TTC仕様書
Technical Specification

TS-M2M-0007v2.0.0

oneM2M 技術仕様書
サービスコンポーネント

oneM2M Technical Specification
Service Components

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一般社団法人
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THE TELECOMMUNICATION TECHNOLOGY COMMITTEE

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TS-M2M-0007v2.0.0

oneM2M 技術仕様書－サービスコンポーネント [oneM2M Technical Specification - Service Components]

＜参考＞ [Remarks]

１．英文記述の適用レベル [Application level of English description]

適用レベル [Application level]：E2

本標準の本文、付属資料および付録の文章および図に英文記述を含んでいる。

[English description is included in the text and figures of main body, annexes and appendices.]

２．国際勧告等の関連 [Relationship with international recommendations and standards]

本標準は、oneM2M で承認された Technical Specification 0007V2.0.0 に準拠している。

[This standard is standardized based on the Technical Specification 0007 (V2.0.0) approved by oneM2M.]

３．上記国際勧告等に対する追加項目等 [Departures from international recommendations]

原標準に対する変更項目 [Changes to original standard]

原標準が参照する標準のうち、TTC 標準に置き換える項目。

[Standards referred to in the original standard, which are replaced by TTC standards.]

原標準が参照する標準のうち、それらに準拠した TTC 標準等が制定されている場合は自動的に

最新版 TTC 標準等に置き換え参照するものとする。

[Standards referred to in the original standard should be replaced by derived TTC standards.]

４．工業所有権 [IPR]

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[Status of "Confirmation of IPR Licensing Condition" submitted is provided in the TTC web site.]

５．作成専門委員会 [Working Group]

oneM2M 専門委員会 [oneM2M Working Group]

ONEM2M	
TECHNICAL SPECIFICATION	
Document Number	TS-0007-V2.0.0
Document Name:	Service Components
Date:	2016-August-30
Abstract:	This document specifies the M2M Services provided by the M2M Services Platform, the integration and interworking of the M2M Services functional architecture of the oneM2M Services Platform and informatively illustrates the use of the M2M Services within the context of complex business services.

About oneM2M

The purpose and goal of oneM2M is to develop technical specifications which address the need for a common M2M Service Layer that can be readily embedded within various hardware and software, and relied upon to connect the myriad of devices in the field with M2M application servers worldwide.

More information about oneM2M may be found at: http//www.oneM2M.org

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1 Scope

The present document describes the M2M Services provided by the oneM2M Services Platform, the integration and interworking of the M2M Services functional architecture of the oneM2M Services Platform and informatively illustrates the use of the M2M Services within the context of complex business services.

2 References

2.1 Normative 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 referenced document (including any amendments) applies.

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

[1]   oneM2M TS-0002: "oneM2M Requirements".

[2]   oneM2M TS-0001: "oneM2M Functional Architecture".

2.2 Informative 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 referenced document (including any amendments) applies.

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.

[i.1]   oneM2M Drafting Rules.

NOTE: Available at http://www.onem2m.org/images/files/oneM2M-Drafting-Rules.pdf.

[i.2]   W3C WD-wsdl20-patterns-20040326:"Web Services Description Language (WSDL) Version 2.0 Part 2: Message Exchange Patterns".

NOTE: Available at http://www.w3.org/TR/2004/WD-wsdl20-patterns-20040326.

[i.3]   OASIS soa-rm: "Reference Model for Service Oriented Architecture 1.0".

NOTE: Available at http://docs.oasis-open.org/soa-rm/v1.0/soa-rm.pdf.

[i.4]   oneM2M TS-0003: "oneM2M Security Solutions".

[i.5]   oneM2M TS-0004: "Service Layer Core Protocol Specification".

[i.6]   Broadband Forum TR-069: "CPE WAN Management Protocol"..

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

M2M Service: Service that creates added-value to the providing M2M Service Platform and is consumed by one or more Supporting Services

NOTE: The Data Exchange Service is an example of a M2M Service.

M2M Service Capability: Service Capability that is identified within the M2M Service Platform

M2M Service Registration: when a Service is deployed into a SOA environment; the SOA environment's Service Registry is updated so that the Service can be accessed by other Services

Proprietary Reference Point: Reference Point as defined in Functional Architecture [2] where the realization of the communication flows are implementation specific

service: mechanism to enable access to one or more Service Capabilities, where the access is provided using a prescribed interface and is exercised consistent with constraints and policies as specified by the service description [i.3]

service capability: real-world effect that a service provider is able to provide to a service consumer [i.3]

service cluster: collection of distributed and related Services that are gathered to solve a business problem

service component: entity of the M2M Services Architecture which may contain one or more M2M Services

service execution environment: Execution Environment is a logical entity that represents an environment capable of running Services

service exposure component: Service Component that provides an enforcement point for specific oneM2M Reference Points (e.g. Mca, Mcn, Mcc')

service registry: component of an underlying SOA environment that maintains information about Services and provides facilities to publish and discover Services to entities that would utilize the Service

supporting service: A Service that creates added-value to an organization and is relevant to the business process of the organization that consumes Services from the M2M Services Platform.

NOTE: Supporting Services are typically complex, orchestrated Services which consume M2M Services among other Services. A Device Onboarding Service is an example of a Supporting Service.

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

ACC	Accounting
AE	Application Entity
AE-ID	Application Entity Identifier
AMQP	Advanced Message Queuing Protocol
ASP	Application Service Provider
CDMA	Code Division Mupltiple Access
CSE	Common Service Entity
DM	Device Management
EDGE	Enhanced Data Rates for Global Evolution
ESB	Enterprise Service Bus
GNSS	Global Navigation Satellite System
GPRS	Global Packet Radio Service
GPS	Global Positioning System
INF	Infrastructure
JMS	Java Message Service
LAN	Local Area Network
M2M	Machine-to-Machine
M2M-Serv-Cap-ID	M2M Service Capability Identifier
MA	Management Agent
MEP	Message Exchange Pattern
MQTT	Message Queuing Telemetry Transport
NFC	Near Field Communication
NSE	Network Service Exposure
POA	Point of Attachment
SE	Service Exposure
SEA	Security Association Endpoint
SEE	Service Execution Environment
SOA	Service Oriented Architecture
SP	Service Provider
SSUB	Service Subscription

TRA	Transport Adapter
UPA	Universal Powerline Association
URL	Universal Resource Language
USB	Universal Serial Bus
WCDMA	Wideband Code Division Mupltiple Access
WLAN	Wireless Local Area Network
WSDL	Web Service Description Language
XMPP	Extensible Messaging and Presence Protocol

4 Conventions

The keywords "Shall", "Shall not", "May", "Need not", "Should", "Should not" in the present document are to be interpreted as described in the oneM2M Drafting Rules [i.1].

5 M2M Services Architecture

5.1 Introduction

This clause describes the architecture the M2M Services within the context of the M2M Services Platform.

The architecture of the M2M Service Platform as defined in the oneM2M Functional Architecture [2] includes an entity described as the Common Service Entity (CSE). The CSE comprises a set of service functions that are common to the M2M environment and are exposed through the Mca and Mcc' Reference Points. These Reference Points are described in the oneM2M Functional Architecture [2]. The M2M Service Architecture described in this present document is primarily suitable for the Infrastructure Domain where the CSE is viewed as a set of Service Components.

The M2M Service Architecture augments the oneM2M Functional Architecture by specifying M2M Services provided to M2M Application and M2M Service Providers.

These M2M Services are consumed by:

- AEs across the Mca Reference Point via the Service Exposure Component.

- Other Infrastructure CSEs across the Mcc' Reference Point via the Remote Service Exposure Component.

- Other Service Components across the Msc Reference Point.

These M2M Services utilize services of the:

- Underlying Network across the Mcn Reference Point via the Network Service Utilization Component.
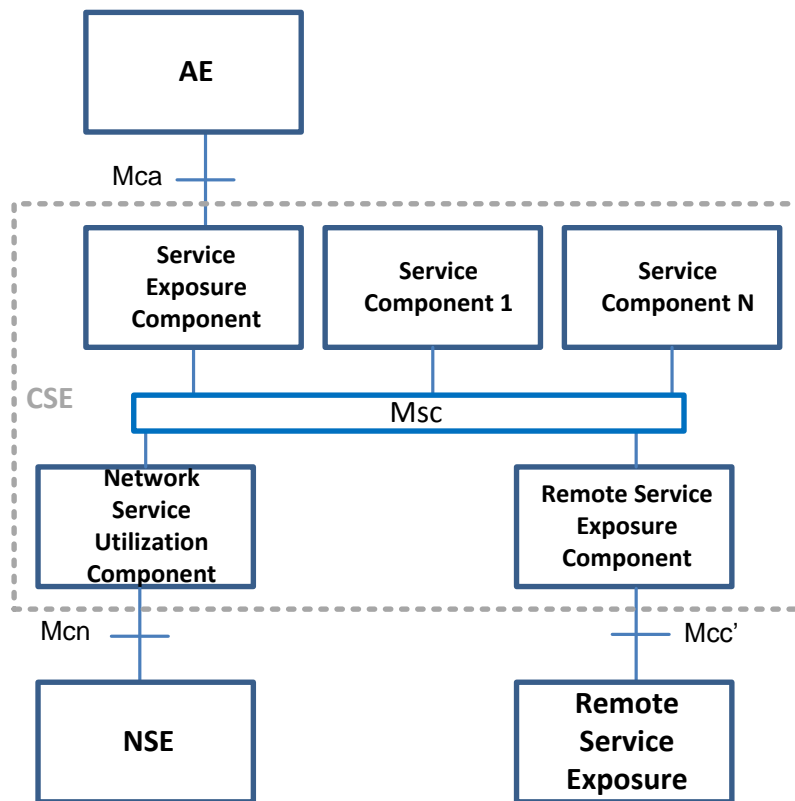
Figure 5.1-1: oneM2M Services Architecture

The oneM2M Services architecture in Figure 5.1-1 comprises of the following entities:

1) **Application Entity (AE):** Defined by the oneM2M Functional Architecture [2], the Application Entity provides Application logic for the end-to-end M2M solutions.

2) **Common Services Entity (CSE):** Defined by the oneM2M Functional Architecture [2], a Common Services Entity comprises the set of "service functions" that are common to the M2M environments and specified by oneM2M. For oneM2M Services, this definition of a CSE is a logical representation where "service functions" that are exposed through the Mca and Mcc' Reference Points via the corresponding Service Exposure and Remote Service Exposure Components and the Network Service Utilization Component utilizes services of the Underlying Network through the Mcn referent point. In addition Service Components consume and provide M2M Services with other Service Components.

As a logical representation of loosely coupled Service Components, the CSE is entity that in itself is identifiable but not directly addressable. Instead the addressable entities are the corresponding M2M Service Capabilities within the Service Exposure Components of the Reference Points:

- **Service Exposure Component:** The Service Exposure Component exposes M2M Service Capabilities to AEs.

- **Network Service Utilization Component:** The Network Service Utilization Component consumes Service Capabilities from the NSE.

- **Remote Service Exposure Component:** The Remote Service Exposure connects M2M Service Capabilities from different M2M environments.

The Service Exposure, Network Service Utilization and Remote Service Exposure Components follow the CSE Public Domain Names convention described in clause 6.5.1.1 of the Functional Architecture [2] but are extended as a sub-domain of the Infrastructure Node public domain name.

5.2 Reference Points

5.2.1 Introduction

The M2M Service Architecture exposes M2M Services across the Mca and Msc Reference Points. The enhancement of the Mcc and Mcc' Reference Point to expose M2M Services through the Remote Service Exposure Component is FFS. Likewise the Service Capabilities consumed from the NSE are FFS.

5.2.2 Mca Reference Point

The Mca Reference Point is defined within the oneM2M Functional Architecture [2]. This present document defines a set of service oriented capabilities that is used for the communication flow between the M2M Service Platform and the AE.

NOTE: In this present document, when an AE uses the Data Exchange M2M Service Capabilities defined in this present document across the Mca Reference Point, the CSE transmits the payload through the M2M Service Platform; offering additional M2M Services (e.g. Authorization, Event Collection) associated with the transmittal of the payload.

5.2.3 Msc Reference Point

5.2.3.1 Introduction

The Msc Reference Point is a Proprietary Reference Point that specifies set of interactions between the Service Capabilities of different Service Components.

5.2.3.2 Message Exchange Patterns

Communication between M2M Service Components which pass over the Msc Reference Point utilizes a web services approach, e.g. Web Services Message Exchange Patterns (MEP) defined by WSDL [i.2]:

- In-Only.

- Robust In-Only.

- In-Out.

- In-Optional-Out.

- Out-Only.

- Robust Out-Only.

- Out-In.

- Out-Optional-In.

Figure 5.2.3.1-1: Message Exchange Patterns

The MEP(s) utilized by a M2M Service Capability is documented within the Service Capabilities Policy clause.

NOTE: A subset of the MEPs provided by a M2M Service Capability would be exposed by the Service Exposure Component or the Remote Service Exposure Component.

5.2.3.2   M2M Identifiers

5.2.3.2.1   M2M Service Capability Identifier (M2M-Serv-Cap-ID)

Service Components contain multiple M2M Services (M2M-Serv-ID). Each M2M Service contains multiple M2M Service Capabilities. The M2M Service Capability Identifier is assigned to each M2M Service Capability.

Table 5.2.3.2.1-1: M2M Service Capability Identifier

Identifier	Assigned by	Assigned to	Assigned during	Lifetime	Uniqueness	Used during	Remarks
M2M Service Capability Identifier	M2M SP	M2M Service Capability	M2M Service Registration. This is the identifier from the Services Registry.	Life of the M2M Service Registration.	Global	Message exchange between Service Components across the Msc and Mcc'. Message exchange across the Mca.	

5.2.4 Mcc' Reference Point

The Mcc' Reference Point is defined within the oneM2M Functional Architecture [2]. The oneM2M Service Architecture utilizes communications over the Mcc' Reference Point to construct a Service Cluster for service sharing and capacity expansion. A messaging exchange protocol (e.g. AMQP, XMPP, JMS) between two service execution environments (SEE) (e.g. ESB, Apache Service Mix) accommodates the SEEs with same and different ownership.

