



**oneM2M;  
Service Layer Core Protocol Specification  
(oneM2M TS-0004 version 2.7.1 Release 2)**



---

Reference

RTS/oneM2M-000004v200

---

Keywords

IoT, M2M, protocol

***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.

© European Telecommunications Standards Institute 2016.  
 All rights reserved.

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

**GSM®** and the GSM logo are Trade Marks registered and owned by the GSM Association.

# Contents

Intellectual Property Rights .....	18
Foreword.....	18
1    Scope .....	19
2    References .....	19
2.1    Normative references .....	19
2.2    Informative references.....	21
3    Definitions and abbreviations.....	21
3.1    Definitions.....	21
3.2    Abbreviations .....	22
4    Conventions.....	23
5    Protocol design principles and requirements.....	23
5.1    General introduction.....	23
5.2    Introduction .....	23
5.2.0    Overview .....	23
5.2.1    Interfaces to the underlying networks.....	24
5.3    API design guidelines.....	24
5.4    Primitives .....	25
5.4.1    Introduction.....	25
5.4.2    Primitives modelling.....	26
5.4.3    Primitive principles.....	27
5.4.4    Serialization of primitives.....	27
5.5    Design principles.....	27
5.5.1    Introduction.....	27
5.5.2    Extensibility.....	27
5.5.3    Scalability .....	27
5.5.4    Fault tolerance and robustness .....	28
5.5.5    Efficiency.....	28
5.5.6    Inter-operability .....	28
5.5.7    Self-operation and self-management.....	28
6    oneM2M protocols/API overview.....	28
6.1    Introduction .....	28
6.2    Addressing.....	30
6.2.1    Introduction.....	30
6.2.2    Summary of oneM2M Identifiers .....	30
6.2.3    oneM2M Entity Addressing.....	30
6.2.4    oneM2M Resource Addressing.....	31
6.3    Common data types .....	32
6.3.1    Introduction.....	32
6.3.2    Simple data types incorporated from XML schema .....	32
6.3.3    oneM2M simple data types.....	34
6.3.4    oneM2M enumerated data types .....	38
6.3.4.1    Introduction.....	38
6.3.4.2    Enumeration type definitions .....	40
6.3.4.2.1    m2m:resourceType .....	40
6.3.4.2.2    m2m:cseTypeID .....	40
6.3.4.2.3    m2m:locationSource.....	41
6.3.4.2.4    m2m:stdEventCats.....	41
6.3.4.2.5    m2m:operation.....	41
6.3.4.2.6    m2m:responseType.....	41
6.3.4.2.7    m2m:resultContent .....	42
6.3.4.2.8    m2m:discResType .....	42
6.3.4.2.9    m2m:responseStatusCode.....	42
6.3.4.2.10    m2m:requestStatus .....	42
6.3.4.2.11    m2m:memberType .....	42

