantiateVnfData information element .....	131
8.3.4.12.1	Description .....	131
8.3.4.12.2	Attributes .....	131
8.3.4.13	ExtVirtualLinkData information element .....	132
8.3.4.13.1	Description .....	132
8.3.4.13.2	Attributes .....	132
8.3.4.14	VnfExtCpData information element .....	132
8.3.4.14.1	Description .....	132

8.3.4.14.2	Attributes .....	132
8.3.4.15	ChangeVnfFlavourData information element .....	133
8.3.4.15.1	Description .....	133
8.3.4.15.2	Attributes .....	133
8.3.4.16	OperateVnfData information element .....	133
8.3.4.16.1	Description .....	133
8.3.4.16.2	Attributes .....	134
8.3.4.17	ModifyVnfInfoData information element .....	134
8.3.4.17.1	Description .....	134
8.3.4.17.2	Attributes .....	135
8.3.4.18	Void.....	135
8.3.4.19	AssocNewNsdVersionData information element.....	135
8.3.4.19.1	Description .....	135
8.3.4.19.2	Attributes .....	135
8.3.4.20	MoveVnfInstanceData information element .....	136
8.3.4.20.1	Description .....	136
8.3.4.20.2	Attributes .....	136
8.3.4.21	AddVnffgData information element .....	136
8.3.4.21.1	Description .....	136
8.3.4.21.2	Attributes .....	136
8.3.4.22	UpdateVnffgData information element.....	136
8.3.4.22.1	Description .....	136
8.3.4.22.2	Attributes .....	136
8.3.4.23	NfpData information element.....	137
8.3.4.23.1	Description .....	137
8.3.4.23.2	Attributes .....	137
8.3.4.24	HealNsData information element.....	137
8.3.4.24.1	Description .....	137
8.3.4.24.2	Attributes .....	137
8.3.4.25	HealVnfData information element .....	138
8.3.4.25.1	Description .....	138
8.3.4.25.2	Attributes .....	138
8.3.4.26	AffinityOrAntiAffinityRule information element.....	139
8.3.4.26.1	Description .....	139
8.3.4.26.2	Attributes .....	139
8.3.4.27	ChangeNsFlavourData information element.....	139
8.3.4.27.1	Description .....	139
8.3.4.27.2	Attributes .....	139
8.3.4.28	ExtManagedVirtualLinkData information element.....	140
8.3.4.28.1	Description .....	140
8.3.4.28.2	Attributes .....	140
8.3.4.29	ChangeExtVnfConnectivityData information element .....	140
8.3.4.29.1	Description .....	140
8.3.4.29.2	Attributes .....	140
8.3.4.30	NfpRule Information element .....	141
8.3.4.30.1	Description .....	141
8.3.4.30.2	Attributes .....	141
8.3.4.31	PortRange Information element .....	141
8.3.4.31.1	Description .....	141
8.3.4.31.2	Attributes .....	142
8.3.4.32	AddPnfData information element .....	142
8.3.4.32.1	Description .....	142
8.3.4.32.2	Attributes .....	142
8.3.4.33	ModifyPnfData information element .....	142
8.3.4.33.1	Description .....	142
8.3.4.33.2	Attributes .....	142
8.3.4.34	PnfExtCpData information element .....	143
8.3.4.34.1	Description .....	143
8.3.4.34.2	Attributes .....	143
8.3.4.35	ExtLinkPortData information element .....	143
8.3.4.35.1	Description .....	143
8.3.4.35.2	Attributes .....	143