NOTE: The M2M Service Capabilities that are exposed across the Mcc' Reference Point is FFS. Likewise, the protocol used for communication between SEEs with different ownership may require additional security capabilities and is FFS.

5.2.5 Mcn Reference Point

The Mcn Reference Point is defined within the oneM2M Functional Architecture [2].

NOTE: The Service Capabilities that are consumed across the Mcn Reference Point is FFS.

5.3 Configurations support by M2M Service Architecture

M2M Services exposed across the Mca, Mcn, Mcc' and Msc reference are supported for Infrastructure Nodes as defined in the oneM2M Functional Architecture [2].

6 M2M Services

6.1 Introduction

This clause describes the M2M Services provided by the M2M Services Platform. The M2M Services defined in this clause are utilized by the Supporting Services described in the annexes of the present document.

Service Subscription	Authotization	Data Exchange	Broker
Device Management	Management Adapter	Service Administration	Service Subscription Administration
Event Collection	Registration	Registration Administration	
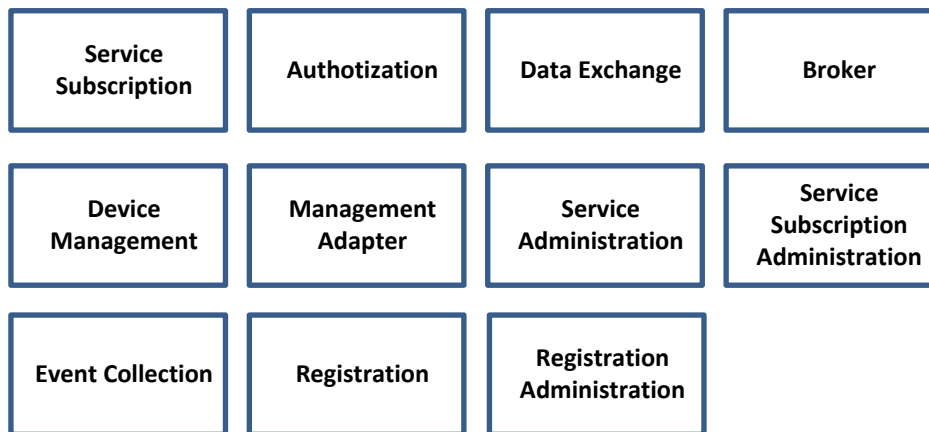
Figure 6.1-1: M2M Services

6.2 Service Subscription

6.2.1 Overview

The Service Subscription service provides the ability to:

- Validate the M2M Service Capabilities (e.g. requests, notifications) that go across the Mca Reference Point by ensuring M2M Service requested by the originator is permitted within the context of the M2M Service Subscription.

- Retrieve the Application Entity and associated M2M Service Subscription for the Application Entity.

- Assist in returning the Broker and Transport Adapter service instances needed to exchange data for data exchange service capabilities.

- Assist in returning the Management Adapter service instance needed to manage the device.

6.2.2 M2M Service Subscription Entities

6.2.2.1 Overview

Figure 6.2.2.1-1 describes the associations between the AE, Service Roles and the M2M Service Capabilities to obtain an Application Entity and validate the M2M Service Subscription:

- The M2M Service Subscription(s) for a specified M2M Service Capability is validated through the associations the Service Role has to the M2M Service Capability and M2M Service Subscription.

- The Application Entity and associated M2M Service Subscription is obtained through the Application Entity's to the M2M Service Subscription that is created during registration of the Application Entity.
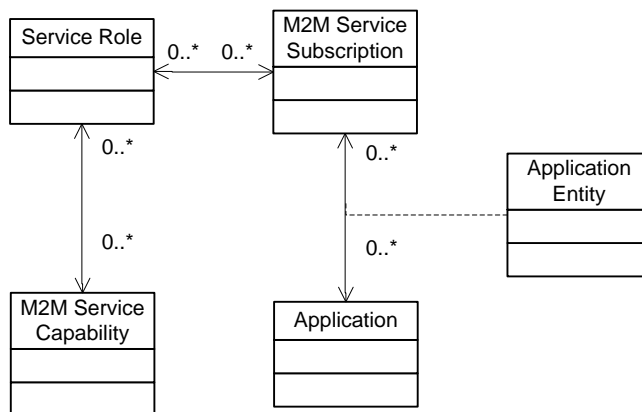
Figure 6.2.2.1-1: Service Subscription Entity Relationships

6.2.2.2   M2M Service Subscription Broker Entities

In the present document. Brokers are used to exchange data between AEs where the AEs use the publish-subscribe data exchange pattern. Brokers are typically implemented using types of Message Queue technologies (e.g. MQTT, XMPP).

Figure 6.2.2.2-1 describes the associations between the AE, M2M Service Subscription, M2M Service Capability and the Broker resource in order to obtain the Broker used to exchange the data:

- The Broker is obtained through the association of the Broker Resource and the M2M Service Capability.

- The Broker Resource is associated with Applications which are themselves associated with the Application Entity in the context of a M2M Service Subscription.
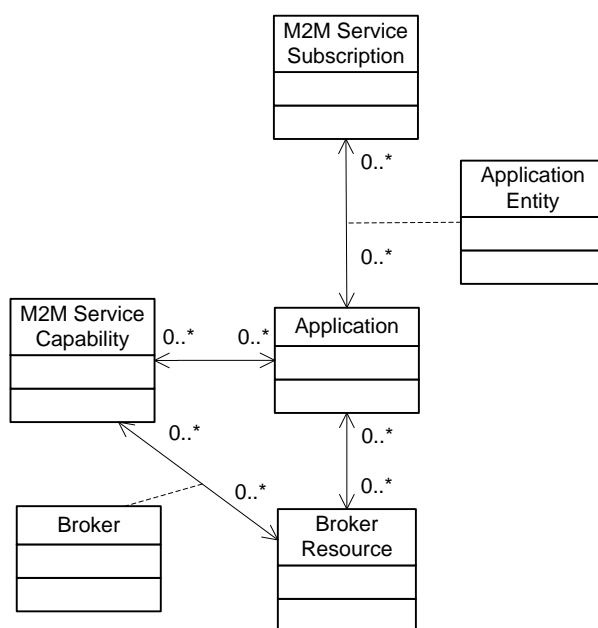
Figure 6.2.2.2-1: M2M Service Subscription for Broker Entity Relationships

6.2.2.3   M2M Service Subscription Management Adapter Entities

Figure 6.2.2.3-1 describes the associations between the M2M Service Subscription, M2M Nodes associated with the M2M Service Subscription and M2M Service Capability in order to obtain the Management Adapter:

- The Management Adapter is obtained through the association of the M2M Node and the M2M Service Capability.

- The M2M Node is associated with the M2M Service Subscription.
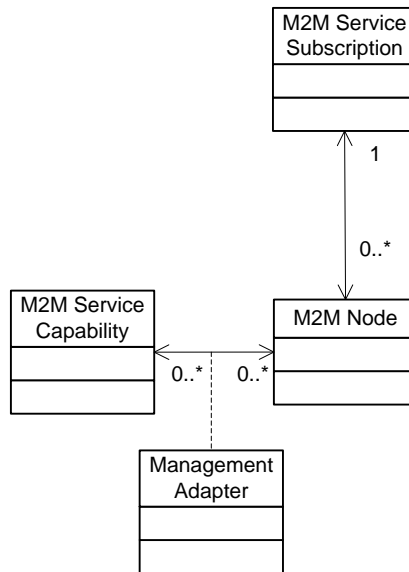
Figure 6.2.2.3-1: M2M Service Subscription For Management Adapter Entity Relationships

6.2.2.4 M2M Service Subscription Transport Adapter Entities

In the present document, Transport Adapters for request-reply message exchange patterns. Transport Adapters are typically implemented using types of Message technologies (e.g. WSDL, REST).

Figure 6.2.2.4-1 describes the associations between the M2M Service Subscription, AE and M2M Service Capability in order to obtain the Transport Adapter:

- The Transport Adapter is obtained through the association of the Application and the M2M Service Capability.

- The Application is associated with the M2M Service Subscription.

- The AE is associated with an Application and M2M Service Subscription AE registration.
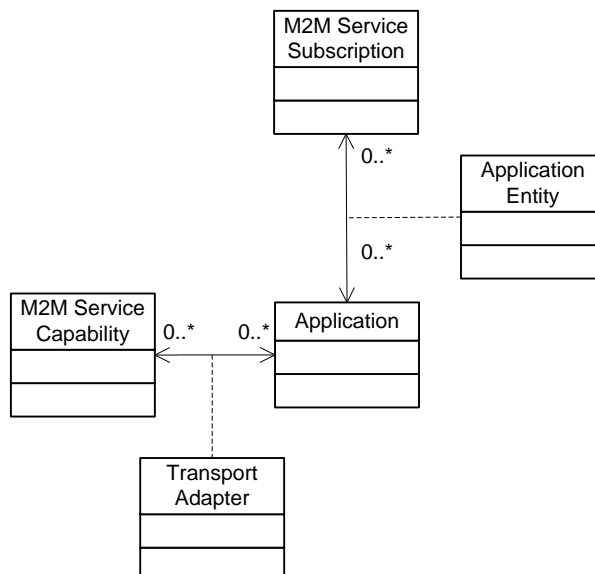
Figure 6.2.2.4-1: M2M Service Subscription For Transport Adapter Entity Relationships

6.2.3 Service Capabilities

6.2.3.1 validateServiceSubscription

6.2.3.1.1 Description

This service capability ensures that a valid M2M Service Subscription exists for the requested M2M Service Capability requested that is either received by the M2M Service Platform from an AE or is transmitted to the AE from the M2M Service Platform.

6.2.3.1.2 Pre-Conditions

A correlation between the M2M Service Capability, M2M Service Role(s) and the M2M Service Subscription has been defined in order to validate the M2M Service Subscription.

6.2.3.1.3 Signature - validateServiceSubscription

Table 6.2.3.1.3-1: Service Subscription - validateServiceSubscription capability

Parameter name	Direction	Optional	Description
serviceSubscriptionId	IN	NO	The M2M Service Subscription Identifier (M2M-Service-Profile-ID)
serviceCapId	IN	NO	The M2M Service Capability Identifier (M2M-Serv-Cap-ID)
responseType	OUT	NO	Response types: • M2M Service Capability does not exist for requested M2M Service Subscription • M2M Service Capability does exist for the requested M2M Service Subscription

6.2.3.1.4 Post-Conditions

Not Applicable.

6.2.3.1.5 Exceptions

Not Applicable.

6.2.3.1.6 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.2.3.1.7 oneM2M Resource Interworking

This service capability interworks with the following oneM2M Resource operations that are interworked are:

• RETRIEVE <m2MServiceSubscriptionProfile> resource retrieves the associated Service Roles. A M2M Service Capability is associated with the M2M Service Roles. The M2M Service Subscription is validated through the Service Roles associated with the M2M Service Capability.

6.2.3.2 getAE

6.2.3.2.1 Description

This service capability provides the ability to retrieve the Application Entity information and associated M2M Service Subscription Identifier associated with the Application Entity Identifier.

6.2.3.2.2 Pre-Conditions

Not Applicable.

6.2.3.2.3 Signature - getAE

Table 6.2.3.2.3-1: Service Subscription - getAE capability

Parameter name	Direction	Optional	Description
aeId	IN	NO	The Application Entity Id (AE-ID).
applicationId	OUT	NO	The Application Identifier (App-ID) for the AE.
serviceSubscriptionId	OUT	YES	The M2M Service Subscription (M2M-Service-Profile-ID) for the AE.
externalIds	OUT	YES	The external identifiers of the device that hosts the AE.
reachabilitySchedule	OUT	YES	The contact reachability schedule information of the AE associated with the device node. The absence of this parameter implies the AE associated with the device node is always contact reachable. Type Schedule, see clause 6.9.2.7.1.
responseType	OUT	YES	Unique response types for this service: • AE does not exist.

6.2.3.2.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the service capability:
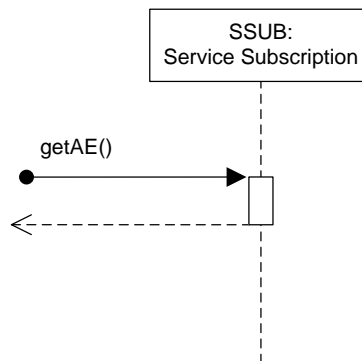
Figure 6.2.3.2.4-1: Service Subscription - getAE Diagram

6.2.3.2.5 Post-Conditions

Not Applicable.

6.2.3.2.6 Exceptions

Not Applicable.

6.2.3.2.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

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6.2.3.2.8 oneM2M Resource Interworking

When an AE is registered using a CREATE operation on the <AE> resource, the AE is associated with the M2M Service Subscription which is returned along with the correlated AE information (e.g. Application, Device).

6.2.3.3 getBroker

6.2.3.3.1 Description

This service capability obtains the Broker instance that will be used to subscribe and publish requests based on the requested M2M Service Capability (e.g. publishRequest, subscribeRequest), AE, Resource and M2M Service Subscription.

For the publishRequest service capability the AE is the from AE-ID and the resource is the toResource representing a leaf node from the publication resource.

For the subscribeRequest service capability the AE is the from AE-ID and the resource is the publication resource.

6.2.3.3.2 Pre-Conditions

A correlation between a M2M Service Subscription, AE, Service Capability, Resource and Broker exist.

6.2.3.3.3 Signature - getBroker

Table 6.2.3.3.3-1: Service Subscription - getBroker capability

Parameter name	Direction	Optional	Description
serviceSubscriptionId	IN	NO	The M2M Service Subscription Identifier (M2M-Service-Profile-ID).
serviceCapId	IN	NO	The M2M Service Capability Identifier (M2M-Serv-Cap-ID).
aeId	IN	NO	The identifier of the AE
resource	IN	NO	The identifier of the resource that is associated with the AE and M2M Service Subscription
broker	OUT	NO	The returned instance of the Broker service associated with the M2M Service Subscription.
responseType	OUT	NO	Response types: • Broker does not exist for requested M2M Service Capability, M2M Service Subscription and Resource.

