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| **Title\*:** | TS102 690 Annex A Editing | | |
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| from **Source**\*: | WG/TG Chairman | | |
| Contact: | Yongjing Zhang | | |
|  |  | | |
| input for **Committee**\***:** | M2M WG2 | | |
|  |  | | |
| Contribution **For\*:** | Decision | **X** |  |
|  | Discussion |  |  |
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|  |  | | |
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|  | | | |

**Decision/action requested:** Incorporate into latest draft of TS 102 690.

**ABSTRACT:***This contribution incorporates all agreed changes into Annex A proposed by contribution M2M(11)0537r3, M2M(11)0549r3, M2M(11)0560r1 and M2M(11)0562r1.*

# **References**

[1] Draft ETSI TS 102 690 v0.13.3, Machine-to-Machine communication (M2M) Functional Architecture

# **Rationale**

This contribution incorporates all agreed changes into Annex A proposed by contribution M2M(11)0537r3, M2M(11)0549r3, M2M(11)0560r1 and M2M(11)0562r1. All revision marks are kept as they’re in the original contributions.

Note that proposed changes to section 2.1 (Normative References) are also listed at the end, since it’s highly correlated to the modifications in Annex A.1.

# **Details of Contribution**

\*\*\*\*\* Start of Proposed Change #1\*\*\*\*\*

Annex A (Normative): <mgmtObj> resources that contain the basic ETSI description

A.1 M2M Management Function List

This section provides all functions that are required in an ETSI M2M system for Remote Entity Management. Such functions are provided by ETSI M2M specific management resources and/or the management resources mapped from the equivalent data models of OMA-DM and BBF-TR069 as shown in Table A-1..

The M2M management functions are divided into following packages:

* **General Management (GEN):** Allows retrieving general information of the M2M Device or Gateway, and provides generic mechanism applicable to different specific management functions.
* **Configuration Management (CFG):** Allows configuration of the device capabilities and features for supporting M2M services and applications, including activating / deactivating device hardware components or I/Os in the M2M Device or Gateway.
* **Diagnostic & Monitoring Management (D&M):** Allows running specific diagnostic tests on a device and collecting the results or alerts from the M2M Device or Gateway. This package is also called Fault and Performance Management.
* **Software/Firmware Management (SFW):** Allows installation /update/removal of application specific or SCL related software / firmware in M2M Device or Gateway.
* **Area Network Management (ANW):** Allows M2M Gateway-specific configuration and M2M Area Network and Device management through a M2M Gateway.
* **SCL Management (SCL):** Allows remote configuration and retrieval of M2M Device or Gateway service capability layer parameters.

Although the ETSI M2M specific data model SHOULD be based on the “common” part of existing OMA-DM and TR069 data models, it MAY contain a management object/parameter which is missing from one existing model or another. The bottom line is that the management object/parameter MUST be supported by at least one existing data model. Any request for the missing object/parameter of a M2M Device/Gateway which implements only OMA-DM or TR069 model is still allowed, but SHALL result in an error response (e.g. 404 not found).

ETSI M2M specific data model shall be supported as mandatory function, while others are optional at implementation discretion.

All management functions except for SCL Management are exposed to network applications via mIa reference point. The access to those functions is controlled by the accessRight resource associated with the corresponding management resources.

Note: The same Management Object parameter on the same device shall not be allowed to be modified by more than one management authority (e.g. NA) in this release.

