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**Machine-to-Machine communications (M2M);  
OMA DM Compatible Management Objects for ETSI M2M**

## Reference

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## Keywords

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<Management Objects, M2M>

***ETSI***

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

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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

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## Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Machine-to-Machine communications (M2M).

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# 1 Scope

The present document contains OMA DM [DMPRO] compatible management objects for three ETSI M2M mgmtObj instances: etsiScI Mo [M2M-TS102690], etsiAreaNwkInfo [M2M-TS102690], and etsiAreaNwkDeviceInfo [M2M-TS102690].

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# 2 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 reference document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://docbox.etsi.org/Reference>.

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

## 2.1 Normative references

The following referenced documents are necessary for the application of the present document.

- [DMPO] OMA-WP-AC\_MO-20090127-A: "White Paper on Provisioning Objects"
- [DMPRO] OMA-TS-DM\_Protocol-V1\_3-20120216-D: "OMA Device Management Protocol"
- [DMTND] OMA-TS-DM\_TND-V1\_3-20120216-D: "OMA Device Management Tree and Description"
- [GwMO] "Gateway Management Object Technical Specification", Version 1.0, Open Mobile Alliance™, OMA-TS-GwMO-V1\_0, [URL:http://www.openmobilealliance.org/](http://www.openmobilealliance.org/)
- [M2M-TS102690] ETSI TS 102 690: "Machine to Machine Communications (M2M); Functional Architecture".
- [M2M-TS102921] ETSI TS 102 921: "Machine to Machine Communications (M2M); mla, mld, dla Interfaces".
- [ISO8601] ISO 8601:2000, Data elements and interchange formats -- Information interchange -- Representation of dates and times. URL:<http://www.iso.ch/>

## 2.2 Informative references

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.

- [TR102725] ETSI TR 102 725: "Machine to Machine Communications (M2M); Definitions". The acronyms and the abbreviations defined in TR 102 725 and used inside this document (TS 102 690) are normative by means of this reference.

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## 3 Definitions, symbols and abbreviations

### 3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 102 725 [7] apply.

### 3.2 Symbols

For the purposes of the present document, the symbols given in TR 102 725 [7] apply.

### 3.3 Abbreviations

For the purposes of the present document, the abbreviations given in TR 102 725 [7] apply. The following abbreviations are introduced in the present document.

DDF	Device Description Framework
DM	Device Management
MANDMO	M2M Area Network Device Management Object
MANMO	M2M Area Network Management Object
MO	Management Object
MSCLMO	M2M Service Capability Layer Management Object
OMA	Open Mobile Alliance

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## 4 General Principles

In the present document, the following three OMA DM compliant MOs are developed for ETSI M2M.

- MSCLMO for ETSI M2M etsiScIInfo
- MANMO for ETSI M2M etsiAreaNwkInfo
- MANDMO for ETSI M2M etsiAreaNwkDeviceInfo

Based on OMA DM specification on designing a new MO [DMPO] [DMTND], the following rules are followed in the present document

- MO Identifiers
  - MO identifier for MSCLMO is urn:oma:mo:ext-etsi-msclmo:1.0
  - MO identifier for MANMO is urn:oma:mo:ext-etsi-manmo:1.0
  - MO identifier for MANDMO is urn:oma:mo:ext-etsi-mandmo:1.0
- Special Handling of resource/attributes in etsiScIInfo/etsiAreaNwkInfo/etsiAreaNwkDeviceInfo
  - Subscriptions resource in etsiScIInfo/etsiAreaNwkInfo/etsiAreaNwkDeviceInfo will not be modeled in MSCLMO/MANMO/MANDMO

- Several common attributes of a M2M resource in etsiScIInfo/etsiAreaNwkInfo/etsiAreaNwkDeviceInfo including expirationTime, accessRightID, searchStrings, creationTime, lastModifiedTime, moID, originalMO, description, does not occur in MSCLMO/MANMO/MANDMO
- Collection instances in etsiScIInfo/etsiAreaNwkInfo/etsiAreaNwkDeviceInfo are modelled as an unnamed node (i.e. <x>) in MSCLMO/MANMO/MANDMO
- Node Properties in MSCLMO/MANMO/MANDMO management tree
  - The Occurrence of a node in MSCLMO/MANMO/MANDMO management tree can be:
    - ZeroOrOne, ZeroOrMore, ZeroOrN, One, OneOrN, OneOrMore for unnamed node
    - Named node can only have ZeroOrOne, or One occurrence since OMA-DM needs each node in a management tree must have a unique URI.
    - Character      Meaning
 