6.2.3.3.4 Post-Conditions

Not Applicable.

6.2.3.3.5 Exceptions

Not Applicable.

6.2.3.3.6 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.2.3.3.7 oneM2M Resource Interworking

This service capability interworks with the following oneM2M Resource operations that are interworked are:

• Not Applicable.

6.2.3.4 getManagementAdapter

6.2.3.4.1 Description

This service capability obtains the Management Adapter instance that will be used to manage device based on the requested M2M Service Capability (e.g. downloadFirmware, installFirmware) and device.

6.2.3.4.2　　Pre-Conditions

A correlation between a Management Adapter, the M2M Service Capability and device exist.

6.2.3.4.3　　Signature - getManagementAdapter

Table 6.2.3.4.3-1: Service Subscription - getManagementAdapter capability

Parameter name	Direction	Optional	Description
serviceSubscriptionId	IN	YES	The M2M Service Subscription Identifier (M2M-Service-Profile-ID), is optional when the deviceId is unique across M2M Service Subscription.
serviceCapId	IN	NO	The M2M Service Capability Identifier (M2M-Serv-Cap-ID).
deviceId	IN	YES	The unique device identifier in the context of the M2M Service Subscription.
managementAdapter	OUT	NO	The returned instance of the Management Adapter service associated with the subscription.
responseType	OUT	NO	Response types: • Management Adapter does not exist.

6.2.3.4.4　　Post-Conditions

Not Applicable.

6.2.3.4.5　　Exceptions

Not Applicable.

6.2.3.4.6　　Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.2.3.4.7　　oneM2M Resource Interworking

This service capability interworks with the following oneM2M Resource operations that are interworked are:

• Not Applicable.

6.2.3.5　　getTransportAdapter

6.2.3.5.1　　Description

This service capability obtains the Transport adapter instance that will be used to send requests based on the requested M2M Service Capability, AE and M2M Service Subscription.

6.2.3.5.2　　Pre-Conditions

A correlation between a M2M Service Subscription, AE and type of transport adapter (e.g. Broker) service exist.

6.2.3.5.3　　Signature - getTransportAdapter

Table 6.2.3.5.3-1: Service Subscription - getTransportAdapter capability

Parameter name	Direction	Optional	Description
serviceSubscriptionId	IN	NO	The M2M Service Subscription Identifier (M2M-Service-Profile-ID)'.
serviceCapId	IN	NO	The M2M Service Capability Identifier (M2M-Serv-Cap-ID).
aeId	IN	NO	The identifier of the AE that is to target of the request ("to") (AE-ID).
transportAdapter	OUT	NO	The returned instance of the service (e.g. Broker) associated with the M2M Service Subscription.
responseType	OUT	NO	Response types: • Transport Adapter does not exist for requested M2M Service Capability, M2M Service Subscription and target.

6.2.3.5.4   Post-Conditions

Not Applicable.

6.2.3.5.5   Exceptions

Not Applicable.

6.2.3.5.6   Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.2.3.5.7   oneM2M Resource Interworking

Not Applicable.

6.2.3.6   associateAEWithServiceSubscription

6.2.3.6.1   Description

This service capability provides the ability to associate an AE with a M2M Service Subscription. This service capability shall be restricted to the Msc Reference Point.

6.2.3.6.2   Pre-Conditions

One of the following combinations has to be unique within the M2M System for the AE to be associated with an M2M Service Subscription:

- Identifier of Application Entity (AE-ID); or

- Identifier of the M2M Application (App-ID) and the credential identifier for the M2M Application.

The M2M System is pre-provisioned with the Application Rule (clause 6.9.2.5) that includes one of the above combinations in order for a M2M Service Subscription to the returned.

6.2.3.6.3   Signature - associateAEWithServiceSubscription

Table 6.2.3.6.3-1: Service Subscription - associateAEWithServiceSubscription capability

Parameter name	Direction	Optional	Description
aeId	IN	NO	The Application Entity Identifier (AE-ID).
credentialId	IN	YES	The Application Credential Identifier.
applicationId	IN	YES	The Application Identifier (App-ID).
serviceSubscriptionId	OUT	NO	The M2M Service Subscription Identifier (M2M-Service-Profile-ID).
responseType	OUT	YES	Unique response types for this service: • M2M Service Subscription does not exist. • Application Entity Identifier is not unique within the context of the M2M System.

6.2.3.6.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue this capability:
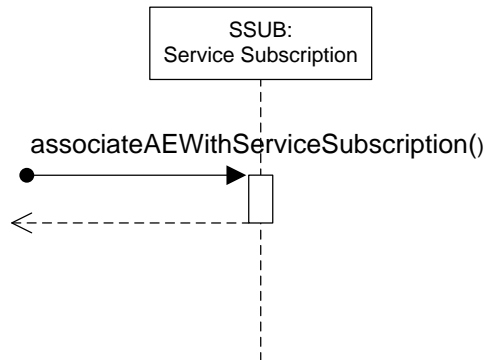
Figure 6.2.3.6.4-1: Service Subscription - associateAEWithServiceSubscription Diagram

6.2.3.6.5 Post-Conditions

The Application Entity Identifier (AE-ID) provided as the input parameter is associated with the M2M Service Subscription.

6.2.3.6.6 Exceptions

Not Applicable.

6.2.3.6.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.2.3.6.8 oneM2M Resource Interworking

This service capability associates the AE-ID with the M2M Service Subscription Profile. Currently oneM2M TS-0001 [2] does not define how an AE is associated with a M2M Service Subscription Profile as part of a registration flow.

6.2.3.7 disassociateAEFromServiceSubscription

6.2.3.7.1 Description

This service capability provides the ability to remove the association of an AE from a M2M Service Subscription. This service capability shall be restricted to the Msc Reference Point.

6.2.3.7.2 Pre-Conditions

An AE has successfully registered with the M2M system.

6.2.3.7.3 Signature - disassociateAEFromServiceSubscription

Table 6.2.3.7.3-1: Service Subscription - disassociateAEFromServiceSubscription capability

Parameter name	Direction	Optional	Description
aeId	IN	NO	The Application Entity Identifier (AE-ID).
serviceSubscriptionId	IN	NO	The M2M Service Subscription Identifier (M2M-Service-Profile-ID).
responseType	OUT	YES	Unique response types for this service: • M2M Service Subscription does not exist. • Application Entity Identifier is not associated with the M2M Service Subscription.

6.2.3.7.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue this capability.
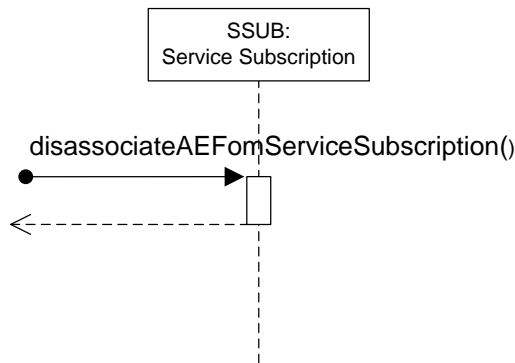
Figure 6.2.3.7.4-1: Service Subscription - disassociateAEFromServiceSubscription Diagram

6.2.3.7.5 Post-Conditions

The Application Entity registration association is removed from the M2M Service Subscription.

6.2.3.7.6 Exceptions

Not Applicable.

6.2.3.7.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.2.3.7.8 oneM2M Resource Interworking

This service capability removes the association of the AE-ID from the M2M Service Subscription Profile. Currently oneM2M TS-0001 [2] does not define how an AE is disassociated from a M2M Service Subscription Profile as part of a AE lifecycle flow.

6.2.3.8 refreshAEAssociationWithServiceSubscription

6.2.3.8.1 Description

This service capability provides the ability to refresh an existing registration association between an Application Entity and a M2M Service Subscription. This service capability shall be restricted to the Mca and Msc Reference Points.

6.2.3.8.2 Pre-Conditions

An AE has successfully registered with the M2M system.

6.2.3.8.3 Signature - refreshAEAssociationWithServiceSubscription

Table 6.2.3.8.3-1: Service Subscription - refreshAEAssociationFWithServiceSubscription capability

Parameter name	Direction	Optional	Description
aeId	IN	NO	The Application Entity Identifier (AE-ID).
serviceSubscriptionId	IN	NO	The M2M Service Subscription Identifier (M2M-Service-Profile-ID).
responseType	OUT	YES	Unique response types for this service: • M2M Service Subscription does not exist. • Application Entity Identifier is not associated with the M2M Service Subscription.

6.2.3.8.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue this capability.

```
              ┌──────────────────────┐
              │       SSUB:          │
              │  Service Subscription │
              └──────────────────────┘
                          ┆
   refreshAEAssociationWithServiceSubscription()
    ●────────────────────────▶ ┌─┐
                               │ │
    ◀ - - - - - - - - - - - - - └─┘
                          ┆
                          ┆
```
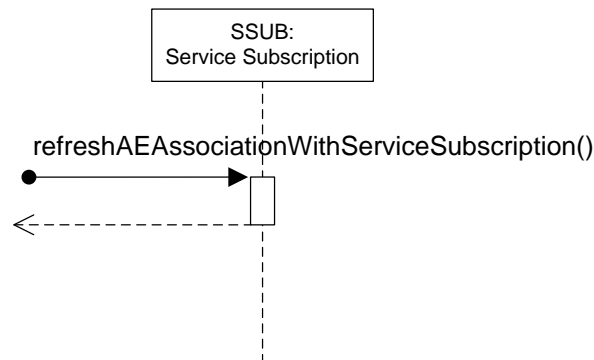
Figure 6.2.3.8.4-1: Service Subscription - refreshAEAssociationWithServiceSubscription Diagram

6.2.3.8.5 Post-Conditions

Not Applicable.

6.2.3.8.6 Exceptions

Not Applicable.

6.2.3.8.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.2.3.8.8 oneM2M Resource Interworking

This service capability refreshes the association of the Application Entity (AE-ID) with the M2M Service Subscription Profile. Currently oneM2M TS-0001 [2] does not define how an AE registration association is refreshed with a M2M Service Subscription Profile as part of a AE lifecycle flow.

6.3 Authorization

6.3.1 Overview

The Authorization service provides the ability to:

- Authorize the Originator for the service capability.

NOTE: The determination of how the entity instance based access management is configured in order to ensure no cross ASP access to other ASPs data is FFS.

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6.3.2 Service Capabilities

6.3.2.1 authorizeServiceCapability

6.3.2.1.1 Description

This service capability authenticates an Originator is a valid Originator of the request and then authorizes the M2M Service Capability within the context of a M2M Service Subscription between the from AE-ID and to AE-ID.

6.3.2.1.2 Pre-Conditions

The M2M Identifiers for the request Originator, M2M Service Subscription from AE-ID and to AE-ID are assigned to the M2M Service Subscription.

A correlation between the M2M Service Capability, M2M Service and the M2M authorization event has been defined in order to authorize the M2M Service Capability.

6.3.2.1.3 Common M2M Service Capability Parameters for Request Authentication and Authorization

**Table 6.3.2.1.3-1: Common M2M Service Capability Parameters for
Request Authentication and Authorization**

Parameter name	Direction	Optional	Description
originator	IN	NO	The identifier of the Originator that is issuing the request.
from	IN	NO	The identifier of the Originator of the request (AE-ID).
to	IN	NO	The identifier of the AE that is to target of the request (AE-ID).
serviceCapId	IN	NO	The identifier of the M2M Service Capability (M2M-Serv-Cap-ID).
serviceSubscriptionId	IN	NO	The M2M Service Subscription Identifier (M2M-Service-Profile-ID).
responseType	OUT	YES	Response types that are relevant to the Authentication and Authorizations of requests from AEs across the Mca Reference Point: • Originator is not authenticated. • Originator does not have a M2M Service Subscription. • Originator not authorized for the M2M Service Capability.

6.3.2.1.4 Service Interactions

Not Applicable.

6.3.2.1.5 Post-Conditions

Not Applicable.

6.3.2.1.6 Exceptions

Not Applicable.

6.3.2.1.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.3.2.1.8 oneM2M Resource Interworking

This service capability interworks with the following oneM2M Resource operations that are interworked are:

- FFS - The End-to-End Security Framework is expected to develop APIs that can be issued for this purposed.

6.4 Data Exchange

6.4.1 Overview

The Data Exchange service provides the ability to exchange payloads between AEs across the Mca Reference Point using supported data exchange patterns. This service utilizes an underlying transport adapter to provide the transportation functions.

The supported data exchange patterns are:

- Subscribe-Publish-Notify.

- Request-Response.

6.4.2 Data Exchange Entities

6.4.2.1 Subscribe-Publish-Notify Data Exchange

6.4.2.1.1 Overview

This data exchange pattern permits AEs to subscribe to publication resources. When an AE publishes data to a specific publication resource, the AEs that have subscribed to the publication resource are notified of the publication by receiving the published data.

6.4.2.1.2 Supporting Rules

6.4.2.1.2.1 Overview

A publication resource is an entity that represents the mechanism used by underlying publish and subscribe protocols which represent one or more queues in the underlying protocol. A publication resource in the data exchange service provides capabilities to reference one or more queues in the underlying protocol using a tree mechanism where wildcards are placed to represent all elements of the tree branch or leaf.

6.4.2.1.1.2 Publication Resources

When a AE publishes a payload to a publication resource, the publication resource is evaluated to obtain the leaf node of the tree. The AEs that have subscribed to leaf nodes of the tree receive the message via the notify M2M Service Capability.

6.4.2.1.1.3 Delivery Policy

As part of the notify M2M Service Capability the Service Layer attempts to honour the delivery policy of the subscriber and publisher. The delivery policy is the attempt by the Service Layer to provide a reliable delivery of the payload that was published using the mechanisms of the underlying Broker. The reliable delivery of a payload is defined in the deliveryPolicy type.

Table 6.4.2.1.1.3-1: Type: deliveryPolicy

Attribute	Description
retryLimit	The number of retries by the Broker to connected subscribers before assuming failure of the notification.