Table A-1Remote Entity Management Function List

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | | **Function** | | **ETSI resources and procedures** | | **Description** | | | **Equivalent in OMA DM** | | **Equivalent in BBF-TR069** |
| GEN-001 | | Retrieve device manufacturing information | | etsiDeviceInfo | | The device manufacturing information includes device identifier, device type, manufacture information, version information, etc. | | | urn:oma:mo:oma-dm-devinfo:1.0 [16]  urn:oma:mo:oma-dm-devdetail:1.1 [16] | | DeviceInfo [17] |
| GEN-002 | | Enable/Disable a specific REM function | | CREATE/ DELETE corresponding <mgmtObj> | | Enable or Disable a specific REM function to be exposed via mIa by creating or deleting the corresponding <mgmtObj> resource in N-SCL.  The use cases include but not limited to adding a instance for a multi-instance manageable parameters/ objects (e.g. firmware/ software), and activate a management function only when it’s needed (e.g. disable wifi/camera when entering a restrict area) | | | Add / Delete method [9] | | AddObject / DeleteObject method [13] |
| GEN-003 | | Discover manageable objects / parameters | | Discover the <mgmtObj> | | Discover the manageable objects / parameters supported by the device at the run-time, especially for the “optional” or “multi-instance” ones. | | | Get MO tree with attribute filter criteria [18]:  ?list=”Struct”  ?list=”StructData”  ?list=”TNDS”  ?list=”MORoot”  ?list=”MORootData” | | GetParameterNames method [13] |
| GEN-004 | | Support RPC command execution | | <mgmtCmd> | | Performing RPC-like management command without an associated MO tree. | | | n/a | | FactoryReset method [13]  Reboot method [13]  Upload method [13]  Download method [13]  ScheduleDownload method [13]  ScheduleInform method [13]  ChangeDUState method [13] |
|  | |  | |  | |  | | |  | |  |
| CFG-001 | | Activate / deactivate device hardware components. And retrieve current status. | | etsiDeviceCapability | | The hardware components include camera, display, speaker, USB, GPS etc. | | | urn:oma:mo:oma-dcmo:1.0 [19] | | UserInterface [20]  SmartCardReader [20]  USBHosts [20] |
| CFG-002 | | Activate / deactivate communication modules.  And retrieve current status. | | etsiDeviceCapability | | The communication modules include Bluetooth, WLAN, UPnP, etc. | | | urn:oma:mo:oma-dcmo:1.0 [19] | | UPNP [20]  WLAN-Configuration [22] |
| CFG-003 | | Reboot complete device | | etsiReboot | | Support reboot level and timing control | | | urn:oma:mo:oma-diag:restart:1.0 [21] | | Reboot method [13] |
| CFG-004 | | Factory reset complete device | | etsiReboot | | Reset to factory default state | | | urn:oma:mo:oma-lawmo:1.0 [23] | | Factory reset method [13] |
|  | |  | |  | |  | | |  | |  |
| D&M-001 | | Monitor general device run-time parameters | | n/a | | General run-time parameters include device uptime, roaming statue, etc. | | | urn:oma:mo:oma-dm-devdetail:1.1[16] | | DeviceInfo [17][20] |
| D&M-002 | | Monitor battery information | | etsiBattery | | Battery information includes current level, charging status, standby time, etc. | | | urn:oma:mo:oma-diag:batteryinfo:1.0 [21] | | n/a |
| D&M-003 | | Monitor memory status | | etsiMemory | | Memory status includes the available space, total space, etc. | | | urn:oma:mo:oma-diag:memory:1.0 [21] | | DeviceInfo [20] |
| D&M-004 | | Monitor CPU and process information | | n/a | | CPU and process information includes the current usage of CPU, process id, etc. | | | n/a | | DeviceInfo [20] |
| D&M-005 | | Monitor temperature information | | n/a | | The temperature information of the device. | | | n/a | | .DeviceInfo [20] |
| D&M-006 | | Monitor radio metrics | | n/a | | The working performance of the radio interface(s) on the device | | | urn:oma:mo:oma-diag:RFParms\_3GPP\_GSM:1.0 [21]  urn:oma:mo:oma-diag:RFParms\_3GPP\_UMTS:1.0 [21]  urn:oma:mo:oma-diag:RFParms\_3GPP\_LTE:1.0 [21] | | n/a |
| D&M-007 | | Monitor NFC status | | n/a | | NFC parameters | | | urn:oma:mo:oma-diag:NFC:1.0 [21] | | n/a |
| D&M-008 | | Set diagnostic trap events notification. | | etsiTrapEvent | | Such events include temperature warning, short of memory, application exception, etc. | | | urn:oma:mo:oma-diagmontrap:1.0 [24]  urn:oma:mo:oma-diag:trap-geo:1.0 [25]  urn:oma:mo:oma-diag:trap-rxpwr:1.0 [25] | | SetParameterAttritutes method [13] with argument. |
| D&M-009 | | Collect historical or statistical performance/ fault data | | etsiPerformanceLog | | Such data include , etc. | | | urn:oma:mo:oma-diagmon:1.0 [26]  urn:oma:mo:oma-diag:trapeventlogging:1.0 [21]  urn:oma:mo:oma-diag:paniclog:1.0 [21]  urn:oma:mo:oma-diag:appmonlog:1.0 [21] | | DownloadDiagnostics [17][22]  UploadDiagnostics [17][22]  IPPingDiagnostics [17][22]  TraceRouteDiagnostics [17][22]  SelfTestDiagnostics [20]  NSLookupDiagnostics [20]  PeriodicStatistics [20] |
|  | |  | |  | |  | | |  | |  |
| SFW-001 | | Firmware Management | | etsiFirmware | | Checking firmware status, performing firmware download, update and removal operations. | | | urn:oma:mo:oma-fumo:1.0 [27] | | Download Method [13]  Command in Signed Package [13] |
| SFW-002 | | Software Management | | etsiSoftware | | Checking software status, performing software download, (un)install, (de-)activate and removal operations. | | | [28] | | [20]  ChangeDUState Method [13] |
|  | |  | |  | |  | | |  | |  |
| ANW-001 | | Management of attached D’ (d) devices | | attachedDevices | | List of attached D’ (or d) devices and the MOs thereof | | | urn:oma:mo:oma-gwmo-deviceinventory:1.0 [29] | | InternetGatewayDevice.LANDevice [22] |
| ANW-002 | | Report device attach/detach events | | SUBSCRIBE/ NOTIFY procedures | | Gateway can report the events of the (de)attachment of D’ devices | | | urn:oma:mo:oma-gwmo-config:1.0 [29] | | Active Notification [13] |
| ANW-003 | | Fan-out management | | Reuse <group> resource | | A single operation performed on a number of devices. (e.g. bulk firmware upgrade, group-based operations) | | | urn:oma:mo:oma-gwmo-imageinventory:1.0 [29]  urn:oma:mo:oma-gwmo-fanout:1.0 [29] | | n/a |
| ANW-004 | | Area Network Management | | etsiAreaNwkInfo  etsiAreaNwkDeviceInfo | | Configuring or monitoring the area network specific parameters (e.g. MTU, network type). | | | n/a | | n/a |
|  | |  | |  | |  | | |  | |  |
| SCL-001 | | Registration Configuration/ Retrieval | | etsiScl | | Default parameters/policies related to SCL registration (e.g. target SCL list, expiration duration, accessRightID, searchStrings) | | | n/a | | n/a |
| SCL-002 | | Announcement Configuration/ Retrieval | | etsiScl | | Default parameters/policies related to announcement (e.g. announcedTo list, expiration duration) | | | n/a | | n/a |
| SCL-003 | | Misc | | etsiScl | | Other default parameters/policies (e.g. Max number of discovery records) | | | n/a | | n/a |

A.2 ETSI M2M specific Management Objects Data Model

## A.2.1 Resource etsiSclMo

Editor’s note: (to be endorsed by OMA-DM and BBF-TR069)

Editor’s Note: The structure of etsiSclMo is to be developed by ETSI TC M2M. The final outcome of etsiSclMo shall be endorsed by OMA-DM and/or BBF-TR069 so that remote configuration of D/G-SCL can be implemented through the existing DM/TR069 management procedures over mId reference points.