+	1 ore more occurrences
*	0 or more occurrences
?	0 or 1 occurrences
  - Each node in MSCLMO/MANMO/MANDMO can have one or more of following access types as specified and supported by OMA-DM [DMPRO]
    - Get, Replace, Exec, Add, Delete, Copy
    - A RO (sub-) resource or an attribute is modelled as a node with Get access type
    - A RW (sub-) resource or an attribute is modelled as a node with Get and Replace access type
    - An attribute standing for an action is modelled as a node with Get and Exec access type
  - The DFFormat of a node in MSCLMO/MANMO/MANDMO management tree can be:
    - b64, bin, bool, chr, int, node, null, xml, date, time, float
      - for the leaf node of type 'chr' which is defined as comma separated list: when a comma is contained in an item of such a list, the comma shall be escaped by using '\,'.
    - an interior node must have "node" as its DFFormat value
  - The Status of each node in MSCLMO/MANMO/MANDMO can be "Required" or "Optional"
    - An Optional (sub-)resource or attribute is modelled as an Optional node.
    - A Mandatory (sub-)resource or attribute is modelled as a Required node
- A node with the name "Ext" is introduced in MSCLMO/MANMO/MANDMO for vendor-specific extension

## 5 M2M Service Capabilities MO

### 5.1 MO Description

The M2M SCL MO (MSCLMO) resides in the Management Tree of the any M2M Device or M2M Gateway which supports the M2M service capabilities (e.g. DM enablers). This MO corresponds to the etsiScIsmo which is an mgmtObj resource instance as specified in ETSI M2M functional architecture [M2M-TS102690]. This MO maintains information regarding the management of the M2M service capabilities in M2M Devices and M2M Gateways.

Figure 1 gives the pictorial description of the MSCLMO. The description of the various nodes within this MO is given below.

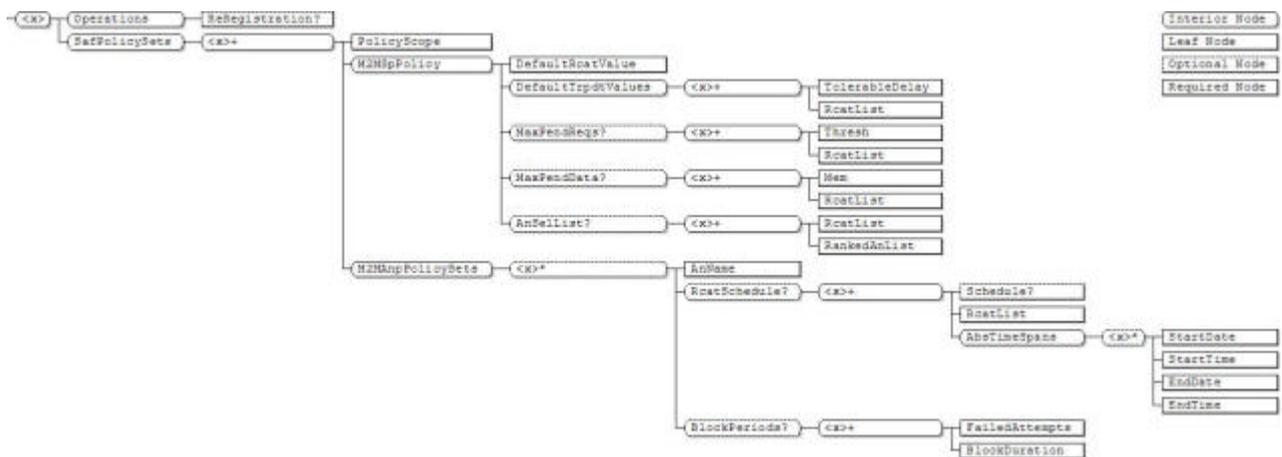


Figure 1: OMA-DM Compatible SCL MO (MSCLMO)

In what follows the term “time zero” is used to refer to the time of first instantiation of the management object.