6.4.2.1.1.4   Message Retainment Policy

When a message is published, the M2M Service Layer, using the resources of the underlying Broker, attempts to retain messages according to a retainment policy. Retainment of messages permits AEs that are subscribed to the publication resource but not connected to the underlying Broker to receive messages, up to the retainLimit once the AE connects to the Broker. The message retainment policy is defined in the retainmentPolicy type.

Table 6.4.2.1.1.4-1: Type: retainmentPolicy

Attribute	Description
retainLimit	The maximum number of messages retained by the Broker for a subscriber that is not connected to the underlying Broker.

6.4.2.1.1.5   Service Subscription Integration

In order for the Data Exchange Service to take advantage of the underlying transport, there shall be an association between the AE Resource and the identifier of the underlying transport within the context of the M2M Service Subscription.

6.4.2.2   Request-Response Data Exchange

6.4.2.2.1   Overview

This data exchange pattern permits AEs to synchronously send messages to other AEs utilizing the underlying transport.

6.4.2.2.2   Supporting Rules

6.4.2.2.2.1   Overview

Messages are sent to from an AE to another AE via the Service Layer. When sending a message the originating AE can provide a delivery policy to be used by the transport adapter when sending the message to the target AE.

6.4.2.2.2.2   Delivery Policy

As part of the message sending capability the Service Layer attempts to honour the delivery policy of the message Originator. The delivery policy is the attempt by the Service Layer to provide a reliable delivery of the payload that was sent using the mechanisms of the transport adapter. The reliable delivery of a payload is defined in the deliveryPolicy type.

Table 6.4.2.2.2.2-1: Type: deliveryPolicy

Attribute	Description
retryLimit	The number of retries by the transport adapter to target AEs before assuming failure of the notification.

6.4.2.2.2.3   Service Subscription Integration

In order for the Data Exchange Service to take advantage of the underlying transport, there shall be an association between the target AE and the identifier of the underlying transport within the context of the M2M Service Subscription.

6.4.3   Service Capabilities

6.4.3.1   subscribe

6.4.3.1.1   Description

This service capability provides the ability for AEs to subscribe to receive payloads based on a publication resource.

As part of the subscription, the subscribing AE can provide delivery and retainment policies to enhance the robustness of the notification to AEs that have subscribed to the publication resource identified in the request.

6.4.3.1.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a M2M Service Subscription, publication resource, subscribing AE and Broker exist.

6.4.3.1.3 Signature - subscribe

Table 6.4.3.1.3-1: Data Exchange Service - subscribe capability

Parameter name	Direction	Optional	Description
publicationResource	IN	NO	The publication resource. See clause 6.4.2.1.1.2.
deliveryPolicy	IN	YES	The delivery policy when notifying the subscriber. See clause 6.4.2.1.1.3.
retainmentPolicy	IN	YES	The retainment policy for unconnected subscribers. See clause 6.4.2.1.1.4.
responseType	OUT	YES	Unique response types for this service (see note): • Exception: Request may not have been completed.
NOTE: Consumed services also provide response types.			

6.4.3.1.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the subscribe request to the Supporting Service to validate the request and obtain the Broker instance for the subscription request.

2) Issue the request to the broker to subscribe the AE-ID for the publication resource.

3) Issue the subscribe complete subscription request to the Supporting Service.
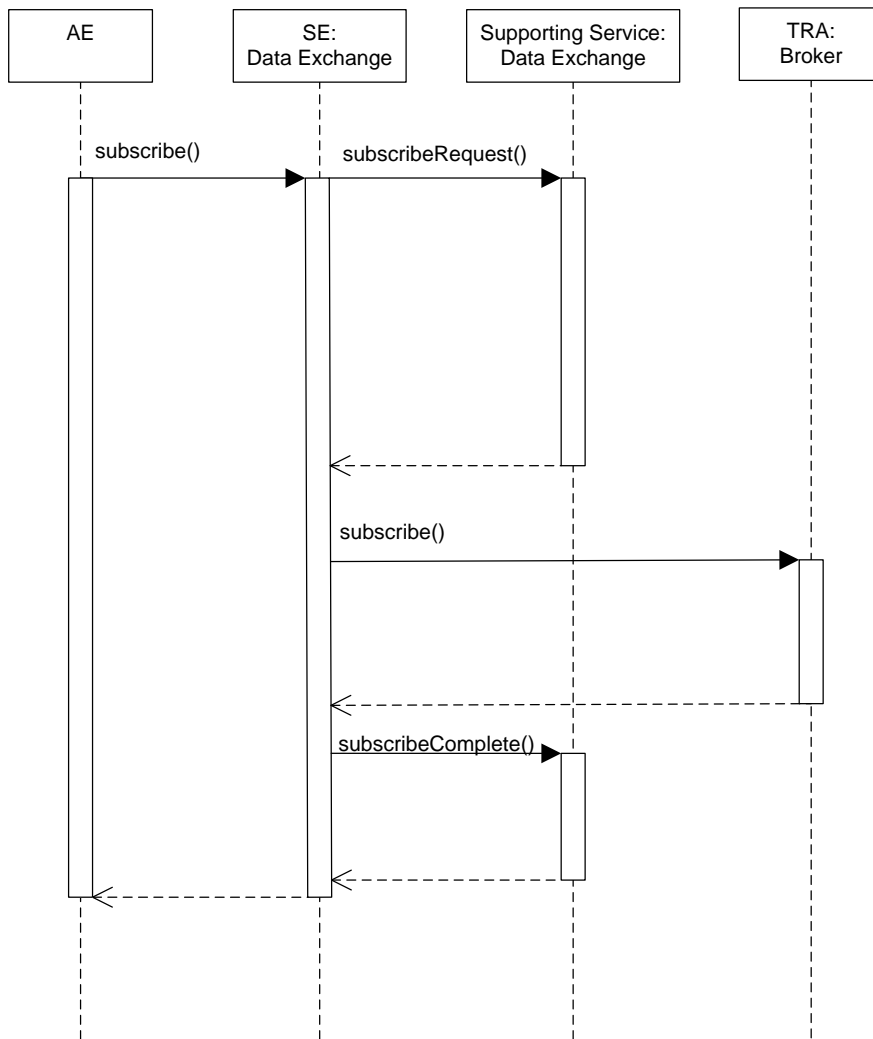
Figure 6.4.3.1.4-1: Data Exchange Service - subscribe capability

6.4.3.1.5 Post-Conditions

Not Applicable.

6.4.3.1.6 Exceptions

Not Applicable.

6.4.3.1.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.4.3.1.8 oneM2M Resource Interworking

This service capability interworks with the following oneM2M Resource operations that are interworked are:

- Not Applicable.

6.4.3.2 publish

6.4.3.2.1 Description

This service capability provides the ability for AEs to publish payloads to a leaf node of a publication resource.

As part of the publication, the publishing AE can provide a delivery policy to enhance the robustness of the publication to AEs that have subscribed to the Resource identified in the request.

6.4.3.2.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a M2M Service Subscription, resource to publish the payload, publishing AE and Broker exist.

6.4.3.2.3 Signature - publish

Table 6.4.3.2.3-1: Data Exchange Service - publish capability

Parameter name	Direction	Optional	Description
toResource	IN	NO	The leaf node of a publication resource. See clause 6.4.2.1.1.2.
deliveryPolicy	IN	YES	The delivery policy when notifying the subscriber. See clause 6.4.2.1.1.3.
payload	IN	NO	The payload to published.
responseType	OUT	YES	Unique response types for this service (see note): • Exception: Request may not have been completed.
NOTE: Consumed services also provide response types.			

6.4.3.2.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the publish request to the Supporting Service to validate the request.

2) Issue the request to the broker to publish the payload from the publishing AE to the resource in the request.

3) Issue the complete publication request to the Supporting Service.
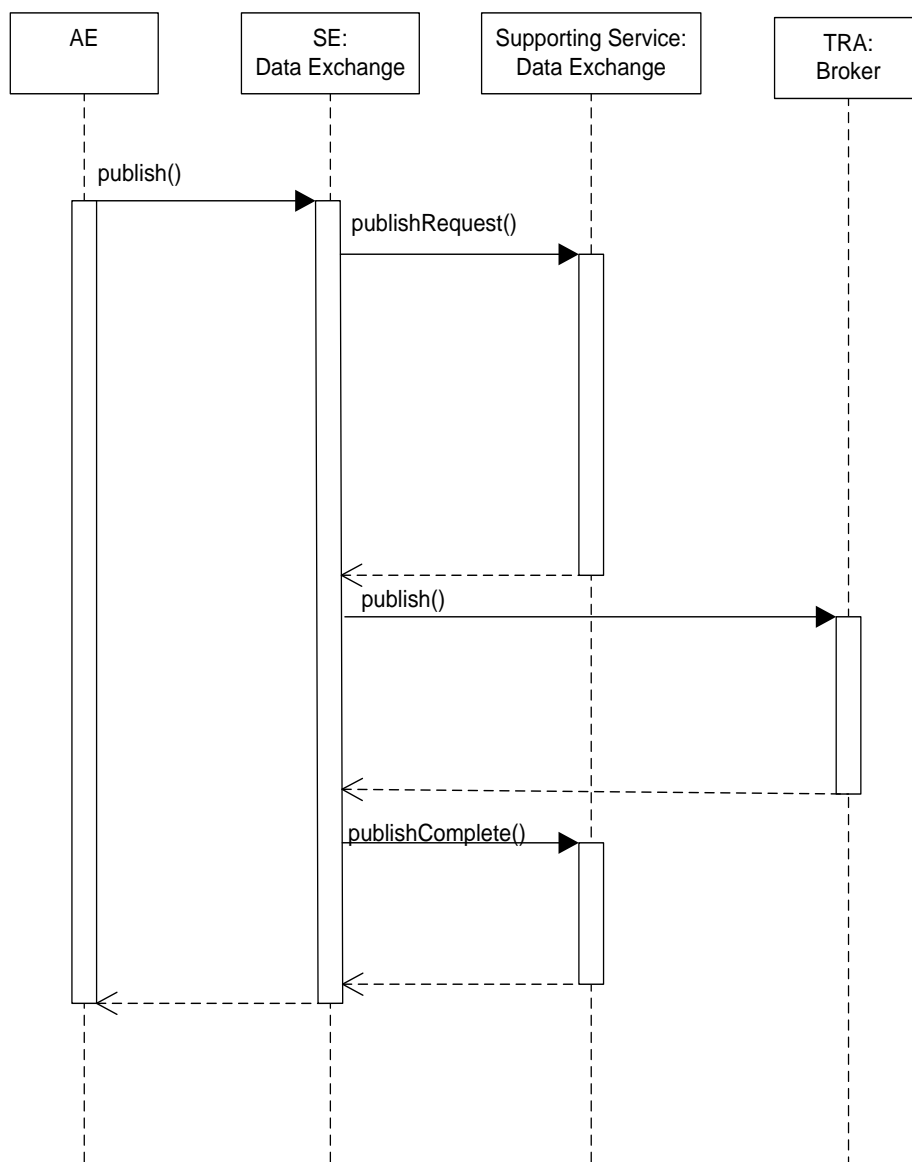
Figure 6.4.3.2.4-1: Data Exchange Service -publish (In-Out) capability

6.4.3.2.5 Post-Conditions

Not Applicable.

6.4.3.2.6 Exceptions

Not Applicable.

6.4.3.2.7 Policies for Use

Message Exchange Patterns: In-Out; In-Only.

The In-Only message exchange pattern would return a transport layer acknowledgement if supported by the underlying transport layer protocol. Response types or Exceptions are not returned in this message exchange pattern.

Transaction Pattern: Participation allowed.

6.4.3.2.8 oneM2M Resource Interworking

This service capability interworks with the following oneM2M Resource operations that are interworked are:

- Not Applicable.

6.4.3.3 notify

6.4.3.3.1 Description

This service capability provides the ability to notify AEs that have subscribed to the publication resource identified in a publish request.

6.4.3.3.2 Pre-Conditions

A correlation between a M2M Service Subscription, subscribed AE, publication resource and Broker exist.

6.4.3.3.3 Signature - notify

Table 6.4.3.33-1: Data Exchange Service - notify capability

Parameter name	Direction	Optional	Description
fromResource	IN	NO	The leaf node of a publication resource. See clause 6.4.2.1.1.2.
deliveryPolicy	IN	YES	The delivery policy when notifying the subscriber. See clause 6.4.2.1.1.3.
payload	IN	NO	The Payload of the message to notify to the AE.
responseType	OUT	YES	Unique response types for this service (see note): • Exception: Request may not have been completed.
NOTE: Consumed services also provide response types.			

6.4.3.3.4 Post-Conditions

Not Applicable.

6.4.3.3.5 Exceptions

Not Applicable.

6.4.3.3.6 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.4.3.3.7 oneM2M Resource Interworking

This service capability interworks with the following oneM2M Resource operations that are interworked are:

- Not Applicable.

6.4.3.4 sendMessage

6.4.3.4.1 Desription

This service capability provides the ability for AEs to send messages to a target AE.

As part of the message send request, the originating AE can provide a delivery policy to enhance the robustness of the message to the AE.

6.4.3.4.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a M2M Service Subscription, Originating AE and Transport Adapter exist.

6.4.3.4.3 Signature - sendMessage

Table 6.4.3.4.3-1: Data Exchange Service - sendMessage capability

Parameter name	Direction	Optional	Description
deliveryPolicy	IN	YES	The delivery policy when sending to the target AE. See clause 6.4.2.2.2.2.
payload	IN	NO	The payload to be sent.
responseType	OUT	YES	Unique response types for this service (see note): • Exception: Request may not have been completed.
NOTE: Consumed services also provide response types.			

6.4.3.4.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the sendMessage request to the Supporting Service to validate the request.

2) Issue the request to the transport adapter (in this case the Broker service) to send the payload from the Originator to the target AE.