6.3.4.2.12	m2m:consistencyStrategy .....	43
6.3.4.2.13	m2m:cmdType .....	44
6.3.4.2.14	m2m:execModeType .....	44
6.3.4.2.15	m2m:execStatusType .....	44
6.3.4.2.16	m2m:execResultType .....	44
6.3.4.2.17	m2m:pendingNotification .....	45
6.3.4.2.18	m2m:notificationContentType .....	45
6.3.4.2.19	m2m:notificationEventType .....	45
6.3.4.2.20	m2m:status .....	46
6.3.4.2.21	m2m:batteryStatus .....	46
6.3.4.2.22	m2m:mgmtDefinition .....	46
6.3.4.2.23	m2m:logTypeId .....	47
6.3.4.2.24	m2m:logStatus .....	47
6.3.4.2.25	m2m:eventType .....	47
6.3.4.2.26	m2m:statsRuleStatusType .....	48
6.3.4.2.27	m2m:statModelType .....	48
6.3.4.2.28	m2m:encodingType .....	48
6.3.4.2.29	m2m:accessControlOperations .....	48
6.3.4.2.30	Void .....	49
6.3.4.2.31	m2m:filterUsage .....	49
6.3.4.2.32	m2m:notificationTargetPolicyAction .....	49
6.3.4.2.33	m2m:logicalOperator .....	49
6.3.4.2.34	m2m:filterOperation .....	49
6.3.4.2.35	m2m:securityInfoType .....	49
6.3.4.2.36	m2m:allJoynDirection .....	50
6.3.4.2.37	m2m:contentFilterSyntax .....	50
6.3.4.2.38	m2m:contentSecurity .....	50
6.3.4.2.39	m2m:suid .....	51
6.3.4.2.40	m2m:esprimKeyGenAlgID .....	51
6.3.4.2.41	m2m:esprimProtocolAndAlgID .....	52
6.3.4.2.42	m2m:periodicIndicator .....	52
6.3.4.2.43	m2m:stationaryIndication .....	52
6.3.4.2.44	m2m:contentStatus .....	52
6.3.4.2.45	m2m:networkAction .....	52
6.3.5	Complex data types .....	53
6.3.5.1	Introduction .....	53
6.3.5.2	m2m:deliveryMetaData .....	53
6.3.5.3	m2m:aggregatedRequest .....	53
6.3.5.4	m2m:metaInformation .....	53
6.3.5.5	m2m:primitiveContent .....	54
6.3.5.6	m2m:batchNotify .....	54
6.3.5.7	m2m:eventNotificationCriteria .....	54
6.3.5.8	m2m:filterCriteria .....	55
6.3.5.9	m2m:attribute .....	55
6.3.5.10	Void .....	55
6.3.5.11	m2m:scheduleEntries .....	55
6.3.5.12	m2m:aggregatedNotification .....	55
6.3.5.13	m2m:notification .....	56
6.3.5.14	m2m:actionStatus .....	56
6.3.5.15	m2m:anyArgType .....	57
6.3.5.16	m2m:resetArgsType .....	57
6.3.5.17	m2m:rebootArgsType .....	57
6.3.5.18	m2m:uploadArgsTypes .....	57
6.3.5.19	m2m:downloadArgsType .....	57
6.3.5.20	m2m:softwareInstallArgsType .....	58
6.3.5.21	m2m:softwareUpdateArgsType .....	58
6.3.5.22	m2m:softwareUninstallArgsType .....	58
6.3.5.23	m2m:execReqArgsListType .....	58
6.3.5.24	m2m:mgmtLinkRef .....	59
6.3.5.25	m2m:resourceWrapper .....	59
6.3.5.26	m2m:setOfAcrs .....	59
6.3.5.27	m2m:accessControlRule .....	60

6.3.5.28	m2m:locationRegion .....	60
6.3.5.29	m2m:childResourceRef .....	61
6.3.5.30	m2m:responseTypeInfo .....	61
6.3.5.31	m2m:rateLimit .....	61
6.3.5.32	m2m:operationResult .....	61
6.3.5.33	m2m:aggregatedResponse .....	62
6.3.5.34	m2m:mgmtResource .....	62
6.3.5.35	m2m:announcedMgmtResource .....	63
6.3.5.36	m2m:contentRef .....	63
6.3.5.37	m2m:deletionContexts .....	63
6.3.5.38	m2m:flexContainerResource .....	64
6.3.5.39	m2m:announcedFlexContainerResource .....	64
6.3.5.40	m2m:missingData .....	64
6.3.5.41	m2m:tokenPermission .....	65
6.3.5.42	m2m:tokenClaimSet .....	65
6.3.5.43	m2m:dynAuthLocalTokenIdAssignments .....	65
6.3.5.44	m2m:dynAuthTokenSummary .....	65
6.3.5.45	m2m:dynAuthTokenReqInfo .....	66
6.3.5.46	m2m:dynAuthDasRequest .....	66
6.3.5.47	m2m:dynAuthDasResponse .....	66
6.3.5.48	m2m:securityInfo .....	67
6.3.5.49	m2m:listOfChildResourceRef .....	67
6.3.5.50	m2m:originatorESPrimRandObject .....	67
6.3.5.51	m2m:receiverESPrimRandObject .....	67
6.3.5.52	m2m:e2eSecInfo .....	68
6.3.5.53	m2m:tokenPermissions .....	68
6.3.5.54	m2m:backOffParameters .....	68
6.3.5.55	m2m:listOfDataLinks .....	68
6.3.5.56	m2m:dataLink .....	69
6.3.6	Universal and Common attributes .....	69
6.4	Message parameter data types .....	72
6.4.1	Request primitive parameter data types .....	72
6.4.2	Response primitive parameter data types .....	73
6.5	Resource data types .....	74
6.5.1	Description .....	74
6.5.2	resource .....	75
6.5.2.1	Description .....	75
6.5.2.2	Reference .....	75
6.5.2.3	Usage .....	75
6.5.3	regularResource .....	75
6.5.3.1	Description .....	75
6.5.3.2	Reference .....	75
6.5.3.3	Usage .....	76
6.5.4	announceableResource .....	76
6.5.4.1	Description .....	76
6.5.4.2	Reference .....	76
6.5.4.3	Usage .....	76
6.5.5	announcedResource .....	76
6.5.5.1	Description .....	76
6.5.5.2	Reference .....	76
6.5.5.3	Usage .....	76
6.5.6	announceableSubordinateResource .....	76
6.5.6.1	Description .....	76
6.5.6.2	Reference .....	77
6.5.6.3	Usage .....	77
6.5.7	announcedSubordinateResource .....	77
6.5.7.1	Description .....	77
6.5.7.2	Reference .....	77
6.5.7.3	Usage .....	77
6.5.8	announcedSubordinateResource .....	77
6.5.8.1	Description .....	77
6.5.8.2	Reference .....	77