<x>

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

This placeholder node is the root node for the MSCLMO. The parent node of this node defines the location of this MO in the Management Tree.

The Management Object Identifier for the MSCLMO MUST be: “urn:oma:mo:ext-etsi-msclmo:1.0”.

<x>/Operations

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

This interior node is the root node for operations allowed to operate on the MSCLMO.

**<x>/Operations/ReRegistration**

Status	Tree Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	null	Exec

This leaf node is used to trigger a re-registration action.

**<x>/SafPolicySets**

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

This interior node is the parent node for all policies related to store-and-forward (SAF).

**<x>/SafPolicySets/<x>**

Status	Tree Occurrence	Format	Min. Access Types
Required	OneOrMore	node	Get

This interior node is the parent node for a specific store-and-forward (SAF) policy set. At time zero one node of this type is present which contains the default policies. The value for the "PolicyScope" leaf node (see next paragraph) has to be set to "default". More nodes of this type are possible to define policies that are specific to a given request issuer (DA or GA).

**<x>/SafPolicySets/<x>/PolicyScope**

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

This leaf node stands for the scope of an SAF policy set <x>. The value of this leaf node defines the scope of the policies contained in the parent node <x> for a specific SAF policy set.

In case of the default SAF policy set which must exist at time zero, the value of the PolicyScope leaf node shall be the string "default".

For other SAF policy sets, the value of the PolicyScope leaf node can be set to a list of Application IDs, in which case the policies contained in the respective parent SAF policy set node are applicable to requests coming from any of the listed applications..

**<x>/SafPolicySets/<x>/M2MSPolicy**

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

This interior node is the parent node for all information related to an SAF policy set controlled by the M2M service provider.

**<x>/SafPolicySets/<x>/M2MSPolicy/DefaultRcatValue**

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

This leaf node is the default value for a request category (Rcat) to be used for requests to remotely hosted resources during SAF-handling when no RCAT value was specified in the request. In case of the default SAF policy set, this leaf node shall be set to the value "RCAT\_0" at time zero.

**<x>/SafPolicySets/<x>/M2MSPolicy/DefaultTrpdtValues**

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

This interior node stands for a list of default TRPDT values to be used for requests of a given RCAT value. Each list item consists of one or more RCAT values and an associated default TRPDT value. All default TRPDT values need to be defined as time durations. Different list items must not contain overlapping RCAT values.

**<x>/SafPolicySets/<x>/M2MSPolicy/DefaultTrpdtValues/<x>**

Status	Tree Occurrence	Format	Min. Access Types
Required	OneOrMore	node	Get

This interior node stands for a default TRPDT value. In case of the default SAF policy set, only one interior node of this type shall exist at time zero.

**<x>/SafPolicySets/<x>/M2MSPolicy/DefaultTrpdtValues/<x>/TolerableDelay**

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

This leaf node stands for the duration in seconds that is tolerable for the processing of an issued request that is pending in SAF processing. In case of the default SAF policy set, this leaf node of the only

<x>/SafPolicySets/<x>/M2MSPolicy/DefaultTrpdtValues/<x> node that exists at time zero shall be set to the value "315360000" (representing 10 years) or larger.

**<x>/SafPolicySets/<x>/M2MSPolicy/DefaultTrpdtValues/<x>/RcatList**

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

This leaf node contains all information about a list of RCAT values with which to associate a TRPDT value. All RCAT values in this list are comma separated and each RCAT value is a string for expressing the Request Category to which the TRPDT value in the TolerableDelay leaf node under the same parent node applies. In case of the default SAF policy set, this leaf node of the only

<x>/SafPolicySets/<x>/M2MSPolicy/DefaultTrpdtValues/<x> node that exists at time zero shall be set to a value that represents a list of all possible request categories, i.e. "RCAT\_0, RCAT\_1, ... RCAT\_<N>".

**<x>/SafPolicySets/<x>/M2MSPolicy/MaxPendReqs**

Status	Tree Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	node	Get

This interior node stands for a list of SAF request threshold policy items for triggering establishment of connectivity by D/GSCL defining the maximum number of pending requests in SAF-handling associated with given ranges of RCAT values. According to the description in [M2M-TS102690], the D/GSCL shall be allowed to trigger establishment of connectivity when more requests have been stored than the configured maximum number of pending requests for a given range of RCAT values. Each SAF request threshold policy list item consists of one or more RCAT values and an associated maximum number of pending requests. Different list items must not contain overlapping RCAT values. In case of the default SAF policy set, no interior node of this type shall exist at time zero.