3) Issue the complete sendMessage request to the Supporting Service.
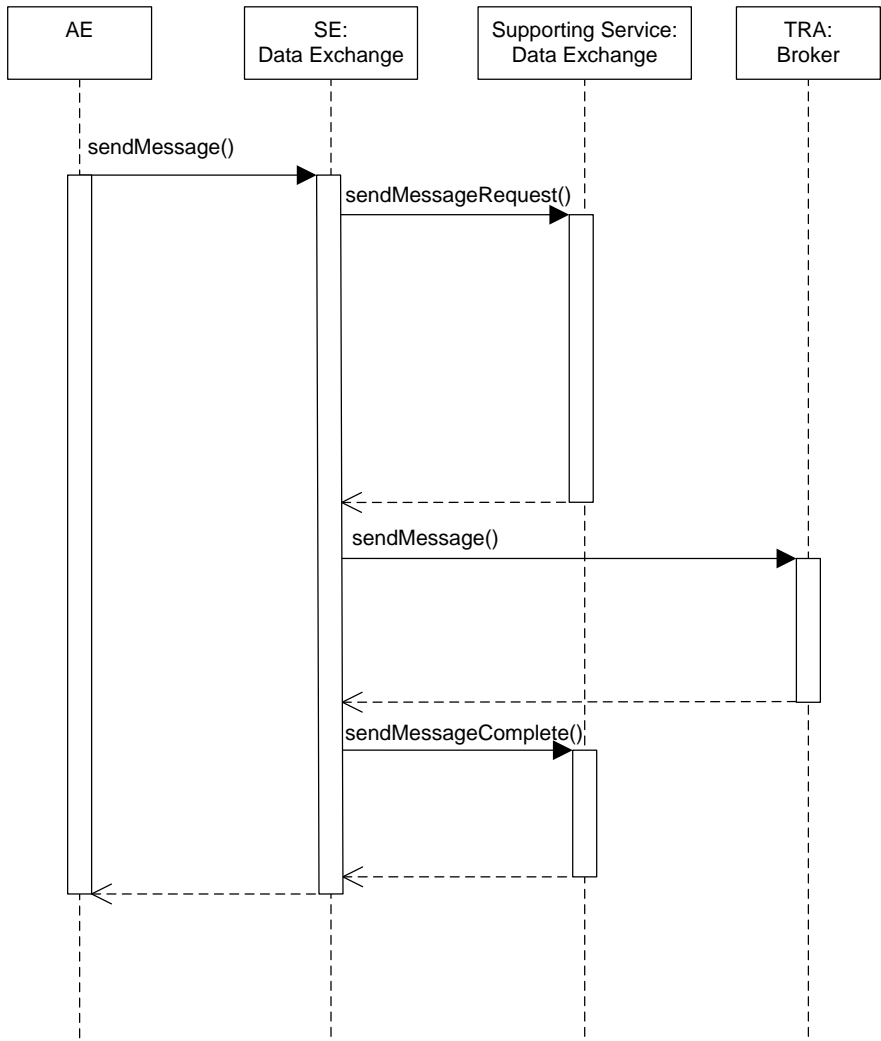
Figure 6.4.3.4.4-1: Data Exchange Service -sendMessage capability

6.4.3.4.5 Post-Conditions

Not Applicable.

6.4.3.4.6 Exceptions

Not Applicable.

6.4.3.4.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.4.3.4.8 oneM2M Resource Interworking

Not Applicable.

6.5 Broker

6.5.1 Overview

The Broker service provides the ability to adapt the Publish-Subscribe-Notify and Request Response data exchange patterns to the underlying transport protocol and deployment configuration.

The Broker maintains the subscriptions to the publication resources

6.5.2 Service Capabilities

6.5.2.1 subscribe

6.5.2.1.1 Description

This service capability provides the ability for AEs to subscribe to receive payloads based on a publication resource.

As part of the publication, the publishing AE can provide delivery and retainment policies to enhance the robustness of the notification to AEs that have subscribed to the Resource identified in the request.

6.5.2.1.2 Pre-Conditions

Not Applicable.

6.5.2.1.3 Signature - subscribe

Table 6.5.2.1.3-1: Broker - subscribe capability

Parameter name	Direction	Optional	Description
publicationResource	IN	NO	The publication resource. See clause 6.4.2.1.1.2.
deliveryPolicy	IN	YES	The delivery policy when notifying the subscriber. See clause 6.4.2.1.1.3.
retainmentPolicy	IN	YES	The retainment policy for unconnected subscribers. See clause 6.4.2.1.1.3.
responseType	OUT	YES	Unique response types for this service (see note): • Exception: Request may not have been completed.
NOTE: Consumed services also provide response types.			

6.5.2.1.4 Post-Conditions

Not Applicable.

6.5.2.1.5 Exceptions

Not Applicable.

6.5.2.1.6 Policies for Use

Message Exchange Patterns: In-Out0.

The In-Only message exchange pattern would return a transport layer acknowledgement if supported by the underlying Transaction Pattern: Participation allowed.

6.5.2.2 publish

6.5.2.2.1 Description

This service capability provides the ability for AEs to publish payloads to a leaf node of a publication resource.

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As part of the publication, the publishing AE can provide a delivery policy to enhance the robustness of the publication to AEs that have subscribed to the Resource identified in the request.

6.5.2.2.2 Pre-Conditions

Not Applicable.

6.5.2.2.3 Signature - publish

Table 6.5.2.2.3-1: Broker - publish capability

Parameter name	Direction	Optional	Description
toResource	IN	NO	The leaf node of a publication resource. See clause 6.4.2.1.1.2.
deliveryPolicy	IN	YES	The delivery policy when notifying the subscriber. See clause 6.4.2.1.1.3.
payload	IN	NO	Payload to be published.
responseType	OUT	YES	Unique response types for this service (see note): • Exception: Request may not have been completed.
NOTE: Consumed services also provide response types.			

6.5.2.3.4 Post-Conditions

Not Applicable.

6.5.2.3.5 Exceptions

Not Applicable.

6.5.2.3.6 Policies for Use

Message Exchange Patterns: In-Out.

The In-Only message exchange pattern would return a transport layer acknowledgement if supported by the underlying Transaction Pattern: Participation allowed.

6.5.2.3.7 oneM2M Resource Interworking

This service capability interworks with the following oneM2M Resource operations that are interworked are:

- Not Applicable.

6.5.2.3 notify

6.5.2.3.1 Description

This service capability provides the ability for the Broker to notify AEs that have subscribed to the publication resource identified in the request.

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6.5.2.3.2   Pre-Conditions

The Broker maintains the AEs (to AE-ID, clientId) that have subscribed to publicationResources.

The Broker maintains the M2M Service Subscription (serviceSubscriptionId) for AE subscriptions to publicationResources.

6.5.2.3.3   Signature - notify

Table 6.5.2.3.3-1: Broker - notify capability

Parameter name	Direction	Optional	Description
payload	IN	NO	The payload to be transferred.
fromResource	IN	NO	The leaf node of a publication resource. See clause 6.4.2.1.1.2.
deliveryPolicy	IN	YES	The delivery policy when notifying the subscriber. See clause 6.4.2.1.1.3.
responseType	OUT	YES	Unique response types for this service (see note): - Originator does not have a Broker for the requested resource. - Originator has requested an invalid delivery policy. - Exception: Request may not have been completed.
NOTE: Consumed services also provide response types.			

6.5.2.3.4   Service Interactions

For each AE subscribed to the resource perform the interactions of service capabilities required for this service capability:

1) Issue the notify request to the Supporting Service to validate the request.

2) Issue the request to the SE: Data Exchange.

3) Issue the complete request to the Supporting Service.

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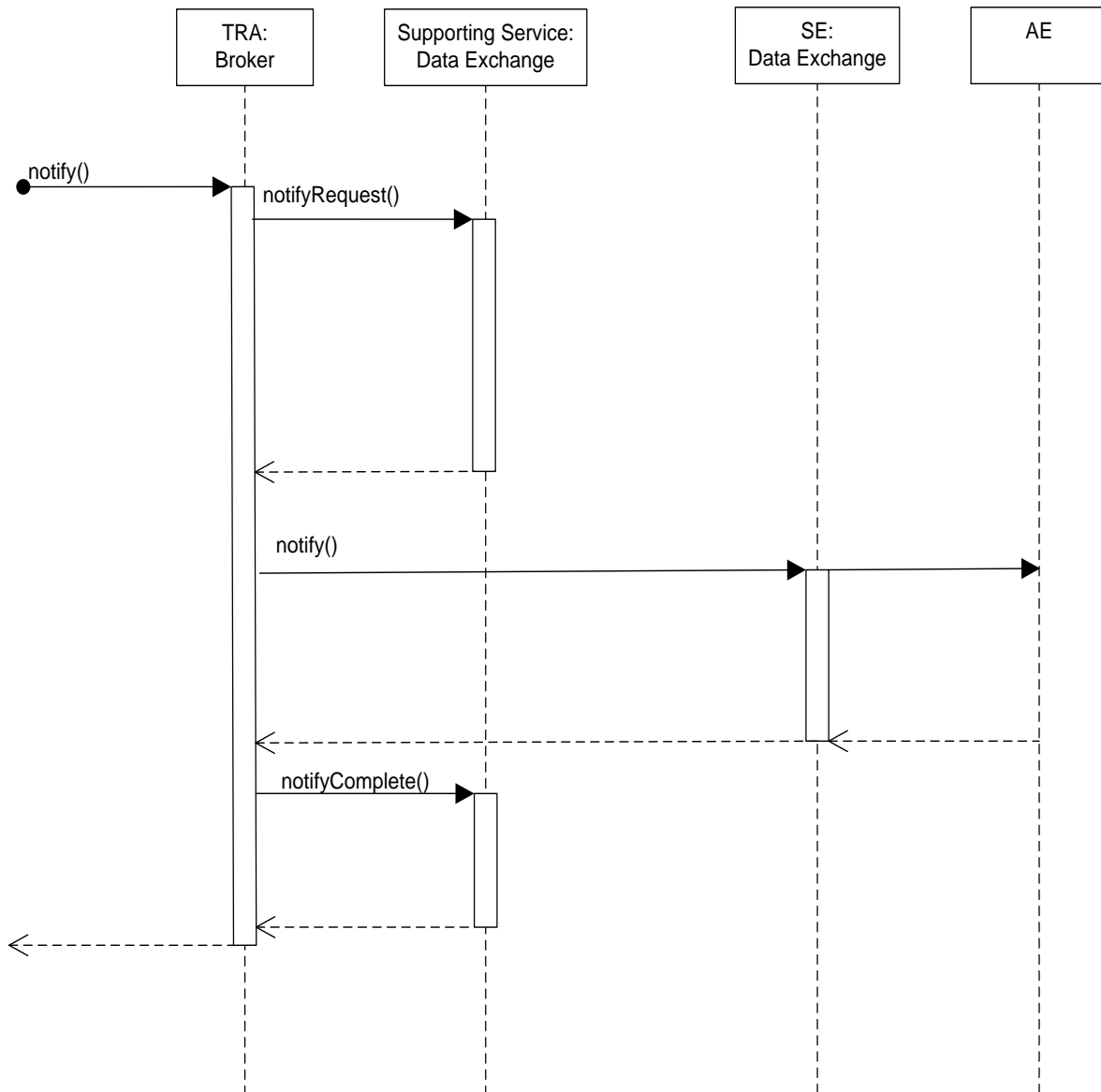
Figure 6.5.2.3.4-1: Broker -notify (In-Out) capability

6.5.2.3.5 Post-Conditions

Not Applicable.

6.5.2.3.6 Exceptions

Not Applicable.

6.5.2.3.7 Policies for Use

Message Exchange Patterns: In-Out; In-Only.

The In-Only message exchange pattern would return a transport layer acknowledgement if supported by the underlying transport layer protocol. Response types or Exceptions are not returned in this message exchange pattern.

Transaction Pattern: Participation allowed.

6.5.2.3.8 oneM2M Resource Interworking

This service capability interworks with the following oneM2M Resource operations that are interworked are:

- Not Applicable.

6.5.2.4 sendMessage

6.5.2.4.1 Description

This service capability provides the ability for AEs to send message payloads to a target AE.

As part of the send message, the originating AE can provide delivery to enhance the robustness of the publication to AEs that have subscribed to the Resource identified in the request.

6.5.2.4.2 Pre-Conditions

The Broker service has connectivity to the target AE where the target AE has subscribed to the Broker to receive send message requests from the Broker.

6.5.2.4.3 Signature - sendMessage

Table 6.5.2.4.3-1: Broker - sendMessage capability

Parameter name	Direction	Optional	Description
deliveryPolicy	IN	YES	The delivery policy when notifying the subscriber. See clause 6.4.1.1.2.2.
payload	IN	NO	Payload to be published.
responseType	OUT	YES	Unique response types for this service: • Target AE is not subscribed with the Broker to receive messages. • Originator has requested an invalid delivery policy (see note). • Exception: Request may not have been completed.
NOTE: Consumed services also provide response types.			

6.5.2.4.4 Post-Conditions

Not Applicable.

6.5.2.4.5 Exceptions

Not Applicable.

6.5.2.4.6 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.5.2.4.7 oneM2M Resource Interworking

Not Applicable.

6.6 Device Management

6.6.1 Overview

The Device Management service provides for the capability for an AE to manage devices across the Mca Reference Point using supported device management message exchange patterns. This service utilizes management adapters to provide the management functions.

The supported device management message exchanges patterns are:

- Request-Response.

- Request- Asynchronous Report.

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This is a draft oneM2M document and should not be relied upon; the final version, if any, will be made available by oneM2M Partners Type 1.

6.6.2 Device Management Entities

6.6.2.1 Overview

The Device Management service permits AEs to request management operations (e.g. device configuration operations, device troubleshooting operations, device firmware management operations, and application software management operations) and provide the result or report/retrieve the status of the operations to the originating AE.

AEs have the option to request to manage a targeted set of devices that include:

- Individual device.

- Multiple devices through the use of lists of devices.

- A group that designates as list of devices using the groupId.

AEs have option to request management operations to be performed based on a schedule.