**Figure A.2.2.1 SCLMO structure**

The etsiSclMo resource shall contain the following sub resources:

|  |  |  |  |
| --- | --- | --- | --- |
| **subResource** | **Mandatory/Optional** | **Multiplicity** | **Description** |
| Subscriptions | M | 1 | See xxx. |
| sclMoAction | M | 1 | A sub-resource that contains the action to be executed |

and the following attributes:

|  |  |  |  |
| --- | --- | --- | --- |
| **AttributeName** | **Mandatory/Optional** | **Type** | **Description** |
| expirationTime | M | RW | See xxx. |
| accessRightID | M | RW | See xxx. |
| searchStrings | M | RW | See xxx. |
| creationTime | M | RO | See xxx. |
| lastModifiedTime | M | RO | See xxx. |
| moID | M | WO | See xxx |
| originalMO | M | WO | See xxx |
| Description | O | RW | the text-format description of mgmtObj |
| regTargetNsclList | M | RW | A list of NSCLs that the D/G-SCL may use in order to perform a new registration (after reboot or not). |
| regExpirationDuration | O | RW | This represents the duration of the next registration. This parameter shall not be set to zero.  Any negative value stands for infinite duration. |
| regAccessRightID | O | RW | See xxx. |
| regSearchStrings | O | RW | This allows to modify the criteria for discovery of D/G-SCL |
| announcedToSclList | M | RW | Set default announcedTo-SCL list for D/G-SCL to announce local resources to remote SCLs (especially when the application doesn’t specify the announceTo attribute when creating resources). |
| maxNumberOfDiscovRecords | O | RW | Limits the maximum number of resourceURIs contained in a discovery result.  This attribute and the maxSizeOfDiscovAnswer attribute are mutually exclusive. |
| maxSizeOfDiscovAnswer | O | RW | The maximum size of the Discovery Answer. This value is expressed in bytes and is useful for very constrained devices.  This attribute and the maxNumberOfDiscovRecords attribute are mutually exclusive. |
| actionStatus | M | RO | Indicates the status of the Action (including a progress indicator, a final state and a reminder of the requested action) |

The etsiSclMo is used by a NSCL in order to configure some parameters in a D/G-SCL. The new parameters are taken into account for example after a reboot

## A.2.1.1 sclMoAction resource



Figure A.2.2.1 Structure of the sclMoAction resource

The sclMoAction resource shall contain the following sub resource:

|  |  |  |  |
| --- | --- | --- | --- |
| **subResource** | **Mandatory/Optional** | **Multiplicity** | **Description** |
| subscriptions | M | 1 | See xxx. |

and the following attributes:

|  |  |  |  |
| --- | --- | --- | --- |
| **AttributeName** | **Mandatory/Optional** | **Type** | **Description** |
| accessRightID | M | RW | See xxx. |
| creationTime | M | RO | See xxx. |
| lastModifiedTime | M | RO | See xxx. |
| reRegistration | O | RW | This action allows to immediately apply the new attributes by triggering a re-registration.  Note: an explicit de-registration shall be performed by removing the corresponding registered <scl> resource, not by sclMo handling. |

The execution of the action is triggered by the UPDATE of the corresponding action attribute.

A subsequent action shall not be authorized before the completion of the previous one.

## A.2.2 Resource etsiDeviceInfo

subscriptions

”attribute”

deviceId

hardwareVersion

manufacturer

model

deviceType

firmwareVersion

softwareVersion

etsiDeviceInfo

Figure A.2.3. Structure of the etsiDeviceInfo resource

The etsiDeviceInfo resource shall contain the following sub resources:

|  |  |  |  |
| --- | --- | --- | --- |
| **subResource** | **Mandatory/Optional** | **Multiplicity** | **Description** |
| Subscriptions | M | 1 | See xxx. |

and the following attributes:

|  |  |  |  |
| --- | --- | --- | --- |
| **AttributeName** | **Mandatory/Optional** | **Type** | **Description** |
| expirationTime | M | RW | See xxx. |
| accessRightID | M | RW | See xxx. |
| searchStrings | M | RW | See xxx. |
| creationTime | M | RO | See xxx. |
| lastModifiedTime | M | RO | See xxx. |
| contentType | M | RO | Editor's note: The format of this attribute is FFS. |
| moID | M | WO | See xxx |
| originalMO | M | WO | See xxx |
| Description | O | RW | the text-format description of mgmtObj |
| deviceId | M | RW | Unique device identity assigned by the manufacturer. The uniqueness may be global or only valid within a certain domain (e.g. vendor-wise). |
| Manufacturer | M | RW | The name/identifier of the device manufacturer |
| Model | M | RW | The name/identifier of the device mode assigned by the manufacturer |
| deviceType | M | RW | The type (e.g. cell phone, photo frame, smart meter) or product class (e.g. X-series) of the device |
| firmware Version | M | RW | The firmware version of the device |
| softwareVersion | M | RW | The software version of the device  Editor’s note: the meaning of this attribute needs to be further clarified. |
| hardwareVersion | M | RW | The hardware version of the device |

Editor’s note: in this description and in all the other descriptions related to the basic part of the <mgmtObj> resources, it is supposed that a way for subscribing to attributes is existing.

## A.2.3 Resource etsiDeviceCapability

0-n

etsiDeviceCapability

<capabilityInstance>

”attribute”

subscriptions

Figure A.2.4 Structure of the etsiDeviceCapability resource

The etsiDeviceCapability resource shall contain the following sub resources:

|  |  |  |  |
| --- | --- | --- | --- |
| **subResource** | **Mandatory/Optional** | **Multiplicity** | **Description** |
| <capabilityInstance> | O | 0::n | The sub-resource that contains the information about one of the capabilities of a device (e.g. camera, display, external storage, communication module, …) |
| Subscriptions | M | 1 | See xxx. |

and the following attributes:

|  |  |  |  |
| --- | --- | --- | --- |
| **AttributeName** | **Mandatory/Optional** | **Type** | **Description** |
| expirationTime | M | RW | See xxx. |
| accessRightID | M | RW | See xxx. |
| searchStrings | M | RW | See xxx. |
| creationTime | M | RO | See xxx. |
| lastModifiedTime | M | RO | See xxx. |
|  |  |  |  |
| moID | M | WO | See xx |
| originalMO | M | WO | See xx |
| description | O | RW | the text-format description of mgmtObj |

## A.2.3.1 <capabilityInstance> resource



Figure A.2.4.1 Structure of the <capabilityInstance> resource

The <capabilityInstance> resource shall contain the following sub resources:

|  |  |  |  |
| --- | --- | --- | --- |
| **subResource** | **Mandatory/Optional** | **Multiplicity** | **Description** |
| capabilityAction | M | 1 | A sub-resource that contains the actions to be executed. |
| subscriptions | M | 1 | See xxx. |

and the following attributes:

|  |  |  |  |
| --- | --- | --- | --- |
| **AttributeName** | **Mandatory/Optional** | **Type** | **Description** |
| accessRightID | M | RW | See xxx. |
| creationTime | M | RO | See xxx. |
| lastModifiedTime | M | RO | See xxx. |
| originalMO | M | WO | See xx |
| capabilityName | M | WO | The name of the capability |
| attached | M | RO | Indicates whether the capability is attached to the device or not. |
| actionStatus | M | RO | Indicates the status of the Action (including a progress indicator, a final state and a reminder of the requested action) |

.