**<x>/SafPolicySets/<x>/M2MSPolicy/MaxPendReqs/<x>**

Status	Tree Occurrence	Format	Min. Access Types
Required	OneOrMore	node	Get

This interior node is the parent node for all information about a long threshold, which associates with a given set of RCAT values.

**<x>/SafPolicySets/<x>/M2MSPolicy/MaxPendReqs/<x>/Thresh**

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

This leaf node stands for the value of a long threshold.

**<x>/SafPolicySets/<x>/M2MSPolicy/MaxPendReqs/<x>/RcatList**

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

This leaf node contains all information about a list of RCAT values with which to associate a the long threshold value in the leaf node Thresh under the same parent node. All RCAT values in this list are comma separated and each RCAT value is a string for expressing the Request Category to which the long threshold in the Thresh leaf node under the same parent node applies.

**<x>/SafPolicySets/<x>/M2MSPolicy/MaxPendData**

Status	Tree Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	node	Get

This interior node stands for a list of SAF data threshold policy items for triggering establishment of connectivity defining the maximum amount of data used for pending requests in SAF-handling associated with given ranges of RCAT values. According to the description in [M2M-TS102690], the D/GSCL shall be allowed to trigger establishment of connectivity when more data has been stored than the configured maximum amount of data for a given range of RCAT values. Each SAF data threshold policy list item consists of one or more RCAT values and an associated maximum amount of data. Different list items must not contain overlapping RCAT values. In case of the default SAF policy set, no interior node of this type shall exist at time zero.

**<x>/SafPolicySets/<x>/M2MSPolicy/MaxPendData/<x>**

Status	Tree Occurrence	Format	Min. Access Types
Required	OneOrMore	node	Get

This interior node is the parent node for all information about a memory size threshold associating with different sets of RCAT values.

**<x>/SafPolicySets/<x>/M2MSPolicy/MaxPendData/<x>/Mem**

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

This leaf node stands for a token value to be associated with a list of RCAT values.

**<x>/SafPolicySets/<x>/M2MSPolicy/MaxPendData/<x>/RcatList**

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

This leaf node contains all information about a list of RCAT values with which to associate the token value in the leaf node Mem under the same parent node.. All RCAT values in this list are comma separated and each RCAT value is a string for expressing the request category to which the token value in the leaf node Mem under the same parent node applies.

**<x>/SafPolicySets/<x>/M2MSPolicy/AnSelList**

Status	Tree Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	node	Get

This interior node stands for a list of access network selection policy items to govern selection of a preferred access network for processing requests pending in SAF-handling associated with given ranges of RCAT values. According to the description in [M2M-TS102690], the D/GSCL shall use a ranked list of preferred access networks for a given range of RCAT values. Each access network selection policy list item consists of one or more RCAT values and a ranked list of access network names in line with the "anName" attributes of <anpPolicy> resources in descending order of preference. Different list items must not contain overlapping RCAT values. In case of the default SAF policy set, no interior node of this type shall exist at time zero.

**<x>/SafPolicySets/<x>/M2MSPolicy/AnSelList/<x>**

Status	Tree Occurrence	Format	Min. Access Types
Required	OneOrMore	node	Get

This interior node is the parent node for all information about an association between a ranked list of preferred access network tokens and an item-specific set of RCAT values.

**<x>/SafPolicySets/<x>/M2MSPolicy/AnSelList/<x>/RcatList**

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

This leaf node contains all information about a list of RCAT values with which to associate a ranked list of preferred access networks. All RCAT values in this list are comma separated and each RCAT value is a string for expressing the request category to which the ranked list of preferred access networks in the leaf node RankedAnList under the same parent node applies.

**<x>/SafPolicySets/<x>/M2MSPolicy/AnSelList/<x>/RankedAnList**

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

This leaf node is a ranked list of preferred access networks tokens to be associated with the list of RCAT value. All tokens in this list are comma separated and each token identifies a specific access network.

**<x>/SafPolicySets/<x>/M2MAnpPolicySets**

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

This interior node is the parent node for all information related to SAF-handling policies which are controlled by the access network provider.