6.5.8.3	Usage.....	77
6.6	Response status codes .....	77
6.6.1	Introduction.....	77
6.6.2	RSC framework overview .....	78
6.6.3	Definition of Response Status Codes.....	78
6.6.3.1	Overview .....	78
6.6.3.2	Informational response class .....	78
6.6.3.3	Successful response class .....	78
6.6.3.4	Redirection response class .....	78
6.6.3.5	Originator error response class.....	78
6.6.3.6	Receiver error response class .....	79
6.6.3.7	Network system error response class .....	79
6.7	oneM2M specific MIME media types.....	80
6.8	Virtual Resources .....	81
7	oneM2M procedures.....	82
7.1	Introduction .....	82
7.2	Primitive format and generic procedure .....	82
7.2.1	Primitive format.....	82
7.2.1.1	Request primitive format.....	82
7.2.1.2	Response primitive format .....	83
7.2.2	Description of generic procedures .....	84
7.2.2.1	Generic resource request procedure for originator.....	84
7.2.2.2	Generic request procedure for receiver .....	86
7.3	Common operations .....	90
7.3.1	Originator actions .....	90
7.3.1.1	Compose request primitive .....	90
7.3.1.2	Send a request to the receiver CSE .....	91
7.3.1.3	Wait for response primitive .....	91
7.3.1.4	Retrieve the <request> resource .....	91
7.3.2	Receiver CSE actions.....	91
7.3.2.1	Check the validity of received request primitive.....	91
7.3.2.2	Create <request> resource locally .....	93
7.3.2.3	Create a success response (acknowledgement) .....	94
7.3.2.4	Send response primitive (acknowledgement).....	94
7.3.2.5	Update <request> resource.....	94
7.3.2.6	Forwarding .....	94
7.3.2.7	Check Service Subscription Profile.....	95
7.3.3	Hosting CSE actions .....	95
7.3.3.1	Check supported resource types .....	95
7.3.3.2	Check existence of the addressed resource .....	95
7.3.3.3	Check validity of resource representation for CREATE .....	95
7.3.3.4	Check validity of resource representation for UPDATE.....	96
7.3.3.5	Create the resource .....	97
7.3.3.6	Retrieve the resource .....	98
7.3.3.7	Update the resource .....	98
7.3.3.8	Delete the resource .....	98
7.3.3.9	Notify processing .....	99
7.3.3.9.1	Notify processing when <b>To</b> parameter is an <AE> resource .....	99
7.3.3.9.2	Notify processing when <b>To</b> parameter is the <CSEBase> resource .....	99
7.3.3.10	Announce the resource or attribute .....	99
7.3.3.11	De-announce the resource or attribute.....	101
7.3.3.12	Create a success response.....	102
7.3.3.13	Create an error response .....	103
7.3.3.14	Resource discovery procedure .....	103
7.3.3.15	Check authorization of the originator.....	103
7.3.3.16	Send response primitive .....	104
7.3.3.17	Using Filter Criteria for identification of target resources .....	104
7.3.3.17.0	Introduction .....	104
7.3.3.17.1	Conditions on the creationTime attribute .....	106
7.3.3.17.2	Conditions on the lastModifiedTime attribute.....	107
7.3.3.17.3	Conditions on stateTag attribute .....	107