## A.2.3.2 capabilityAction resource



Figure A.2.4.2 Structure of the capabilityAction resource

The capabilityAction resource shall contain the following sub resource:

|  |  |  |  |
| --- | --- | --- | --- |
| **subResource** | **Mandatory/Optional** | **Multiplicity** | **Description** |
| subscriptions | M | 1 | See xxx. |

and the following attributes:

|  |  |  |  |
| --- | --- | --- | --- |
| **AttributeName** | **Mandatory/Optional** | **Type** | **Description** |
| accessRightID | M | RW | See xxx. |
| creationTime | M | RO | See xxx. |
| lastModifiedTime | M | RO | See xxx. |
|  |  |  |  |
| enable | O | RW | The action that allows to enable the device capability |
| disable | O | RW | The action that allows to disable the device capability |

The execution of an action is triggered by the UPDATE of the corresponding action attribute.

A subsequent action shall not be authorized before the completion of the previous one.

## A.2.4 Resource etsiBattery

<batteryInstance>

standbyTime

0-n

etsiBattery

”attribute”

subscriptions

1

Figure A.2.5 Structure of the etsiBattery resource

The etsiBattery resource shall contain the following sub resources:

|  |  |  |  |
| --- | --- | --- | --- |
| **subResource** | **Mandatory/Optional** | **Multiplicity** | **Description** |
| <batteryInstance> | O | 0..n | A sub-resource that contains the information about one of the batteries of a device |
| subscriptions | M | 1 | See xxx. |

and the following attributes:

|  |  |  |  |
| --- | --- | --- | --- |
| **AttributeName** | **Mandatory/Optional** | **Type** | **Description** |
| expirationTime | M | RW | See xxx. |
| accessRightID | M | RW | See xxx. |
| searchStrings | M | RW | See xxx. |
| creationTime | M | RO | See xxx. |
| lastModifiedTime | M | RO | See xxx. |
|  |  |  |  |
| moID | M | WO | See xx |
| originalMO | M | WO | See xx |
| description | O | RW | the text-format description of mgmtObj |
| standbyTime | M | RW | The estimated time or operation based on the current level of all batteries  Editor’s note: to clarify with OMA-DM about the StandByTime in battery MO. |

## A.2.4.1 Resource <batteryInstance>

subscriptions

”attribute”

level

status

<batteryInstance>

Figure A.2.5.1 Structure of the <batteryInstance> resource

The <batteryInstance> resource shall contain the following sub resources:

|  |  |  |  |
| --- | --- | --- | --- |
| **subResource** | **Mandatory/Optional** | **Multiplicity** | **Description** |
|  |  |  |  |
| subscriptions | M | 1 | See xxx. |

and the following attributes:

|  |  |  |  |
| --- | --- | --- | --- |
| **AttributeName** | **Mandatory/Optional** | **Type** | **Description** |
| accessRightID | M | RW | See xxx. |
| creationTime | M | RO | See xxx. |
| lastModifiedTime | M | RO | See xxx. |
| originalMO | M | WO | See xx |
| level | M | RW | The current battery level |
| status | M | RW | Indicates the status of the battery |

## A.2.5 Resource etsiMemory

subscriptions

”attribute”

RAMAvailable

RAMTotal

etsiMemory

Figure A.2.6 Structure of the etsiMemory resource

The etsiMemory resource shall contain the following sub resources:

|  |  |  |  |
| --- | --- | --- | --- |
| **subResource** | **Mandatory/Optional** | **Multiplicity** | **Description** |
| subscriptions | M | 1 | See xxx. |

and the following attributes:

|  |  |  |  |
| --- | --- | --- | --- |
| **AttributeName** | **Mandatory/Optional** | **Type** | **Description** |
| expirationTime | M | RW | See xxx. |
| accessRightID | M | RW | See xxx. |
| searchStrings | M | RW | See xxx. |
| creationTime | M | RO | See xxx. |
| lastModifiedTime | M | RO | See xxx. |
| moID | M | WO | See xx |
| originalMO | M | WO | See xx |
|  |  |  |  |
| RAMAvailable | M | RW | The current available amount of RAM |
| RAMTotal | M | RW | The total amount of RAM |

## A.2.6 Resource etsiTrapEvent

0-n

<trapInstance>

etsiTrapEvent

”attribute”

subscriptions

Figure A.2.7 Structure of the etsiTrapEvent resource

The etsiTrapEvent resource shall contain the following sub resources:

|  |  |  |  |
| --- | --- | --- | --- |
| **subResource** | **Mandatory/Optional** | **Multiplicity** | **Description** |
| <trapInstance> | O | 0...n | The sub-resource that contains information about one trapEvent supported by a device |
| subscriptions | M | 1 | See xxx. |

and the following attributes:

|  |  |  |  |
| --- | --- | --- | --- |
| **AttributeName** | **Mandatory/Optional** | **Type** | **Description** |
| expirationTime | M | RW | See xxx. |
| accessRightId | M | RW | See xxx. |
| searchStrings | M | RW | See xxx. |
| creationTime | M | RO | See xxx. |
| lastModifiedTime | M | RO | See xxx. |
|  |  |  |  |
| moID | M | WO | See xx |
| originalMO | M | WO | See xx |
| description | O | RW | the text-format description of mgmtObj |