**<x>/SafPolicySets/<x>/M2MAnpPolicySets/<x>**

Status	Tree Occurrence	Format	Min. Access Types
Optional	ZeroOrMore	node	Get

This interior node is the parent node for all information related to a specific set of SAF-handling policies which is controlled by the associated access network provider. In case <x>/SafPolicySets/<x> represents the default SAF policy set, no interior node of this type shall exist at time zero.

**<x>/SafPolicySets/<x>/M2MAnpPolicySets/<x>/AnName**

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

This leaf node stands for an access network name that is used by the managed D/GSCL to determine for which access network the policies defined in this <x>/SafPolicySets/<x>/M2MAnpPolicySets/<x>/ interior node shall apply. When trying to setup connectivity, the D/GSCL needs to be able to use that name internally to establish connectivity via the associated access network.

**<x>/SafPolicySets/<x>/M2MAnpPolicySets/<x>/RcatSchedule**

Status	Tree Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	node	Get

This interior node stands for a list of RCAT schedule policy items for defining when it is appropriate to use the access network associated with "AnName" for processing requests of specific RCAT values. Each item contains one or more RCAT values and allowed time-spans, where the time spans can be defined AbsTimeSpan or Schedule time spans. Details of the format for RCAT schedule policy items are specified in [M2M-TS102921].

**<x>/SafPolicySets/<x>/M2MAnpPolicySets/<x>/RcatSchedule/<x>**

Status	Tree Occurrence	Format	Min. Access Types
Required	OneOrMore	node	Get

This interior node is the parent node for all information about an association between a number of allowed time spans and an item-specific set of RCAT values. Under this parent node, at least one of following nodes

- leaf node "Schedule" as defined below, or
- interior node "AbsTimeSpans/<x>"

needs to be populated with information on allowed time spans.

**<x>/SafPolicySets/<x>/M2MAnpPolicySets/<x>/RcatSchedule/<x>/Schedule**

Status	Tree Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	chr	Get

This leaf node is the comma-separated list of a set of schedule strings. A Schedule string is a string formatted according to the CRONTAB input file definition in [ISO/IEC/IEEE 9945:2009]. The schedule that is defined by the Schedule string is the sum of all absolute time spans (in one minute granularity) that match with the given CRONTAB string. Example of CRONTAB string: “\* 0-6 \* \* 1-6” would mean the period from 0:00h to 6:00h (inclusive) on any week day (Monday through Friday) \* 22-23,0-4 \* \* 1-6” would mean the period from 22:00h to 04:00h on any week day (Monday through Friday).

**<x>/SafPolicySets/<x>/M2MAnpPolicySets/<x>/RcatSchedule/<x>/RcatList**

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

This leaf node contains all information about a list of RCAT values with which to associate allowed time spans. All RCAT values in this list are comma separated and each RCAT value is a string for expressing the request category to which the allowed time spans in the leaf node “Schedule” and “AbsTimeSpans” under the same parent node apply.

**<x>/SafPolicySets/<x>/M2MAnpPolicySets/<x>/RcatSchedule/<x>/AbsTimeSpans**

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

This interior node stands for a list of allowed absolute time spans to be associated with the list of RCAT value.

**<x>/SafPolicySets/<x>/M2MAnpPolicySets/<x>/RcatSchedule/<x>/AbsTimeSpans/<x>**

Status	Tree Occurrence	Format	Min. Access Types
Optional	ZeroOrMore	node	Get

This interior node is the parent node for all information about a time span.

**<x>/SafPolicySets/<x>/M2MAnpPolicySets/<x>/RcatSchedule/<x>/AbsTimeSpans/<x>/StartDate**

Status	Tree Occurrence	Format	Min. Access Types
Required	One	date	Get

This leaf node stands for the start of time span in absolute date as defined by OMA DM.

**<x>/SafPolicySets/<x>/M2MAnpPolicySets/<x>/RcatSchedule/<x>/AbsTimeSpans/<x>/StartTime**

Status	Tree Occurrence	Format	Min. Access Types
Required	One	time	Get

This leaf node stands for the start of time span in absolute time as defined by OMA DM.