AEs have the option to request that responses to requests be delivered synchronous (the request is held until all responses are received) or asynchronously (Reports of the operation are transmitted to the AE when an operation has completed) to the request submission. For asynchronous requests, reports are transmitted based on a report policy configured as part of the original request.

AEs also have the capability to request to manage devices by complex operations (e.g. upgradefirmware), where the M2M service platform can orchestrate management operations (e.g. installfirmware, downloadware) according to the business process.

6.6.2.2 Supporting Rules

6.6.2.2.1 Report Policy Type

The report policy is used to determine how a report is sent by the M2M System to the AE. There is a choice of parameters used for batchReport, pendingReport, latestReport.

Table 6.6.2.2.1-1: Type:ReportPolicy

Parameter	Optional	Description
groupId	YES	The group identifier.
operationMonitorList	YES	List of monitored operations. Enum OperationMonitor, see clause 6.6.2.2.29.
batchReport	YES	This parameter indicates that AE wants to receive batches of reports rather than receiving them one at a time. This attribute e may include two values: the number of reports to be batched for delivery and a duration. If batchReport is used simultaneously with latestReport, only the latest report shall be sent. Type BatchReport, see clause 6.6.2.2.2.
pendingReport	YES	This parameter indicates how missed reports due to a period of connectivity. Enum PendingReport, see clause 6.6.2.2.28.
latestReport	YES	This parameter indicates if AE wants only the latest report.

6.6.2.2.2 Batch Report Type

The BatchReport is complex type that defines the batch for reports.

Table 6.6.2.2.2-1: Type: BatchReport

Parameter	Optional	Description
number	YES	The number of reports to be batched.
duration	YES	The duration in which all the reports to be batched.

6.6.2.2.3 Firmware Report Type

The FirmwareReport is complex type that defines the current state of a firmware management operation for a specific device.

Table 6.6.2.2.3-1: Type: FirmwareReport

Parameter	Optional	Description
groupId	YES	The group identifier.
deviceId	NO	The unique device identifier in the context of the M2M Service Subscription.
operation	YES	The firmware management operation (e.g. installFirmware, downloadFirmware).
operationResult	YES	The firmware management operation execution result.
operationStatus	YES	The firmware management operation execution status. It can be Initiated, Started, Finished, Cancelled or Deleted.

6.6.2.2.4 Orchestration Rule Type

The OrchestrationRule is a complex type that describes the target and associated schedule of the request for the execution of the management operation.

Table 6.6.2.2.4-1: Type: OrchestrationRule

Parameter	Optional	Description
groupId	YES	The group identifier.
deviceId	NO	The unique device identifier in the context of the M2M Service Subscription.
operation	NO	The orchestrated operation (e.g. installFirmware, downloadFirmware)
schedule	YES	The time when to execute firmware operation. If it is not provided, the operation shall be executed immediately.

6.6.2.2.5 Firmware Info Type

The FirmwareInfo is a complex type that describes the version, name, URL of the device firmware.

Table 6.6.2.2.5-1: Type: FirmwareInfo

Parameter	Optional	Description
version	YES	The version of the firmware.
name	YES	The name of the firmware to be used on the device.
url	YES	The URL from which the firmware image can be downloaded.

6.6.2.2.6 Service Subscription Integration

In order for the Device Management Service to take advantage of the Management Adapter, there shall be association between the device associated with a Service Subscription and the service capability to the Management Adapter.

6.6.2.2.7 Device Info Type

The DeviceInfo is a complex type that describes the device label, manufacturer, model, device type, firmware version, software version, hardware version.

Table 6.6.2.2.7-1: Type: DeviceInfo

Parameter	Optional	Description
deviceLabel	YES	Unique device label assigned by the manufacturer. The uniqueness may be global or only valid within a certain domain (e.g. vendor-wise or for a certain deviceType).
manufacturer	YES	The name/identifier of the device manufacturer.
model	YES	The name/identifier of the device mode assigned by the manufacturer.
deviceType	YES	The type (e.g. cell phone, photo frame, smart meter) or product class (e.g. X-series) of the device.
fwVersion	YES	The firmware version of the device (see note).
swVersion	YES	The software version of the device.
hwVersion	YES	The hardware version of the device.
NOTE: If the device only supports one kind of Software this is identical to softwareVersion.		

6.6.2.2.8   Memory Type

The Memory is a complex type that describes the current available amount of memory and the total amount of memory.

Table 6.6.2.2.8-1: Type: Memory

Parameter	Optional	Description
memAvailable	YES	The current available amount of memory in bytes.
memTotal	YES	The total amount of memory in bytes.

6.6.2.2.9   Battery Type

The Battery is a complex type that describes the current battery level and the status of the battery.

Table 6.6.2.2.9-1: Type: Battery

Parameter	Optional	Description
level	YES	The current battery level as a percent of the battery capacity
status	YES	Indicates the status of the battery. Enum BatteryStatus, see clause 6.6.2.2.11.

6.6.2.2.10   DeviceCapability Type

The DeviceCapability is a complex type that describes the name of the capability, attach label, capability action status.

Table 6.6.2.2.10-1: Type: DeviceCapability

Parameter	Optional	Description
name	YES	The name of the capability. Enum DeviceCapabilityName, see clause 6.6.2.2.12.
attached	YES	Indicates whether the capability is attached to the device or not.
state	NO	Indicates if the capability is enabled or disabled.

6.6.2.2.11   BatteryStatus Enum

Table 6.6.2.2.11-1: Enum: BatteryStatus

Battery Status	Description
Normal	The battery is operating normally and not on power.
Charging	The battery is currently charging.
Charge Complete	The battery is fully charged and still on power.
Damaged	The battery has some problem.
Low Battery	The battery is low on charge.
Not Installed	The battery is not installed.
Unknown	The battery information is not available.

6.6.2.2.12 DeviceCapabilityName Enum

Table 6.6.2.2.11-1: Enum: DeviceCapabilityName

Device Capability Name	Description
Hardware: ExternalMemory	Used to enable/disable the removable card memory or storage disk.
Hardware: Display	Used to enable/disable the display screen.
Hardware: Camera	Used to enable/disable the camera.
Hardware: Speaker	Used to enable/disable the speaker.
I/O: Tethering	Used to enable/disable the device to be attached to other devices.
I/O: AudioInputEncoder	Used to enable/disable the audio input encoder.
I/O: AttachedDevice	Used to enable/disable the capability to allow other devices to be attached to this device.
I/O: Keyboard	Used to enable/disable the keyboard.
I/O: InputPeripheral	Used to enable/disable the input peripheral.
I/O: OutputPeripheral	Used to enable/disable the output peripheral.
I/O: USB	Used to enable/disable the USB port.
I/O: SerialPort	Used to enable/disable the serial port.
I/O: ParallelPort	Used to enable/disable the Parallel port.
I/O: GPS	Used to enable/disable GPS capability.
I/O: GNSS	Used to enable/disable GNSS capability.
Connectivity: Bluetooth	Used to enable/disable the Bluetooth connectivity.
Connectivity: WLAN	Used to enable/disable the WLAN connectivity.
Connectivity: Infrared	Used to enable/disable the Infrared connectivity.
Connectivity: WCDMA	Used to enable/disable the WCDMA connectivity.
Connectivity: GPRS	Used to enable/disable the GPRS connectivity.
Connectivity: EDGE	Used to enable/disable the EDGE connectivity.
Connectivity: CDMA	Used to enable/disable the CDMA connectivity.
Connectivity: WiMAX	Used to enable/disable the WiMAX connectivity.
Connectivity: LTE	Used to enable/disable the LTE connectivity.
Connectivity: NFC	Used to enable/disable the NFC connectivity.
Connectivity: TD-SCDMA	Used to enable/disable the TD-SCDMA connectivity.
LAN Interfaces: USB	Used to enable/disable the USB Interface.
LAN Interfaces: Wi-Fi	Used to enable/disable the Wi-Fi Radio.
LAN Interfaces: HomePlug	Used to enable/disable the HomePlug Interface.
LAN Interfaces: MoCA	Used to enable/disable the MoCA Interface.
LAN Interfaces: UPA	Used to enable/disable the UPA Interface.
Hardware: SmartCardReader	Used to enable/disable the SmartCardReader.

6.6.2.2.13 LockStatus Enum

Table 6.6.2.2.13-1: Enum: LockedStatus

Lock Status	Description
locked	The device is locked.
unlocked	The device is unlocked.

6.6.2.2.14 Area Network Info Type

The AreaNwkInfo is a complex type that describes the information about a M2M area network. Information includes the area network identifier, area network name, area network type, and the list of devices in the M2M Area Network.

Table 6.6.2.2.14-1: Type: AreaNwkInfo

Parameter	Optional	Description
areaNwkId	NO	The unique area network identifier.
areaNwkName	YES	The Area Network name.
areaNwkType	YES	The areaNwkType is an implementation-chosen string that indicates the type of M2M Area Network.
listOfDevices	YES	Indicates the list of devices in the M2M Area Network. Type AreaNwkDevice, see clause 6.6.2.2.15. From listOfDevices, the topology of the area network can be discovered and retrieved.

6.6.2.2.15 Area Network Device Type

The AreaNwkDevice is a complex type that describes the device information for a device in the context of a M2M Area Network. Information includes the device identifier, area network identifier and the area network device specific information.

Table 6.6.2.2.15-1: Type: AreaNwkDevice

Parameter	Optional	Description
deviceId	NO	The unique device identifier in the context of the M2M Service Subscription.
areaNwkDeviceInfo	YES	The area network device information. Type AreaNwkDeviceInfo, see clause 6.6.2.2.16.

6.6.2.2.16 Area Network Device Info Type

The AreaNwkDeviceInfo is a complex type that describes information about the device in the context of the M2M Area Network. Information includes the type of device, the interval of time between two sleep cycles, the time duration of each sleep cycle, the status of the device and any neighbor devices.

Table 6.6.2.2.16-1: Type: AreaNwkDeviceInfo

Parameter	Optional	Description
deviceType	YES	The type (e.g. cell phone, photo frame, smart meter) or product class (e.g. X-series) of the device.
sleepInterval	YES	The interval between two sleep cycles.
sleepDuration	YES	The time duration of each sleep cycle.
status	YES	The status of the device (sleeping or waked up).
listOfNeighbors	YES	Indicates the neighbour devices of the same area network. When modified, the connection relationship of the devices shall be modified accordingly.

6.6.2.2.17 LogTypeId Enum

Table 6.6.2.2.17-1: Enum: LogTypeId

LogTypeId	Description
system	System log
security	Security log
event	Event log
trace	Trace log
panic	Panic log

6.6.2.2.18 LogStatus Enum

Table 6.6.2.2.18-1: Enum: LogStatus

LogStatus	Description
Started	The logging activity is started
Stopped	The logging activity is stopped
Unknown	The current status of the logging activity is unknown
NotPresent	The log data is not present and the logData attribute shall be ignored
Error	Error conditions for the logging activities, and the logging is stopped

6.6.2.2.19 LogInfo Type

The LogInfo is a complex type that describes the log type, diagnostic data, log action status.

Table 6.6.2.2.19-1: Type: LogInfo

Parameter	Optional	Description
logTypeId	NO	The type of the log. E.g. security log, system log. Enum LogTypeId, see clause 6.6.2.2.17.
logData	NO	Diagnostic data logged upon event of interests defined by the diagnostic function.
logActionStatus	NO	Indicates the status of the Action. E.g. Started, Stopped. Enum LogStatus, see clause 6.6.2.2.18.

6.6.2.2.20 TroubleshootingReport Type

The TroubleshootingReport is complex type that defines the current state of a troubleshooting operation for a specific device.

Table 6.6.2.2.20-1: Type: TroubleshootingReport

Parameter	Optional	Description
groupId	YES	The group identifier.
deviceId	NO	The unique device identifier in the context of the M2M Service Subscription.
operation	YES	The troubleshooting operation (e.g. rebootDevice, resetDevice, uploadDeviceLog).
operationResult	YES	The troubleshooting operation execution result.
operationStatus	YES	The troubleshooting operation execution status. It can be Initiated, Started, Finished, Cancelling, or Cancelled.

6.6.2.2.21 Log Type

The Log is a complex type that describes the log information, log URL.

Table 6.6.2.2.21-1: Type: Log

Parameter	Optional	Description
logInfo	NO	The log information. Type LogInfo, see clause 6.6.2.2.19.
logURL	NO	The URL from which the log can be accessed.

6.6.2.2.22 Log Filter Criteria

Table 6.6.2.2.22-1: Log Filter Criteria

Criterion name	Description
logTypeId	The type of the log. E.g. security log, system log. Enum LogTypeId, see clause 6.6.2.2.17.
startTime	The start time of log.
endTime	The end time of log.

6.6.2.2.23 Action Enum

Table 6.6.2.2.23-1: Enum: Action

Software Action	Description
Install	The action that installs the software.
Uninstall	The action that un-installs the software.
Activate	The action that activates software previously installed.
Deactivate	The action that deactivates software.

6.6.2.2.24   Status Enum

Table 6.6.2.2.24-1: Enum: Status

Status	Description
Successful	The status is successful.
Failure	The status is failure.
In-Process	The status is in process.

6.6.2.2.25   ActionStatus Type

The ActionStatus is a complex type that describes the action and related status.

Table 6.6.2.2.25-1: Type: ActionStatus

Parameter	Optional	Description
action	NO	The action being performed. Enum Action, see clause 6.6.2.2.24.
status	NO	Indicates the status of the operation is successful, failure or in process. Enum Status, see clause 6.6.2.2.25.

6.6.2.2.26   SoftwareReport Type

The SoftwareReport is complex type that defines the current state of an application software management operation for a specific device.

Table 6.6.2.2.26-1: Type: SoftwareReport

Parameter	Optional	Description
groupId	YES	The group identifier.
deviceId	NO	The unique device identifier in the context of the M2M Service Subscription.
operation	YES	The application software management operation (e.g. downloadSoftware, installSoftware, activateSoftware, deactivateSoftware, removeSoftware).
operationResult	YES	The application software management operation execution result.
installStatus	YES	Indicates the status of the install. Enum ActionStatus, see clause 6.6.2.2.26.
activeStatus	YES	The status of active or deactivate action. Enum ActionStatus, see clause 6.6.2.2.26.