7.3.3.17.4	Conditions on expirationTime attribute .....	107
7.3.3.17.5	Conditions on labels attribute .....	108
7.3.3.17.6	Conditions on resourceType attribute .....	108
7.3.3.17.7	Conditions on contentSize attribute .....	108
7.3.3.17.8	Conditions on typeOfContent of contentInfo attribute .....	108
7.3.3.17.9	Conditions on attribute name and value pairs.....	108
7.3.3.17.10	Constraint on number of retrieved resources by limit element.....	109
7.3.3.17.11	Filter Usage request parameter .....	109
7.3.3.17.12	Filter Operation request attribute.....	109
7.3.3.17.13	Conditions on content-based discovery .....	109
7.3.3.17.14	Constraint on number of applicable levels in resource tree .....	109
7.3.3.17.15	Constraint on number of resources to skip over in retrieve response .....	109
7.3.3.18	Semantic resource discovery .....	109
7.3.3.18.0	Introduction .....	109
7.3.3.18.1	Annotation-based method.....	110
7.3.3.18.2	Resource link-based method.....	110
7.3.4	Management common operations .....	111
7.3.4.1	Identify the managed entity and the technology specific protocol .....	111
7.3.4.2	Locate the technology specific data model objects to be managed on the managed entity .....	111
7.3.4.3	Establish a management session with the managed entity or management server .....	111
7.3.4.4	Send the management request(s) to the managed entity corresponding to the received Request primitive .....	112
7.4	Resource type-specific procedures and definitions .....	112
7.4.0	Introduction.....	112
7.4.1	Resource type specification conventions .....	112
7.4.1.1	Resource type definition conventions .....	112
7.4.1.2	Resource type-specific procedure conventions .....	113
7.4.2	Resource type <accessControlPolicy>.....	113
7.4.2.1	Introduction .....	113
7.4.2.2	<accessControlPolicy> resource specific procedure on CRUD operations .....	114
7.4.2.2.0	Introduction .....	114
7.4.2.2.1	Create.....	114
7.4.2.2.2	Retrieve .....	114
7.4.2.2.3	Update .....	115
7.4.2.2.4	Delete.....	115
7.4.3	Resource Type <CSEBase>.....	115
7.4.3.1	Introduction .....	115
7.4.3.2	<CSEBase> resource specific procedure on CRUD+N operations .....	116
7.4.3.2.1	Create.....	116
7.4.3.2.2	Retrieve .....	116
7.4.3.2.3	Update .....	116
7.4.3.2.4	Delete.....	117
7.4.3.2.5	Notify .....	117
7.4.4	Resource Type <remoteCSE> .....	117
7.4.4.1	Introduction .....	117
7.4.4.2	<remoteCSE> resource specific procedure on CRUD operations .....	119
7.4.4.2.0	Introduction .....	119
7.4.4.2.1	Create.....	119
7.4.4.2.2	Retrieve .....	119
7.4.4.2.3	Update .....	119
7.4.4.2.4	Delete.....	119
7.4.5	Resource Type <AE> .....	119
7.4.5.1	Introduction .....	119
7.4.5.2	<AE> resource specific procedure on CRUD+N operations .....	121
7.4.5.2.0	Introduction .....	121
7.4.5.2.1	Create.....	121
7.4.5.2.2	Retrieve .....	122
7.4.5.2.3	Update .....	122
7.4.5.2.4	Delete.....	122
7.4.5.2.5	Notify .....	122
7.4.6	Resource Type <container> .....	122
7.4.6.1	Introduction .....	122