## A.2.6.1 Resource <trapInstance>



Figure A.2.7.1 Structure of the <trapInstance> resource

The <trapInstance> resource shall contain the following sub resources:

|  |  |  |  |
| --- | --- | --- | --- |
| **subResource** | **Mandatory/Optional** | **Multiplicity** | **Description** |
| trapEventAction | M | 1 | A sub-resource that contains the action to be executed. |
| Subscriptions | M | 1 | See xxx. |

And the following attributes:

|  |  |  |  |
| --- | --- | --- | --- |
| **AttributeName** | **Mandatory/Optional** | **Type** | **Description** |
| accessRightID | M | RW | See xxx. |
| CreationTime | M | RO | See xxx. |
| LastModifiedTime | M | RO | See xxx. |
| OriginalMO | M | WO | See xx |
| trapId | M | RW | The identifier that specifies the meaning of the trap event |
|  |  |  |  |
| eventOccured | M | RO | Indicated the occurrence of the event.  Editor’s note: this attribute indicates that the event was raised in the device. The management server was warned and has to warn the Network Application by using this attribute. The format of this attribute is FFS. It could be a Boolean, a time stamp or even a circular buffer … |
| actionStatus | M | RO | Indicates the status of the Action (including a progress indicator, a final state and a reminder of the requested action). |

## A.2.6.2 trapEventAction resource



Figure A.2.7.2 Structure of the trapEventAction resource

The trapEventAction resource shall contain the following sub resource:

|  |  |  |  |
| --- | --- | --- | --- |
| **subResource** | **Mandatory/Optional** | **Multiplicity** | **Description** |
| subscriptions | M | 1 | See xxx. |

and the following attributes:

|  |  |  |  |
| --- | --- | --- | --- |
| **AttributeName** | **Mandatory/Optional** | **Type** | **Description** |
| accessRightID | M | RW | See xxx. |
| creationTime | M | RO | See xxx. |
| lastModifiedTime | M | RO | See xxx. |
| enable | O | RW | The action that enables the Trap mode |
| disable | O | RW | The action that disables the Trap mode |

The execution of an action is triggered by the UPDATE of the corresponding action attribute.

A subsequent action shall not be authorized before the completion of the previous one.

## A.2.7 Resource etsiPerformanceLog



Figure A.2.8 Structure of the etsiPerformanceLog resource

The etsiPerformanceLog resource shall contain the following sub resources:

|  |  |  |  |
| --- | --- | --- | --- |
| **subResource** | **Mandatory/Optional** | **Multiplicity** | **Description** |
| perfLogAction | M | 1 | A sub-resource that contains the action to be executed. |
| subscriptions | M | 1 | See xxx. |

and the following attributes:

|  |  |  |  |
| --- | --- | --- | --- |
| **AttributeName** | **Mandatory/Optional** | **Type** | **Description** |
| expirationTime | M | RW | See xxx. |
| accessRightID | M | RW | See xxx. |
| searchStrings | M | RW | See xxx. |
| creationTime | M | RO | See xxx. |
| lastModifiedTime | M | RO | See xxx. |
| moID | M | WO | See xx |
| originalMO | M | WO | See xx |
| logTypeId | M | RW | Identifies the type of log that is concerned by the action |
| logData | M | R | Diagnostic data logged upon event of interests defined by this diagnostic function. The format of LogData is implementation dependent. It could be an XML file, a JSON document, or any other encoding format. |
| actionStatus | M | RO | Indicates the status of the Action (including a progress indicator, a final state and a reminder of the requested action) |

## A.2.7.1 Resource perfLogAction



Figure A.2.8.1 Structure of the perfLogAction resource

The perfLogAction resource shall contain the following sub resource:

|  |  |  |  |
| --- | --- | --- | --- |
| **subResource** | **Mandatory/Optional** | **Multiplicity** | **Description** |
| subscriptions | M | 1 | See xxx. |

and the following attributes:

|  |  |  |  |
| --- | --- | --- | --- |
| **AttributeName** | **Mandatory/Optional** | **Type** | **Description** |
| accessRightID | M | RW | See xxx. |
| creationTime | M | RO | See xxx. |
| lastModifiedTime | M | RO | See xxx. |
|  |  |  |  |
| start | O | RW | The action that allows to start the log corresponding to the mentioned logTypeId |
| stop | O | RW | The action that allows to stop the log corresponding to the mentioned logTypeId |

The execution of an action is triggered by the UPDATE of the corresponding action attribute.

A subsequent action shall not be authorized before the completion of the previous one.

## A.2.8 Resource etsiFirmware

etsiFirmware

<fwInstance>

0-n

”attribute”

subscriptions

Figure A.2.9 Structure of the etsiFirmware resource

The etsiFirmware resource shall contain the following sub resources:

|  |  |  |  |
| --- | --- | --- | --- |
| **subResource** | **Mandatory/Optional** | **Multiplicity** | **Description** |
| <fwInstance> | O | 0.n | The sub-resource that contains the information about one firmware of the device |
| subscriptions | M | 1 | See xxx. |

and the following attributes:

|  |  |  |  |
| --- | --- | --- | --- |
| **AttributeName** | **Mandatory/Optional** | **Type** | **Description** |
| expirationTime | M | RW | See xxx. |
| accessRightID | M | RW | See xxx. |
| searchStrings | M | RW | See xxx. |
| creationTime | M | RO | See xxx. |
| lastModifiedTime | M | RO | See xxx. |
| moID | M | WO | See xx |
| originalMO | M | WO | See xx |
|  |  |  |  |
| description | O | RW | the text-format description of mgmtObj |

## A.2.8.1 Resource <fwInstance>



Figure A.2.9.1 Structure of the <fwInstance> resource.