6.6.2.2.27   PendingReport Enum

Table 6.6.2.2.27-1: Enum: PendingReport

PendingReport	Description
SendLatest	Send the latest report.
SendAllPending	Send all pending report.

6.6.2.2.28   OperationMonitor Enum

Table 6.6.2.2.28-1: Enum: OperationMonitor

Monitored Operation	Description
DownloadFirmware	The downloadFirmware operation.
InstallFirmware	The installFirmware operation.
RebootDevice	The rebootDevice operation.
ResetDevice	The resetDevice operation.
UploadDeviceLog	The uploadDeviceLog operation.
DownloadSoftware	The downloadSoftware operation.
InstallSoftware	The installSoftware operation.
ActiveSoftware	The activeSoftware operation.
DeactivateSoftware	The deactivateSoftware operation.
RemoveSoftware	The removeSoftware operation.

6.6.3 Service Capabilities

6.6.3.1 downloadFirmware

6.6.3.1.1 Description

This service capability provides the ability for AEs to download device firmware.

6.6.3.1.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the service capability and device exist.

6.6.3.1.3 Signature - downloadFirmware

Table 6.6.3.1.3-1: Device Management Service -downloadFirmware capability

Parameter name	Direction	Optional	Description
firmwareInfo	IN	NO	The device firmware information. Type FirmwareInfo, see clause 6.6.2.2.5.
deviceId	IN	YES	The unique device identifier in the context of the M2M Service Subscription.
reportPolicy	IN	YES	The policy used to report the state of the operation to the originating AE. Type ReportPolicy, see clause 6.6.2.2.1.
requestId	OUT	NO	The M2M Request Identifier (M2M-Request-ID).
responseType	OUT	YES	Unique response types for this service (see note): • Issuer does not have a Management Adapter for the requested operation. • Report policy does not supported by the Management Adapter. • Firmware download failure,e.g. firmware miss dependency, firmware is too large for available program or data memory.
NOTE: Consumed services also provide response types.			

6.6.3.1.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the request to the Supporting Service to perform the operation.
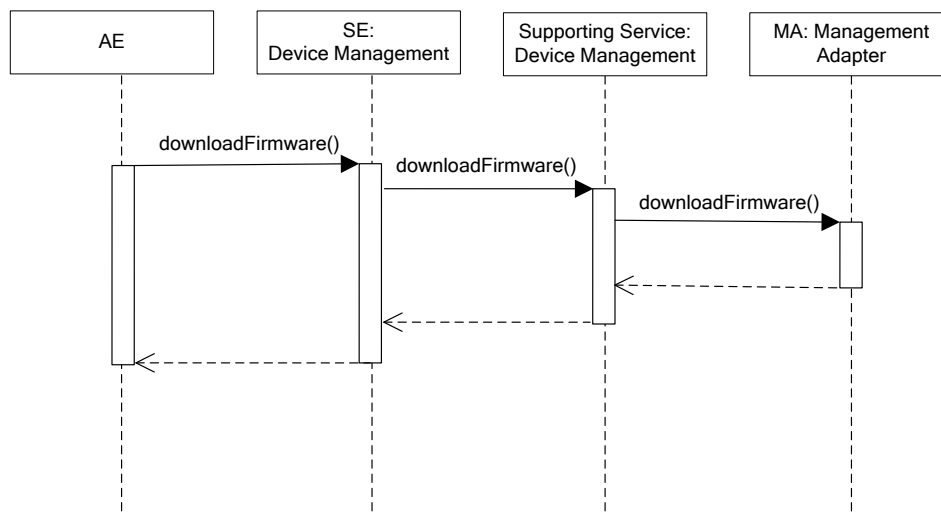
Figure 6.6.3.1.4-1: downloadFirmware Diagram

6.6.3.1.5 Post-Conditions

The Management Adapter has submitted a request to the Management Server to download firmware.

6.6.3.1.6 Exceptions

Not Applicable.

6.6.3.1.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.6.3.1.8 oneM2M Resource Interworking

This service capability is used to download firmware. The service capability aligns with the <firmware> resource and maps to the UPDATE procedure for the attribute update of the resource. The service capability also aligns with the <mgmtCmd> resource and maps to the EXECUTE procedure for the resource.

6.6.3.2 installFirmware

6.6.3.2.1 Description

This service capability provides the ability for AEs to install firmware on the device.

6.6.3.2.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the service capability and device exist.

The firmware to be installed exists on the device.

6.6.3.2.3 Signature - installFirmware

Table 6.6.3.2.3-1: Device Management Service -installFirmware capability

Parameter name	Direction	Optional	Description
firmwareInfo	IN	NO	The device firmware information. Type FirmwareInfo, see clause 6.6.2.2.5.
deviceId	IN	YES	The unique device identifier in the context of the M2M Service Subscription.
reportPolicy	IN	YES	The policy used to report the state of the operation to the originating AE. Type ReportPolicy, see clause 6.6.2.2.1.
requestId	OUT	NO	The M2M Request Identifier (M2M-Request-ID).
responseType	OUT	YES	Unique response types for this service (see note): • Issuer does not have a Management Adapter for the requested operation. • Report policy does not supported by the Management Adapter. • Firmware install failure, e.g. firmware is missing dependency on the device, firmware is too large for available program or data memory.
NOTE: Consumed services also provide response types.			

6.6.3.2.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the request to the Supporting Service to perform the operation.
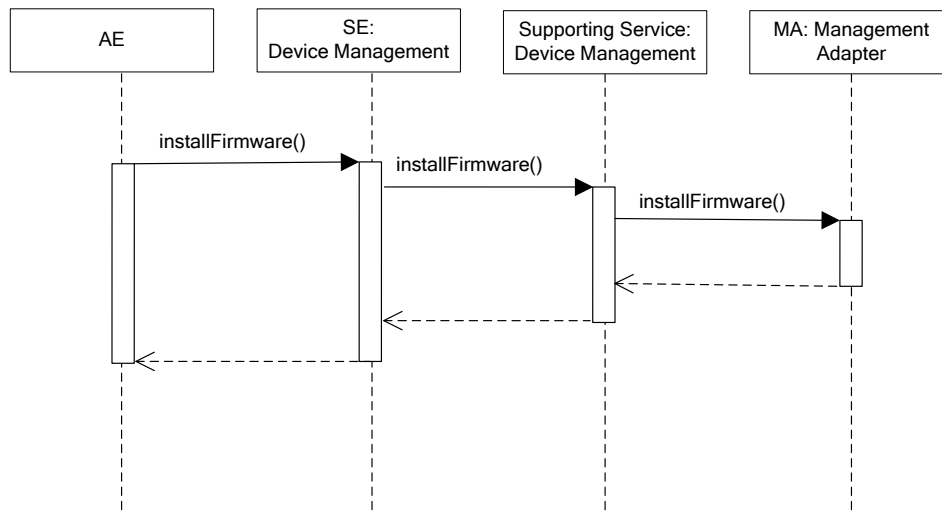
Figure 6.6.3.2.4-1: installFirmware Diagram

6.6.3.2.5 Post-Conditions

The Management Adapter has submitted a request to the Management Server to install firmware.

6.6.3.2.6 Exceptions

Not Applicable.

6.6.3.2.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.6.3.2.8 oneM2M Resource Interworking

This service capability is used to install firmware. The service capability aligns with the <firmware> resource and maps to the UPDATE procedure for the attribute update of the resource. The service capability also aligns with the <mgmtCmd> resource and maps to the EXECUTE procedure for the resource.

6.6.3.3 getFirmwareInformation

6.6.3.3.1 Description

This service capability provides the ability for AEs to get device firmware information.

6.6.3.3.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the service capability and device exist.

6.6.3.3.3　　Signature - getFirmwareInformation

Table 6.6.3.3.3-1: Device Management Service -getFirmwareInformation capability

Parameter name	Direction	Optional	Description
deviceId	IN	YES	The unique device identifier in the context of the M2M Service Subscription.
requestId	OUT	NO	The M2M Request Identifier (M2M-Request-ID).
firmwareInfo	OUT	YES	The device firmware information. Type FirmwareInfo, see clause 6.6.2.2.5.
responseType	OUT	YES	Unique response types for this service (see note): • Issuer does not have a Management Adapter for the requested operation.
NOTE:	Consumed services also provide response types.		

6.6.3.3.4　　Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the request to the Supporting Service to perform the operation.
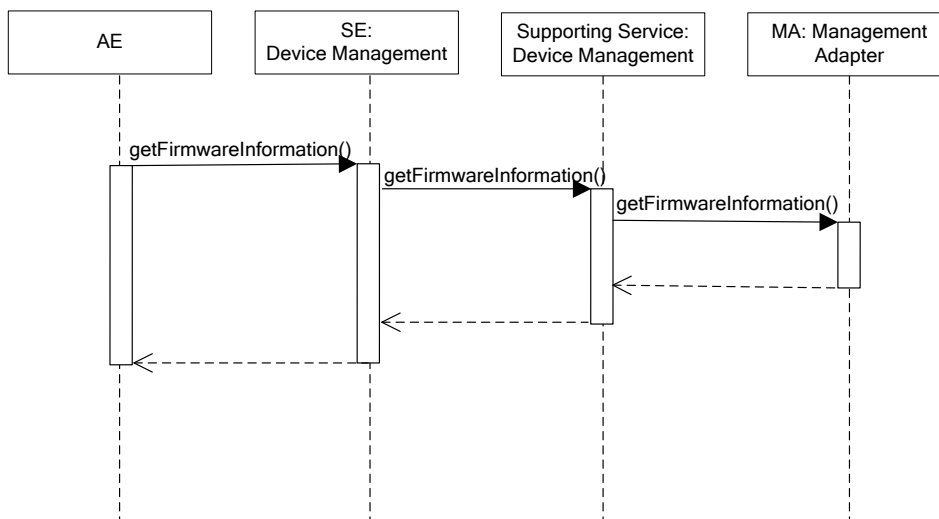
Figure 6.6.3.3.4-1: getFirmwareInformation Diagram

6.6.3.3.5　　Post-Conditions

The Management Adapter has submitted a request to the Management Server to get firmware information.

6.6.3.3.6　　Exceptions

Not Applicable.

6.6.3.3.7　　Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.6.3.3.8　　oneM2M Resource Interworking

This service capability is used to get firmware information. The service capability aligns with the <firmware> resource and maps to the RETRIEVE procedure for the attribute version, name, URL of the resource.

6.6.3.4 getFirmwareExecStatus

6.6.3.4.1 Description

This service capability provides the ability for AEs to get state of firmware management operation for a specific device.

6.6.3.4.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the M2M Service Capability and previously submitted firmware request exist.

6.6.3.4.3 Signature - getFirmwareExecStatus

Table 6.6.3.4.3-1: Device Management Service -getFirmwareExecStatus capability

Parameter name	Direction	Optional	Description
operationRequestId	IN	NO	The M2M Request Identifier of previously submitted firmware request (M2M-Request-ID).
deviceId	IN	YES	The unique device identifier in the context of the M2M Service Subscription.
requestId	OUT	NO	The M2M Request Identifier (M2M-Request-ID).
firmwareReport	OUT	YES	The firmware management operation execution result or status. Type FirmwareReport, see clause 6.6.2.2.3.
responseType	OUT	YES	Unique response types for this service: - Issuer does not have a Management Adapter for the requested operation. - The previously submitted firmware request does not exist.
NOTE: Consumed services also provide response types.			

6.6.3.4.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the request to the Supporting Service to perform the operation.
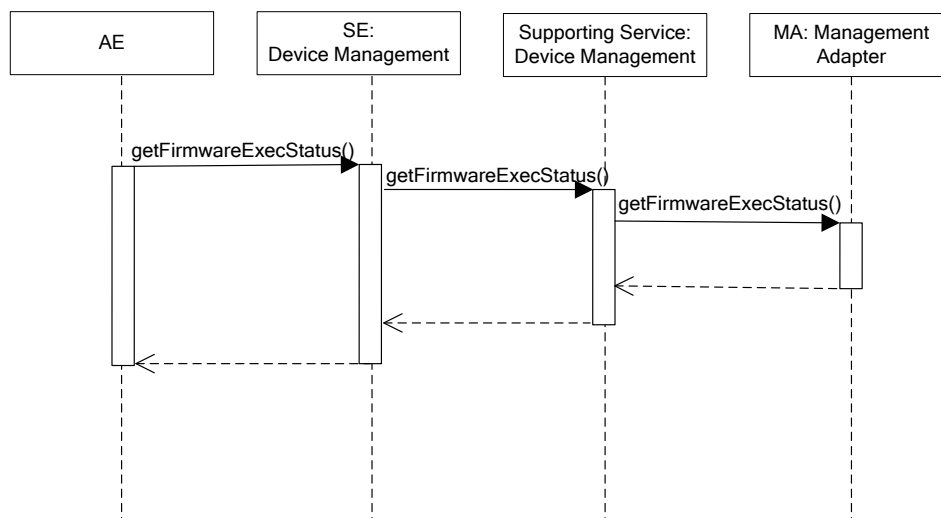
Figure 6.6.3.4.4-1: getFirmwareExecStatus Diagram

6.6.3.4.5 Post-Conditions

The Management Adapter has submitted a request to the Management Server to get firmware state of management operation.

6.6.3.4.6 Exceptions

Not applicable.

6.6.3.4.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.6.3.4.8 oneM2M Resource Interworking

This service capability is used to get state of firmware management operation. The service capability aligns with the <firmware> resource and maps to the RETRIEVE procedure for the attribute updateStatus of the resource. The service capability also aligns with the <execInstance> resource and maps to the RETRIEVE procedure for the attribute execStatus, execResult of the resource.

6.6.3.5 deviceManagementReport

6.6.3.5.1 Description

This service capability provides the ability to report the device management operation execution result or status information to the AE.

6.6.3.5.2 Pre-Conditions

A correlation between a Management Adapter, the M2M Service Capability and previously submitted request exist.