7.4.6.2	<container> resource specific procedure on CRUD operations .....	124
7.4.6.2.0	Introduction .....	124
7.4.6.2.1	Create.....	124
7.4.6.2.2	Retrieve .....	124
7.4.6.2.3	Update .....	124
7.4.6.2.4	Delete.....	124
7.4.7	Resource Type <contentInstance> .....	125
7.4.7.1	Introduction.....	125
7.4.7.2	<contentInstance> resource specific procedure on CRUD operations .....	126
7.4.7.2.1	Create.....	126
7.4.7.2.2	Retrieve .....	126
7.4.7.2.3	Update .....	126
7.4.7.2.4	Delete.....	127
7.4.8	Resource Type <subscription> .....	127
7.4.8.1	Introduction.....	127
7.4.8.2	<subscription> resource specific procedure on CRUD operations .....	128
7.4.8.2.1	Create.....	128
7.4.8.2.2	Retrieve .....	129
7.4.8.2.3	Update .....	129
7.4.8.2.4	Delete.....	129
7.4.9	Resource Type <schedule> .....	129
7.4.9.1	Introduction.....	129
7.4.9.2	<schedule> resource specific procedure on CRUD operations .....	131
7.4.9.2.0	Introduction .....	131
7.4.9.2.1	Create.....	132
7.4.9.2.2	Retrieve .....	132
7.4.9.2.3	Update .....	132
7.4.9.2.4	Delete.....	132
7.4.10	Resource Type <locationPolicy> .....	132
7.4.10.1	Introduction.....	132
7.4.10.2	<locationPolicy> resource specific procedure on CRUD Operations .....	133
7.4.10.2.0	Introduction .....	133
7.4.10.2.1	Create.....	133
7.4.10.2.2	Retrieve .....	135
7.4.10.2.3	Update .....	135
7.4.10.2.4	Delete.....	135
7.4.11	Resource Type <delivery> .....	135
7.4.11.1	Introduction.....	135
7.4.11.2	<delivery> resource specific procedure on CRUD operations .....	136
7.4.11.2.0	Introduction .....	136
7.4.11.2.1	Create.....	136
7.4.11.2.2	Retrieve .....	137
7.4.11.2.3	Update .....	137
7.4.11.2.4	Delete.....	138
7.4.12	Resource Type <request> .....	138
7.4.12.1	Introduction.....	138
7.4.12.2	<request> resource specific procedure on CRUD operations .....	139
7.4.12.2.0	Introduction .....	139
7.4.12.2.1	Create.....	139
7.4.12.2.2	Retrieve .....	139
7.4.12.2.3	Update .....	140
7.4.12.2.4	Delete.....	140
7.4.13	Resource Type <group> .....	140
7.4.13.1	Introduction.....	140
7.4.13.2	<group> resource specific procedure on CRUD operations .....	142
7.4.13.2.0	Introduction .....	142
7.4.13.2.1	Create.....	142
7.4.13.2.2	Retrieve .....	142
7.4.13.2.3	Update .....	143
7.4.13.2.4	Delete.....	143
7.4.14	Resource Type <fanOutPoint> .....	143
7.4.14.1	Introduction.....	143

7.4.14.2	<fanOutPoint> operations .....	144
7.4.14.2.1	Validate the type of resource to be created.....	144
7.4.14.2.2	Sub-group creation for members residing on the same CSE .....	144
7.4.14.2.3	Assign URI for aggregation of notification .....	145
7.4.14.2.4	Fanout Request to each member.....	145
7.4.14.2.5	Aggregation of member responses .....	145
7.4.14.3	<fanOutPoint> resource specific procedure on CRUD operations .....	146
7.4.14.3.1	Introduction .....	146
7.4.14.3.2	Create.....	146
7.4.14.3.3	Retrieve .....	147
7.4.14.3.4	Update .....	147
7.4.14.3.5	Delete.....	147
7.4.15	Resource Type <mgmtObj>.....	148
7.4.15.1	Introduction .....	148
7.4.15.2	<mgmtObj> resource specific procedure on CRUD operations.....	149
7.4.15.2.1	Introduction .....	149
7.4.15.2.2	Create.....	149
7.4.15.2.3	Retrieve .....	149
7.4.15.2.4	Update .....	150
7.4.15.2.5	Delete.....	150
7.4.16	Resource Type <mgmtCmd>.....	150
7.4.16.1	Introduction.....	150
7.4.16.2	<mgmtCmd> resource specific procedure on CRUD oerations.....	153
7.4.16.2.0	Introduction .....	153
7.4.16.2.1	Create.....	153
7.4.16.2.2	Retrieve .....	153
7.4.16.2.3	Update .....	153
7.4.16.2.4	Delete.....	154
7.4.17	Resource Type <execInstance>.....	155
7.4.17.1	Introduction.....	155
7.4.17.2	<execInstance> resource specific procedure on CRUD oerations .....	156
7.4.17.2.0	Introduction .....	156
7.4.17.2.1	Update (Cancel).....	156
7.4.17.2.2	Retrieve .....	157
7.4.17.2.3	Delete.....	157
7.4.18	Resource Type <node>.....	158
7.4.18.1	Introduction.....	158
7.4.18.2	<node> resource specific procedure on CRUD operations .....	158
7.4.18.2.1	Create.....	158
7.4.18.2.2	Retrieve .....	159
7.4.18.2.3	Update .....	159
7.4.18.2.4	Delete.....	159
7.4.19	Resource Type <m2mServiceSubscriptionProfile>.....	159
7.4.19.1	Introduction.....	159
7.4.19.2	<m2mServiceSubscriptionProfile> resource specific procedure on CRUD operations .....	160
7.4.19.2.0	Introduction .....	160
7.4.19.2.1	Create.....	160
7.4.19.2.2	Retrieve .....	160
7.4.19.2.3	Update .....	160
7.4.19.2.4	Delete.....	160
7.4.20	Resource Type <serviceSubscribedNode> .....	161
7.4.20.1	Introduction.....	161
7.4.20.2	<serviceSubscribedNode> resource specific procedure on CRUD operations .....	161
7.4.20.2.0	Introduction .....	161
7.4.20.2.1	Create.....	161
7.4.20.2.2	Retrieve .....	162
7.4.20.2.3	Update .....	162
7.4.20.2.4	Delete.....	162
7.4.21	Resource Type <pollingChannel> .....	162
7.4.21.1	Introduction.....	162
7.4.21.2	<pollingChannel> resource specific procedure on CRUD operations .....	163
7.4.21.2.0	Introduction .....	163