The <fwInstance> resource shall contain the following sub resources:

|  |  |  |  |
| --- | --- | --- | --- |
| **subResource** | **Mandatory/Optional** | **Multiplicity** | **Description** |
| fwAction | M | 1 | A sub-resource that contains the actions to be executed. |
| subscriptions | M | 1 | See xxx. |

and the following attributes:

|  |  |  |  |
| --- | --- | --- | --- |
| **AttributeName** | **Mandatory/Optional** | **Type** | **Description** |
| accessRightID | M | RW | See xxx. |
| creationTime | M | RO | See xxx. |
| lastModifiedTime | M | RO | See xxx. |
| originalMO | M | WO | See xx |
| firmwareName | M | RW | The name of the firmware to be used on the device |
| firmwareVersion | M | RW | The version of the concerned firmware |
| firmwareURL | M | RW | The URL from which the firmware image can be downloaded |
| actionStatus | M | RO | Indicates the status of the Action (including a progress indicator, a final state and a reminder of the requested action) |

## A.2.8.2 Resource fwAction.



Figure A.2.9.2 Structure of the fwAction resource.

The fwAction resource shall contain the following sub resource:

|  |  |  |  |
| --- | --- | --- | --- |
| **subResource** | **Mandatory/Optional** | **Multiplicity** | **Description** |
| subscriptions | M | 1 | See xxx. |

and the following attributes:

|  |  |  |  |
| --- | --- | --- | --- |
| **AttributeName** | **Mandatory/Optional** | **Type** | **Description** |
| accessRightID | M | RW | See xxx. |
| creationTime | M | RO | See xxx. |
| lastModifiedTime | M | RO | See xxx. |
|  |  |  |  |
| download | O | RW | The action that allows to download a new firmware |
| update | O | RW | The action that allows to install a new firmware previously downloaded |
| downloadAndUpdate | O | RW | The action that allows to download then install a new firmware in a single operation. |
| remove | O | RW | The action that allows to remove a firmware package previously downloaded. |

The execution of an action is triggered by the UPDATE of the corresponding action attribute.

A subsequent action shall not be authorized before the completion of the previous one.

## A.2.9 Resource etsiSoftware

etsiSoftware

<swInstance>

0-n

”attribute”

subscriptions

Figure A.2.10 Structure of the etsiSoftware resource

The etsiSoftware resource shall contain the following sub resources:

|  |  |  |  |
| --- | --- | --- | --- |
| **subResource** | **Mandatory/Optional** | **Multiplicity** | **Description** |
| <swInstance> | O | 0..n | The sub-resource that contains the information about one piece of software of the device |
| subscriptions | M | 1 | See xxx. |

and the following attributes:

|  |  |  |  |
| --- | --- | --- | --- |
| **AttributeName** | **Mandatory/Optional** | **Type** | **Description** |
| expirationTime | M | RW | See xxx. |
| accessRightID | M | RW | See xxx. |
| searchStrings | M | RW | See xxx. |
| creationTime | M | RO | See xxx. |
| lastModifiedTime | M | RO | See xxx. |
| moID | M | WO | See xx |
| originalMO | M | WO | See xx |
|  |  |  |  |
| description | O | RW | the text-format description of mgmtObj |

## A.2.9.1 Resource <swInstance>



Figure A.2.10.1 Structure of the <swInstance> resource

The <swInstance> resource shall contain the following sub resources:

|  |  |  |  |
| --- | --- | --- | --- |
| **subResource** | **Mandatory/Optional** | **Multiplicity** | **Description** |
| swAction | M | 1 | A sub-resource that contains the action to be executed. |
| subscriptions | M | 1 | See xxx. |

and the following attributes:

|  |  |  |  |
| --- | --- | --- | --- |
| **AttributeName** | **Mandatory/Optional** | **Type** | **Description** |
| accessRightID | M | RW | See xxx. |
| creationTime | M | RO | See xxx. |
| lastModifiedTime | M | RO | See xxx. |
| originalMO | M | WO | See xx |
| softwareName | M | RW | The name of the software |
| softwareVersion | M | RW | The version of the software |
| softwareURL | M | RW | The URL of the software to be downloaded |
| actionStatus | M | RO | Indicates the status of the Action (including a progress indicator, a final state and a reminder of the requested action) |

## A.2.9.2 Resource swAction



Figure A.2.10.2 Structure of the swAction resource.

The fwAction resource shall contain the following sub resource:

|  |  |  |  |
| --- | --- | --- | --- |
| **subResource** | **Mandatory/Optional** | **Multiplicity** | **Description** |
| subscriptions | M | 1 | See xxx. |

and the following attributes:

|  |  |  |  |
| --- | --- | --- | --- |
| **AttributeName** | **Mandatory/Optional** | **Type** | **Description** |
| accessRightID | M | RW | See xxx. |
| creationTime | M | RO | See xxx. |
| lastModifiedTime | M | RO | See xxx. |
|  |  |  |  |
| download | O | RW | The action that allows to download a new software |
| downloadAndInstall | O | RW | The action that allows to download then install a new software in a single operation |
| install | O | RW | The action that allows to install a software. previously downloaded |
| remove | O | RW | The action that allows to remove a software package previously downloaded. |
| activate | O | RW | The action that allows to activate a software previously installed |
| deactivate | O | RW | The action that allows to deactivate a software |

The execution of an action is triggered by the UPDATE of the corresponding action attribute.

A subsequent action shall not be authorized before the completion of the previous one.