**<x>/SafPolicySets/<x>/M2MAnpPolicySets/<x>/RcatSchedule/<x>/AbsTimeSpans/<x>/EndDate**

Status	Tree Occurrence	Format	Min. Access Types
Required	One	date	Get

This leaf node stands for the end of time span in absolute date as defined by OMA DM.

**<x>/SafPolicySets/<x>/M2MAnpPolicySets/<x>/RcatSchedule/<x>/AbsTimeSpans/<x>/EndTime**

Status	Tree Occurrence	Format	Min. Access Types
Required	One	time	Get

This leaf node stands for the end of time span in absolute time as defined by OMA DM.

**<x>/SafPolicySets/<x>/M2MAnpPolicySets/<x>/BlockPeriods**

Status	Tree Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	node	Get

This interior node stands for a list of block period policy items for defining how long an D/GSCL shall wait before re-trying to establish connectivity via the access network associated with "AnName" after the previous attempt has failed. Each item consists of a number of consecutive failed attempts and a duration. The number of consecutive failed attempts defines how many consecutive attempts for establishing connectivity must have failed to apply this block policy item and the duration defines how long the next attempt shall be blocked. The D/GSCL shall always apply the block policy item with the largest number of consecutive failed attempts that is smaller or equal to the actual number of consecutive failed attempts. Details of the format for block period policy items are specified in [M2M-TS102921]

**<x>/SafPolicySets/<x>/M2MAnpPolicySets/<x>/BlockPeriods/<x>**

Status	Tree Occurrence	Format	Min. Access Types
Required	OneOrMore	node	Get

This interior node is the parent node for all information about a number of consecutively failed access attempts and a duration that should be used to block the next access attempt.

**<x>/SafPolicySets/<x>/M2MAnpPolicySets/<x>/BlockPeriods/<x>/FailedAttempts**

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

This leaf node stands for the number of consecutively failed access attempts.

**<x>/SafPolicySets/<x>/M2MAnpPolicySets/<x>/BlockPeriods/<x>/BlockDuration**

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

This leaf node stands for the duration in seconds for which to block further access attempts.

## 6 M2M Area Network MO

### 6.1 MO Description

The M2M Area Network MO (MANMO) resides in the Management Tree of the DM Gateway, which could function as an M2M Gateway or an M2M Device with M2M service capabilities (e.g. DM enablers) according to ETSI M2M functional architecture [M2M-TS102690]. This MO corresponds to the etsiAreaNwkInfo which is an mgmtObj resource instance as specified in [M2M-TS102690]. This MO maintains information regarding the handling of one or multiple M2M Area Networks through the DM Gateway. An M2M Area Network may be any type of local area (or short range) networks of different technologies (e.g. ZigBee, m-Bus, WiFi).

Figure 2 gives the pictorial description of the MANMO. The description of the various nodes within this MO is given below.

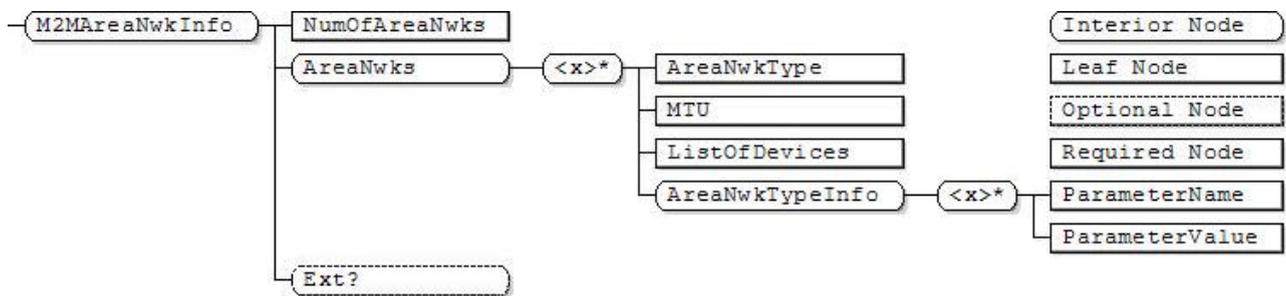


Figure 2: OMA-DM Compatible M2M Area Network MO (MANMO)

#### M2MAreaNwkInfo

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

This interior node is the root node for the MANMO. The parent node of this node defines the location of this MO in the Management Tree. This node and its child nodes contain the information for managing an M2M Area Network.