7.4.21.2.1	Create.....	163
7.4.21.2.2	Retrieve .....	163
7.4.21.2.3	Update .....	163
7.4.21.2.4	Delete.....	164
7.4.22	Resource Type <pollingChannelURI> .....	164
7.4.22.1	Introduction.....	164
7.4.22.2	<pollingChannelURI> resource specific procedure on CRUD operations.....	164
7.4.22.2.0	Introduction .....	164
7.4.22.2.1	Create.....	164
7.4.22.2.2	Retrieve .....	164
7.4.22.2.3	Update .....	165
7.4.22.2.4	Delete.....	165
7.4.22.2.5	Notify .....	165
7.4.23	Resource Type <statsConfig>.....	165
7.4.23.1	Introduction.....	165
7.4.23.2	<statsConfig> resource-specific procedure on CRUD operations .....	166
7.4.23.2.1	Create.....	166
7.4.23.2.2	Retrieve .....	166
7.4.23.2.3	Update .....	166
7.4.23.2.4	Delete.....	167
7.4.24	Resource Type <eventConfig> .....	167
7.4.24.1	Introduction.....	167
7.4.24.2	<eventConfig> resource-specific procedure on CRUD operations.....	168
7.4.24.2.1	Create.....	168
7.4.24.2.2	Retrieve .....	169
7.4.24.2.3	Update .....	169
7.4.24.2.4	Delete.....	169
7.4.25	Resource Type <statsCollect> .....	169
7.4.25.1	Introduction.....	169
7.4.25.2	<statsCollect> resource-specific procedure on CRUD operations .....	170
7.4.25.2.1	Create.....	170
7.4.25.2.2	Retrieve .....	171
7.4.25.2.3	Update .....	171
7.4.25.2.4	Delete.....	171
7.4.26	Announced resource types .....	171
7.4.26.1	Introduction.....	171
7.4.26.2	Resource specific procedure on CRUD operations .....	173
7.4.26.2.1	Introduction .....	173
7.4.26.2.2	Create.....	173
7.4.26.2.3	Retrieve .....	173
7.4.26.2.4	Update .....	173
7.4.26.2.5	Delete.....	174
7.4.27	Resource Type latest.....	174
7.4.27.1	Introduction.....	174
7.4.27.2	<latest> Resource Specific Procedure on CRUD Operations .....	174
7.4.27.2.0	Introduction .....	174
7.4.27.2.1	Create.....	174
7.4.27.2.2	Retrieve .....	174
7.4.27.2.3	Update .....	175
7.4.27.2.4	Delete.....	175
7.4.28	Resource Type oldest.....	175
7.4.28.1	Introduction.....	175
7.4.28.2	<oldest> Resource Specific Procedure on CRUD Operations .....	175
7.4.28.2.0	Introduction .....	175
7.4.28.2.1	Create.....	175
7.4.28.2.2	Retrieve .....	176
7.4.28.2.3	Update .....	176
7.4.28.2.4	Delete.....	176
7.4.29	Resource Type <serviceSubscribedAppRule>.....	177
7.4.29.1	Introduction.....	177
7.4.29.2	<serviceSubscribedAppRule> resource specific procedure on CRUD operations.....	177
7.4.29.2.0	Introduction .....	177