## A.2.10 Resource etsiReboot



Figure A.2.11 Structure of the etsiReboot resource

The etsiReboot resource shall contain the following sub resources:

|  |  |  |  |
| --- | --- | --- | --- |
| **subResource** | **Mandatory/Optional** | **Multiplicity** | **Description** |
| rebootAction | M | 1 | A sub- resource that contains the action to be executed. |
| subscriptions | M | 1 | See xxx. |

and the following attributes:

|  |  |  |  |
| --- | --- | --- | --- |
| **AttributeName** | **Mandatory/Optional** | **Type** | **Description** |
| expirationTime | M | RW | See xxx. |
| accessRightID | M | RW | See xxx. |
| searchStrings | M | RW | See xxx. |
| creationTime | M | RO | See xxx. |
| lastModifiedTime | M | RO | See xxx. |
| moID | M | WO | See xx |
| originalMO | M | WO | See xx |
|  |  |  |  |
| rebootLevel | M | RW | Specify the level of rebooting, (e.g. OS level, all applications, a specific application) |
| rebootTiming | M | RW | Specify the timing requirement of rebooting (e.g. immediately, gracefully) |
| applicationRef | M | RW | Indicates which application has to be rebooted |
| actionStatus | M | RO | Indicates the status of the Action (including a progress indicator, a final state and a reminder of the requested action) |

## A.2.10.1 Resource rebootAction



Figure A.2.11.1 Structure of the rebootAction resource

The rebootAction resource shall contain the following sub resource:

|  |  |  |  |
| --- | --- | --- | --- |
| **subResource** | **Mandatory/Optional** | **Multiplicity** | **Description** |
| subscriptions | M | 1 | See xxx. |

and the following attributes:

|  |  |  |  |
| --- | --- | --- | --- |
| **AttributeName** | **Mandatory/Optional** | **Type** | **Description** |
| accessRightID | M | RW | See xxx. |
| creationTime | M | RO | See xxx. |
| lastModifiedTime | M | RO | See xxx. |
|  |  |  |  |
| reboot | O | RW | The action that allows to reboot the device |
| factoryReset | O | RW | The action that allows to make the device returning to the factory settings |

The execution of an action is triggered by the UPDATE of the corresponding action attribute.

A subsequent action shall not be authorized before the completion of the previous one.

## A.2.11 Resource etsiAreaNwkInfo

1

etsiAreaNwkInfo

“attribute”

n

subscriptions

1

<areaNwkInstance>

\*

numOfAreaNwks

Figure A.2.12 Structure of the etsiAreaNwkInfo resource

The etsiAreaNwkInfo resource shall contain the following sub resources:

|  |  |  |  |
| --- | --- | --- | --- |
| **subResource** | **Mandatory/Optional** | **Multiplicity** | **Description** |
| <areaNwkInstance> | M | 0::n | The sub-resource that contains the information about one of the M2M area networks connecting to the same M2M GW. |
| subscriptions | M | 1 | See xxx. |

and the following attributes:

|  |  |  |  |
| --- | --- | --- | --- |
| **AttributeName** | **Mandatory/Optional** | **Type** | **Description** |
| expirationTime | M | RW | See xxx. |
| accessRightID | M | RW | See xxx. |
| searchStrings | M | RW | See xxx. |
| creationTime | M | RO | See xxx. |
| lastModifiedTime | M | RO | See xxx. |
| contentType | M | RO | Editor's note: The format of this attribute is FFS. |
| moID | M | WO | See xxx |
| originalMO | M | WO | See xxx |
| description | O | RW | the text-format description of MO |
| numOfAreaNwks | M | RO | The number of area networks attached with the M2M GW |

### A.2.11.1 Resource <areaNwkInstance>

1

1

1

<areaNwkInstance>

“attribute”

n

subscriptions

1

areaNwkTypeInfo

1

areaNwkType

MTU

listOfDevices

Figure A.2.12. 1 Structure of the <areaNwkInstance> resource

The <areaNwkInstance> resource shall contain the following sub resources:

|  |  |  |  |
| --- | --- | --- | --- |
| **subResource** | **Mandatory/Optional** | **Multiplicity** | **Description** |
| listOfDevices | M | 1 | It is a group instance as defined in current M2M functional architecture.  Each member of listOfDevices is actually a reference to a corresponding <GSCL>/attachedDevices/<deviceInstance> |
| areaNwkTypeInfo | M | 1 | It is the placeholder to contain parameters specific to a type of M2M area networks, as denoted by the attribute, “areaNwkType”. For example, if areaNwkType shows that the M2M area network is 6LoWPAN, areaNwkTypeInfo will contain 6LoWPAN-specific parameters.  It will at least contain an “addressType” attribute to show the address type of this M2M area network. It could be IPv4, IPv6, non-IP, etc |
| subscriptions | M | 1 | See xxx. |

and the following attributes:

|  |  |  |  |
| --- | --- | --- | --- |
| **AttributeName** | **Mandatory/Optional** | **Type** | **Description** |
| expirationTime | M | RW | See xxx. |
| accessRightID | M | RW | See xxx. |
| searchStrings | M | RW | See xxx. |
| creationTime | M | RO | See xxx. |
| lastModifiedTime | M | RO | See xxx. |
| contentType | M | RO | Editor's note: The format of this attribute is FFS. |
| originalMO | M | WO | See xxx |
| description | O | RW | the text-format description of this MO |
| areaNwkType | M | RW | The type of this area network instance, such as bluetooth/6LoWPAN, 802.15.4/6LoWPAN, WiFi, PLC, etc |
| MTU | M | RO | The maximum transmission unit in this area network instance <areaNwkInstance> |

## A.12 Resource etsiAreaNwkDeviceInfo

\*

etsiAreaNwkDeviceInfo

“attribute”

n

subscriptions

1

<areaNwkDeviceInfoInstance>

Figure A.13 Structure of the etsiAreaNwkDeviceInfo resource

The etsiAreaNwkDeviceInfo resource shall contain the following sub resources:

|  |  |  |  |
| --- | --- | --- | --- |
| **subResource** | **Mandatory/Optional** | **Multiplicity** | **Description** |
| <areaNwkDeviceInfoInstance> | M | 1:n | A device may associate with multiple area networks, but at least one. This sub-resource contains parameters and information of the device related to each area network . |
| subscriptions | M | 1 | See xxx. |

and the following attributes:

|  |  |  |  |
| --- | --- | --- | --- |
| **AttributeName** | **Mandatory/Optional** | **Type** | **Description** |
| expirationTime | M | RW | See xxx. |
| accessRightID | M | RW | See xxx. |
| searchStrings | M | RW | See xxx. |
| creationTime | M | RO | See xxx. |
| lastModifiedTime | M | RO | See xxx. |
| contentType | M | RO | Editor's note: The format of this attribute is FFS. |
| originalMO | M | WO | See xxx |
| description | O | RW | the text-format description of this MO |