The Management Object Identifier for the MANMO MUST be: "urn:oma:mo:ext-etsi-manmo:1.0".

#### M2MAreaNwkInfo/NumOfAreaNwks

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

This leaf node stands for the total number of M2M Area Networks behind an M2M Gateway.

#### M2MAreaNwkInfo/AreaNwks

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

This interior node is the parent node for all information about all M2M Area Networks connecting to the same M2M Gateway.

**M2MAreaNwkInfo/AreaNwks/<x>**

Status	Tree Occurrence	Format	Min. Access Types
Required	ZeroOrMore	node	Get

This interior node is the parent node for information about a specific M2M Area Networks connecting to the same M2M Gateway.

**M2MAreaNwkInfo/AreaNwks/<x>/AreaNwkType**

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

This leaf node stands for the type of the M2M Area Network. The following enumeration-type strings are defined in [M2M-TS102921]: 6LOWPAN, 6LOWPAN-BLUETOOTH, 6LOWPAN-WIFI, 6LOWPAN-PLC, IPV4-WPAN, IPV4-BLUETOOTH, IPV4-WIFI, IPV4-PLC, ZIGBEE. Note that other types of area networks may be added in the future.

**M2MAreaNwkInfo/AreaNwks/<x>/MTU**

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

This leaf node stands for the Maximum Transmission Unit (MTU) of the M2M Area Network.

**M2MAreaNwkInfo/AreaNwks/<x>/ListOfDevices**

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

This interior node contains a list of pointers to all devices in this M2M Area Network. All values in this list are comma separated. Each value stands for a reference to a specific device (i.e. the root node <x> of MANDMO as defined in Section 7.1).

**M2MAreaNwkInfo/AreaNwks/<x>/AreaNwkTypeInfo**

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

This interior node is the placeholder for containing parameters specific to a type of M2M Area Networks, as denoted by the "AreaNwkType".

**M2MAreaNwkInfo/AreaNwks/<x>/AreaNwkTypeInfo/<x>**

Status	Tree Occurrence	Format	Min. Access Types
Required	ZeroOrMore	node	Get

This interior node stands for a specific parameter.

**M2MAreaNwkInfo/AreaNwks/<x>/AreaNwkTypeInfo/<x>/ParameterName**

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

This leaf node stands for the name of the parameter.

**M2MAreaNwkInfo/AreaNwks/<x>/AreaNwkTypeInfo/<x>/ParameterValue**

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

This leaf node stands for the value of the parameter.

**M2MAreaNwkInfo/Ext**

Status	Tree Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	node	Get

This interior node is used for vendor-specific extensions to MANMO.

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## 7 M2M Area Network Device MO

### 7.1 MO Description

The M2M Area Network Device MO (MANDMO) resides in the Management Tree of the DM Gateway, which could function as an M2M Gateway or an M2M Device with M2M service capabilities (e.g. DM enablers) according to ETSI M2M functional architecture [M2M-TS102690]. This MO corresponds to the etsiAreaNwkDeviceInfo which is an mgmtObj resource instance as specified in [M2M-TS102690]. This MO maintains information regarding the handling of an M2M Area Network device through the DM Gateway. An M2M Area Network device may be a legacy device or a constrained device without M2M service capabilities. Each MANDMO maintains the device information pertaining to one or multiple M2M Area Networks that a device is associated with, including both the device characteristics and its neighbouring relationship.

Figure 3 gives the pictorial description of the Device Inventory MO. The description of the various nodes within this MO is given below.