7.4.29.2.1	Create.....	177
7.4.29.2.2	Retrieve .....	178
7.4.29.2.3	Update .....	178
7.4.29.2.4	Delete.....	178
7.4.30	Resource Type <notificationTargetMgmtPolicyRef>.....	178
7.4.30.1	Introduction.....	178
7.4.30.2	<notificationTargetMgmtPolicyRef> resource specific procedure on CRUD operations.....	179
7.4.30.2.0	Introduction .....	179
7.4.30.2.1	Create.....	179
7.4.30.2.2	Retrieve .....	179
7.4.30.2.3	Update .....	179
7.4.30.2.4	Delete.....	179
7.4.31	Resource Type <notificationTargetPolicy>.....	180
7.4.31.1	Introduction.....	180
7.4.31.2	<notificationTargetPolicy> resource specific procedure on CRUD operations .....	181
7.4.31.2.0	Introduction .....	181
7.4.31.2.1	Create.....	181
7.4.31.2.2	Retrieve .....	181
7.4.31.2.3	Update .....	181
7.4.31.2.4	Delete.....	181
7.4.32	Resource Type <policyDeletionRules>.....	181
7.4.32.1	Introduction.....	181
7.4.32.2	<policyDeletionRules> resource specific procedure on CRUD operations .....	182
7.4.32.2.0	Introduction .....	182
7.4.32.2.1	Create.....	182
7.4.32.2.2	Retrieve .....	182
7.4.32.2.3	Update .....	183
7.4.32.2.4	Delete.....	183
7.4.33	Resource Type <notificationTargetSelfReference>.....	183
7.4.33.1	Introduction.....	183
7.4.33.2	<notificationTargetSelfReference> resource specific procedure on CRUD operations .....	183
7.4.33.2.0	Introduction .....	183
7.4.33.2.1	Create.....	183
7.4.33.2.2	Retrieve .....	183
7.4.33.2.3	Update .....	184
7.4.33.2.4	Delete.....	184
7.4.34	Resource Type <semanticDescriptor>.....	185
7.4.34.1	Introduction.....	185
7.4.34.2	<semanticDescriptor> resource specific procedure on CRUD operations .....	186
7.4.34.2.0	Introduction .....	186
7.4.34.2.1	Create.....	186
7.4.34.2.2	Retrieve .....	186
7.4.34.2.3	Update .....	186
7.4.34.2.4	Delete.....	187
7.4.35	Resource Type <semanticFanOutPoint>.....	187
7.4.35.1	Introduction.....	187
7.4.35.2	<semanticFanOutPoint> resource specific procedure on CRUD operations .....	187
7.4.35.2.0	Introduction .....	187
7.4.35.2.1	Create.....	188
7.4.35.2.2	Retrieve .....	188
7.4.35.2.3	Update .....	189
7.4.35.2.4	Delete.....	189
7.4.36	Resource Type <dynamicAuthorizationConsultation>.....	189
7.4.36.1	Introduction.....	189
7.4.36.2	<dynamicAuthorizationConsultation> resource specific procedure on CRUD operations .....	190
7.4.36.2.0	Introduction .....	190
7.4.36.2.1	Create.....	190
7.4.36.2.2	Retrieve .....	190
7.4.36.2.3	Update .....	190
7.4.36.2.4	Delete.....	191
7.4.37	Resource Type <flexContainer>.....	191
7.4.37.1	Introduction.....	191

7.4.37.2	<flexContainer> resource specific procedure on CRUD operations .....	192
7.4.37.2.0	Introduction .....	192
7.4.37.2.1	Create.....	192
7.4.37.2.2	Retrieve .....	192
7.4.37.2.3	Update .....	192
7.4.37.2.4	Delete.....	193
7.4.38	Resource Type <timeSeries> .....	193
7.4.38.1	Introduction.....	193
7.4.38.2	<timeSeries> resource specific procedure on CRUD operations .....	194
7.4.38.2.0	Introduction .....	194
7.4.38.2.1	Create.....	194
7.4.38.2.2	Retrieve .....	195
7.4.38.2.3	Update .....	195
7.4.38.2.4	Delete.....	195
7.4.39	Resource Type <timeSeriesInstance>.....	195
7.4.39.1	Introduction.....	195
7.4.39.2	<timeSeriesInstance> resource specific procedure on CRUD operations.....	196
7.4.39.2.0	Introduction .....	196
7.4.39.2.1	Create.....	196
7.4.39.2.2	Retrieve .....	196
7.4.39.2.3	Update .....	196
7.4.39.2.4	Delete.....	197
7.4.40	Resource Type <role>.....	197
7.4.40.1	Introduction.....	197
7.4.40.2	<role> resource specific procedure on CRUD operations.....	198
7.4.40.2.0	Introduction .....	198
7.4.40.2.1	Create.....	198
7.4.40.2.2	Retrieve .....	198
7.4.40.2.3	Update .....	198
7.4.40.2.4	Delete.....	198
7.4.41	Resource Type <token>.....	198
7.4.41.1	Introduction.....	198
7.4.41.2	<token> resource specific procedure on CRUD operations .....	199
7.4.41.2.0	Introduction .....	199
7.4.41.2.1	Create.....	199
7.4.41.2.2	Retrieve .....	199
7.4.41.2.3	Update .....	200
7.4.41.2.4	Delete.....	200
7.4.42	Resource Type <trafficPattern>.....	200
7.4.42.1	Introduction.....	200
7.4.42.2	<trafficPattern> resource specific procedure on CRUD operations .....	201
7.4.42.2.1	Create.....	201
7.4.42.2.2	Retrieve .....	201
7.4.42.2.3	Update .....	202
7.4.42.2.4	Delete.....	202
7.5	Primitive-specific procedures and definitions .....	202
7.5.1	Notification data object and procedures.....	202
7.5.1.1	Notification data object .....	202
7.5.1.2	Notification procedures .....	203
7.5.1.2.1	Introduction .....	203
7.5.1.2.2	Notification for modification of subscribed resources.....	203
7.5.1.2.3	Subscription Verification during Subscription Creation.....	206
7.5.1.2.4	Notification for Subscription Deletion .....	206
7.5.1.2.5	Notification for Asynchronous Non-blocking Request .....	206
7.5.1.2.6	Notification for subscription via group.....	207
7.5.1.2.7	Notification for service layer long polling.....	207
7.5.1.2.8	Notification for on-demand discovery request .....	208
7.5.1.2.9	Notification for the missing Time Series Data .....	208
7.5.1.2.10	Notification for Dynamic Authorization .....	208
7.5.1.2.11	Notification for receiverESPrimRandObject Generation .....	210
7.5.1.2.12	Notification for End-to-End Security Certificate-based Key Establishment (ESCertKE).....	211
7.5.1.2.13	Using Notify for transport of ESPrim Objects.....	211