### A.12.1 Resource <areaNwkDeviceInfoInstance>

1

1

<areaNwkDeviceInfoInstance>

“attribute”

n

areaNwkTypeInfoOfDevice

1

areaNwkID

groups

sleepInterval

sleepDuration

status

1

1

1

subscriptions

1

Figure A.13.1 Structure of the <areaNwkDeviceInfoInstance> resource

The areaNwkDeviceInfoInstance resource shall contain the following sub resources:

|  |  |  |  |
| --- | --- | --- | --- |
| **subResource** | **Mandatory/Optional** | **Multiplicity** | **Description** |
| groups | M | 1 | It is the standard groups resource as defined in ETSI M2M functional architecture document and has following three group instances   * listOfDeviceNeighbors: each member of this group stands for a device which is the neighbour of the same <deviceInstance> * listOfDeviceApplications: each member of this group stands for a D’A on the same <deviceInstance> using the same M2M area network |
| areaNwkTypeInfoOfDevice | M | 1 | It is the placeholder to contain parameters specific to a type of M2M area networks, as denoted by the attribute, “areaNwkType”. For example, if areaNwkType shows that the M2M area network is 6LoWPAN, areaNwkTypeInfo will contain 6LoWPAN-specific parameters of the device. |
| subscriptions | M | 1 | See xxx. |

and the following attributes:

|  |  |  |  |
| --- | --- | --- | --- |
| **AttributeName** | **Mandatory/Optional** | **Type** | **Description** |
| expirationTime | M | RW | See xxx. |
| accessRightID | M | RW | See xxx. |
| searchStrings | M | RW | See xxx. |
| creationTime | M | RO | See xxx. |
| lastModifiedTime | M | RO | See xxx. |
| contentType | M | RO | Editor's note: The format of this attribute is FFS. |
| originalMO | M | WO | See xxx |
| description | O | RW | the text-format description of this MO |
| areaNwkID | M | RW | The reference to an <areaNwkInstance> which this device associates with. |
| sleepInterval | M | RW | The interval between two sleeps |
| sleepDuration | M | RW | The time duration of each sleep |
| status | M | RW | The status of the device (sleeping or waked up) |

\*\*\*\*\* Start of Proposed Change #2\*\*\*\*\*



## Normative references

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

[1] 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.

[2] ETSI TS 102 921: "Machine to Machine Communications (M2M); mIa, mId, dIa Interfaces".

[3] MIKEY-IBAKE: Identity-Based Mode of Key Distribution in Multimedia Internet KEYing (MIKEY), draft-cakulev-mikey-ibake-05.txt <https://datatracker.ietf.org/doc/draft-cakulev-mikey-ibake/>

[4] An EAP Authentication Method Based on Identity-Based Authenticated Key Exchange <http://tools.ietf.org/html/draft-cakulev-emu-eap-ibake-00>

[5] IBAKE: Identity-Based Authenticated Key Exchange <http://tools.ietf.org/html/draft-cakulev-ibake-04>

[4] 3GPP2 S.S0109, Generic Bootstrapping Architecture (GBA) Framework

[5] 3GPP TS 29.109, Generic Authentication Architecture (GAA); Zh and Zn Interfaces based on the Diameter protocol.

[6] 3GPP TS 24.109, Bootstrapping interface (Ub) and network application function interface (Ua); Protocol details.

[7] OMA-AD-DM-V1\_3: “Device Management Architecture, Version 1.3”

[8] OMA-TS-DM\_Notification-V1\_3: “OMA Device Management Notification Initiated Session, Version 1.3”

[9] OMA-TS-DM-Protocol-V1\_3: “OMA Device Management Protocol, Version 1.3”

[10] OMA-TS-DM\_Sessionless-V1\_3: “OMA Device Management Sessionless Message, Version 1.3”

[11] ETSI TS 102 690: “M2M Functional Architecture”

[12] ETSI TS 102 921: “M2M mIa, dIa and mId interfaces”

[13] Broadband Forum TR-069: “CPE WAN Management Protocol version 1.2, Issue: 1 Amendment 3”, http://www.broadband-forum.org/technical/download/TR-069\_Amendment-3.pdf

[14] OMA MLP TS: "Mobile Location Protocol", http://www.openmobilealliance.org

[15] 3GPP TS 23.271, Functional stage2 description of Location Services(LCS)

[16] OMA-TS-DM\_StdObj-V1\_3: “OMA Device Management Standardized Objects, Version 1.3”

[17] Broadband Forum TR-106: “Data Model Template for TR-069-Enabled Devices, Issue: 1 Amendment 3”

[18] OMA-TS-DM\_TND-V1\_3: “OMA Device Management Tree and Description, Version 1.3”

[19] OMA-TS-DCMO-V1\_0: “Device Capability Management Object, Version 1.0

[20] Broadband Forum TR-157: “Component Objects for CWMP, Issue: 1 Amendment 3”

[21] OMA-TS-DiagMon\_Functions-V1\_0: “DiagMon Functions Supplemental Specification, Version 1.0”

[22] Broadband Forum TR-098: “Internet Gateway Device Data Model for TR-069, Issue: 1 Amendment 2”

[23] OMA-TS-LAWMO-V1\_0: “Lock and Wipe Management Object, Version 1.0”

[24] OMA-TS-DiagMonTrapMOFrame-V1\_2: “Diagnostics and Monitoring Trap Framework Management Object, Version 1.2”

[25] OMA-TS-DiagMonTrapEvents-V1\_2: “Diagnostics and Monitoring Trap Events Specifications, Version 1.2”

[26] OMA-TS-DiagMonMO-V1\_0: “Diagnostics and Monitoring Management Object, Version 1.0”

[27] OMA-TS-DM-FUMO-V1\_0: “Firmware Update Management Object, Version 1.0”

[28] OMA-TS-DM-SCOMO-V1\_0: “Software Component Management Object, Version 1.0”

[29] OMA-TS-GwMO-V1\_0: “Gateway Management Object Technical Specification, Version 1.0”

\*\*\*\*\* End of Proposed Change #2\*\*\*\*\*