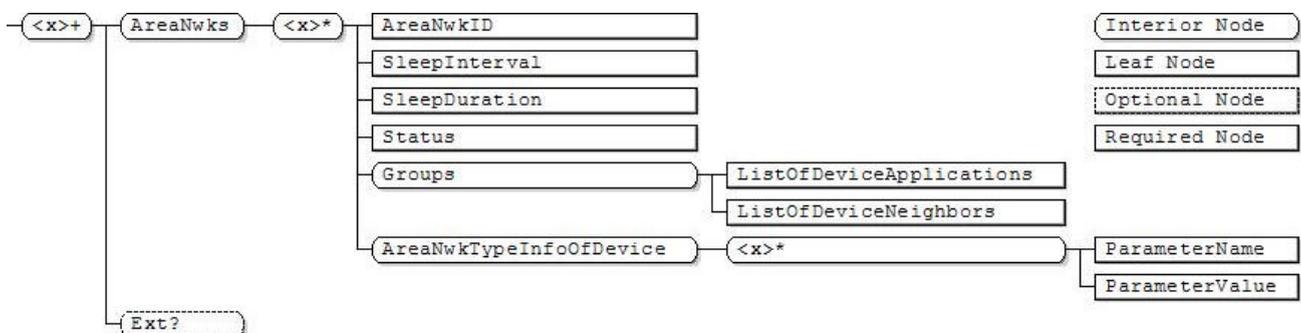


Figure 3: OMA-DM Compatible M2M Area Network Device MO (MANDMO)

&lt;x&gt;

Status	Tree Occurrence	Format	Min. Access Types
Required	OneOrMore	node	Get

This interior node is the root node for the MANDMO. The parent node of this node defines the location of this MO in the Management Tree. This node and its child nodes contain the information for managing an M2M Area Network device, which is associated with one or multiple M2M Area Networks. Each device behind M2M GW should have a corresponding MANDMO. The Management Object Identifier for the MANDMO MUST be: "urn:oma:mo:ext-etsi-mandmo:1.0".

&lt;x&gt;/AreaNwks

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

This interior node is the parent node for all information related to all M2M Area Network that the device is associated with.

&lt;x&gt;/AreaNwks/&lt;x&gt;

Status	Tree Occurrence	Format	Min. Access Types
Required	ZeroOrMore	node	Get

This interior node contains information related to a specific M2M Area Network that the device is associated with.

&lt;x&gt;/AreaNwks/&lt;x&gt;/AreaNwkID

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

This leaf node stands for the M2M Area Network ID that the device <x> belongs to.

&lt;x&gt;/AreaNwks/&lt;x&gt;/SleepInterval

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

This leaf node stands for the sleep interval of the device <x> in seconds.

&lt;x&gt;/AreaNwks/&lt;x&gt;/SleepDuration

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

This leaf node stands for the sleep duration of the device <x> in seconds.

&lt;x&gt;/AreaNwks/&lt;x&gt;/Status

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

This leaf node stands for the status of the device <x>. It can be ASLEEP or AWAKE.

**<x>/AreaNwks/<x>/Groups**

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

This interior node is used to contain two lists: a list of applications on the device <x> and a list of neighbours of the device <x>.

**<x>/AreaNwks/<x>/Groups/ListOfDeviceApplications**

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

This leaf node stands for a list of applications running on the device <x>. All values are comma separated and each value stands for a reference to a specific application running on the device <x>.

**<x>/AreaNwks/<x>/Groups/ListOfDeviceNeighbors**

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

This leaf node stands for a list of neighbours of the device <x>. All values are comma separated and each value stands for a reference to a specific neighbour device.

**<x>/AreaNwks/<x>/AreaNwkTypeInfoOfDevice**

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

This interior node is the placeholder for containing parameters of the device <x> specific to a type of M2M Area Network.

**<x>/AreaNwks/<x>/AreaNwkTypeInfoOfDevice/<x>**

Status	Tree Occurrence	Format	Min. Access Types
Required	ZeroOrMore	node	Get

This interior node contains a specific parameter.

**<x>/AreaNwks/<x>/AreaNwkTypeInfoOfDevice/<x>/ParameterName**

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

This leaf node contains the name of a specific parameter.

**<x>/AreaNwks/<x>/AreaNwkTypeInfoOfDevice/<x>/ParameterValue**

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

This leaf node contains the value of a specific parameter.

&lt;x&gt;/Ext

Status	Tree Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	node	Get

This interior node is used for vendor-specific extensions to MANDMO.

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## History

<b>Document history</b>		
<Version>	<Date>	<Milestone>
V0.0.1	November 2011	Initial Draft <ul style="list-style-type: none"> <li>• It incorporates comments from OMA DM working group.</li> </ul>
V0.0.2	February 2012	Addressed comments from OMA-DM as listed in M2M(12)19_012
V0.1.1	March 2012	Combined 19_022r1 and 19_100r1, which both were agreed during M2M#19 WG5 session.