7.5.2	Elements contained in the Content primitive parameter .....	212
7.6	Security Procedures .....	214
7.6.1	Introduction.....	214
7.6.2	Procedure for applying End-to-End Security of Primitives (ESPrim) .....	214
8	Representation of primitives in data transfer.....	218
8.1	Introduction .....	218
8.2	Short names .....	219
8.2.1	Introduction.....	219
8.2.2	Primitive parameters .....	219
8.2.3	Resource attributes.....	220
8.2.4	Resource types .....	225
8.2.5	Complex data types members .....	227
8.3	XML serialization.....	230
8.3.1	Method.....	230
8.3.2	Examples .....	231
8.4	JSON serialization.....	231
8.4.1	Terminology .....	231
8.4.2	Method.....	232
8.4.3	Examples .....	232
8.5	CBOR serialization.....	233
8.5.1	Method.....	233
8.5.2	Examples .....	234

**Annex A (normative):                   Binding Mch to Diameter for Charging.....236**

A.1	Introduction .....	236
A.2	Diameter Commands on Mch.....	236
A.2.1	Accounting Request Command .....	236
A.2.2	Accounting Answer Command .....	236
A.3	Mapping of M2M Recorded Information Elements to AVPs .....	237
A.4	Summary of AVPs used .....	237
A.5	oneM2M Specific AVP Usage.....	239
A.5.1	Access-Network-Identifier AVP .....	239
A.5.2	Acct-Application-Id AVP.....	239
A.5.3	Accounting-Record-Type AVP.....	239
A.5.4	Application-Entity-ID AVP.....	240
A.5.5	Control-Memory-Size AVP .....	240
A.5.6	Current-Number-Members AVP .....	240
A.5.7	Data-Memory-Size AVP .....	240
A.5.8	External-ID AVP .....	240
A.5.9	Group-Name AVP.....	240
A.5.10	Hosting-CSE-ID AVP .....	240
A.5.11	Originator AVP .....	240
A.5.12	Maximum-Number-Members AVP.....	240
A.5.13	M2M-Event-Record-Timestamp AVP .....	240
A.5.14	M2M-Information AVP .....	241
A.5.15	Node-ID AVP.....	241
A.5.16	Occupancy AVP .....	241
A.5.17	Protocol-Type AVP.....	241
A.5.18	Rating-Group AVP .....	241
A.5.19	Receiver AVP.....	242
A.5.20	Request-Body-Size AVP.....	242
A.5.21	Request-Headers-Size AVP .....	242
A.5.22	Request-Operation AVP.....	242
A.5.23	Response-Body-Size AVP .....	242
A.5.24	Response-Headers-Size AVP .....	242
A.5.25	Response-Status-Code AVP .....	242
A.5.26	Service-Context-Id AVP .....	242
A.5.27	Service-Information AVP .....	243