6.6.3.5.3 Signature - deviceManagementReport

Table 6.6.3.5.3-1: Device Management Service -deviceManagementReport capability

Parameter name	Direction	Optional	Description
isLastReport	IN	NO	Boolean, whether it is the last report.
sequenceNumber	IN	NO	The report sequence number.
firmwareReportList	IN	YES	Array of firmwareReport. Type FirmwareReport, see clause 6.6.2.2.3.
troubleshootingReportList	IN	YES	Array of troubleshootingReport. Type TroubleshootingReport, see clause 6.6.2.2.20.
softwareReportList	IN	YES	Array of softwareReport. Type SoftwareReport, see clause 6.6.2.2.27.
responseType	OUT	YES	Unique response types for this service: • The target AE does not exist.
NOTE: Consumed services also provide response types.			

6.6.3.5.4 Post-Conditions

The AE has received a report of firmware operation execution status or result. The M2M System shall maintain the state of the report (i.e. sequence number) according to the report policy.

6.6.3.5.5 Exceptions

Not Applicable.

6.6.3.5.6 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.6.3.5.7 oneM2M Resource Interworking

Not Applicable.

6.6.3.6 upgradeFirmware

6.6.3.6.1 Description

This service capability is a complex operation for AEs to upgrade firmware on one or more devices. The service capability utilizes orchestration rules for the related management operations such as downloadFirmware, installFirmware, getFirmwareInformation, getFirmwareExecInstance and reportFirmwareStatus according to the business process.

This service capability permits AEs to upgrade the firmware on individual device, multiple devices or a group of devices. In addition the upgrade of the firmware is permitted based on a schedule for each of the operations.

6.6.3.6.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between Management Adapter, the service capability and devices or device group exist.

6.6.3.6.3 Signature - upgradeFirmware

Table 6.6.3.6.3-1: Device Management Service -upgradeFirmware capability

Parameter name	Direction	Optional	Description
orchestrationRuleList	IN	NO	List of OrchestrationRule. Type OrchestrationRule, see clause 6.6.2.2.4.
reportPolicy	IN	YES	The policy used to report the state of the operation to the originating AE. Type ReportPolicy, see clause 6.6.2.2.1.
requestId	OUT	NO	The M2M Request Identifier (M2M-Request-ID).
responseType	OUT	YES	Unique response types for this service (see note): • Report policy is not supported by the Management Adapter. • The Orchestration Rules are not supported by the Management Adapter. • Operation exception: The device's reachability schedule is inconsistent with the schedule of the Orchestration rule.
NOTE: Consumed services also provide response types.			

6.6.3.6.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the request to the Supporting Service to perform the operation.
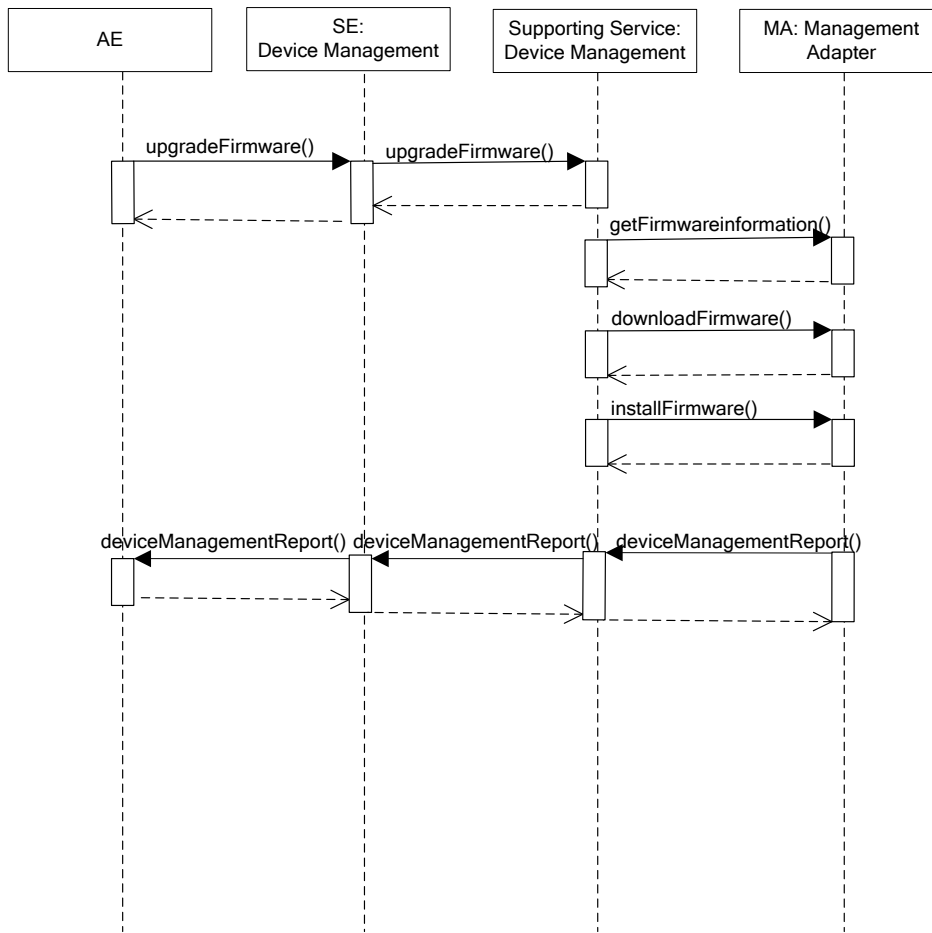
Figure 6.6.3.6.4-1: upgradeFirmware Diagram

6.6.3.6.5 Post-Conditions

The Management Adapter has submitted a set of requests to the Management Server to manage firmware.

6.6.3.6.6 Exceptions

Not Applicable.

6.6.3.6.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.6.3.6.8 oneM2M Resource Interworking

Not Applicable.

6.6.3.7 getDeviceInformation

6.6.3.7.1 Description

This service capability provides the ability for AEs to get device information.

6.6.3.7.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the M2M Service Capability and device exist.

6.6.3.7.3 Signature - getDeviceInformation

Table 6.6.3.7.3-1: Device Management Service - getDeviceInformation capability

Parameter name	Direction	Optional	Description
deviceId	IN	NO	The unique device identifier in the context of the M2M Service Subscription.
deviceInfo	OUT	NO	The device information. Type DeviceInfo, see clause 6.6.2.2.7.
memory	OUT	YES	The memory information. Type Memory, see clause 6.6.2.2.8.
battery	OUT	YES	The battery information. Type Battery, see clause 6.6.2.2.9.
lockStatus	OUT	YES	The device lock status. Enum LockStatus, see clause 6.6.2.2.13.
responseType	OUT	YES	Unique response types for this service (see note): • Issuer does not have a Management Adapter for the requested operation.
NOTE: Consumed services also provide response types.			

6.6.3.7.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the request to the Supporting Service to perform the operation.
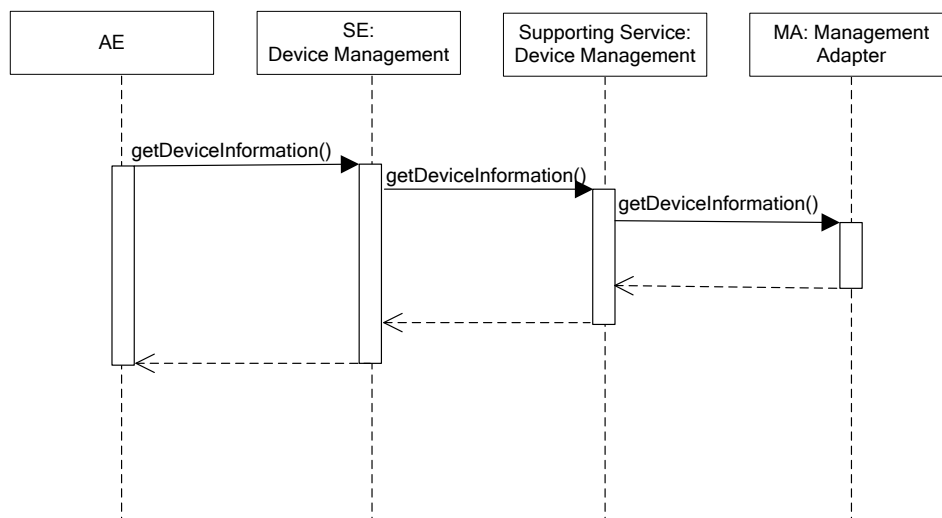
Figure 6.6.3.7.4-1: getDeviceInformation Diagram

6.6.3.7.5 Post-Conditions

The Management Adapter has submitted a request to the Management Server to get device information.

Based on the capabilities supported by the device, the memory, battery and lock status information may or may not be returned.

6.6.3.7.6 Exceptions

Not Applicable.

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6.6.3.7.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.6.3.7.8 oneM2M Resource Interworking

This service capability is used to get device information. The service capability aligns with the <deviceInfo> resource and maps to the Retrieve procedure for the resource. The service capability aligns with the <memory> resource and maps to the Retrieve procedure for the resource. The service capability aligns with the <battery> resource and maps to the Retrieve procedure for the resource.

6.6.3.8 getDeviceCapabilities

6.6.3.8.1 Description

This service capability provides the ability for AEs to get the device capabilities.

6.6.3.8.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the M2M Service Capability and device exist.

6.6.3.8.3 Signature - getDeviceCapabilities

Table 6.6.3.8.3-1: Device Management Service - getDeviceCapabilities capability

Parameter name	Direction	Optional	Description
deviceId	IN	NO	The unique device identifier in the context of the M2M Service Subscription.
deviceCapabilities	OUT	YES	List of deviceCapability. Type DeviceCapability, see clause 6.6.2.2.10.
responseType	OUT	YES	Unique response types for this service (see note): • Issuer does not have a Management Adapter for the requested operation.
NOTE: Consumed services also provide response types.			

6.6.3.8.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the request to the Supporting Service to perform the operation.
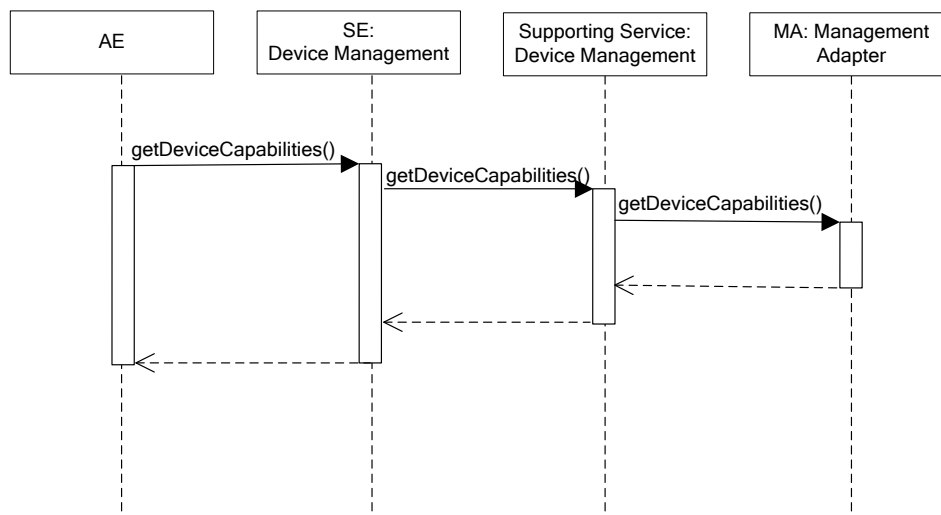
Figure 6.6.3.8.4-1: getDeviceCapabilities Diagram

6.6.3.8.5 Post-Conditions

The Management Adapter has submitted a request to the Management Server to get device capabilities.

6.6.3.8.6 Exceptions

Not Applicable.

6.6.3.8.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.6.3.8.8 oneM2M Resource Interworking

This service capability is used to get device capabilities. The service capability aligns with the<deviceCapability> resource and maps to the RETRIEVE procedure for the resource.

6.6.3.9 enableDeviceCapability

6.6.3.9.1 Description

This service capability provides the ability for AEs to enable device capability.

6.6.3.9.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the M2M Service Capability and device exist.

6.6.3.9.3 Signature -enableDeviceCapability

Table 6.6.3.9.3-1: Device Management Service -enableDeviceCapability capability

Parameter name	Direction	Optional	Description
deviceId	IN	NO	The unique device identifier in the context of the M2M Service Subscription.
Name	IN	NO	The name of the capability. Enum DeviceCapabilityName, see clause 6.6.2.2.12.
state	OUT	NO	Indicates if the capability is enabled or disabled.
responseType	OUT	YES	Unique response types for this service (see note): • Issuer does not have a Management Adapter for the requested operation.
NOTE: Consumed services also provide response types.			

6.6.3.9.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the request to the Supporting Service to perform the operation.

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Figure 6.6.3.9.4-1: enableDeviceCapability Diagram

6.6.3.9.5 Post-Conditions

The Management Adapter has submitted a request to the Management Server to enable device capability.

6.6.3.9.6 Exceptions

Not Applicable.

6.6.3.9.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.6.3.9.8 oneM2M Resource Interworking

This service capability is used to enable device capability. The service capability aligns with the <deviceCapability> resource and maps to the UPDATE procedure for the attribute enable of the resource.

6.6.3.10 disableDeviceCapability

6.6.3.10.1 Description

This service capability provides the ability for AEs to disable device capability.

6.6.3.10.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the service capability and device exist.

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6.6.3.10.3 Signature -disableDeviceCapability

Table 6.6.3.10.3-1: Device Management Service -disableDeviceCapability capability

Parameter name	Direction	Optional	Description
deviceId	IN	NO	The unique device identifier in the context of the M2M Service Subscription.
name	IN	NO	The name of the capability. Enum DeviceCapabilityName, see clause 6.6.2.2.12.
state	OUT	NO	Indicates if the capability is enabled or disabled.
responseType	OUT	YES	Unique response types for this service (see note): • Issuer does not have a Management Adapter for the requested operation.
NOTE: Consumed services also provide response types.			

6.6.3.10.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the request to the Supporting Service to perform the operation.
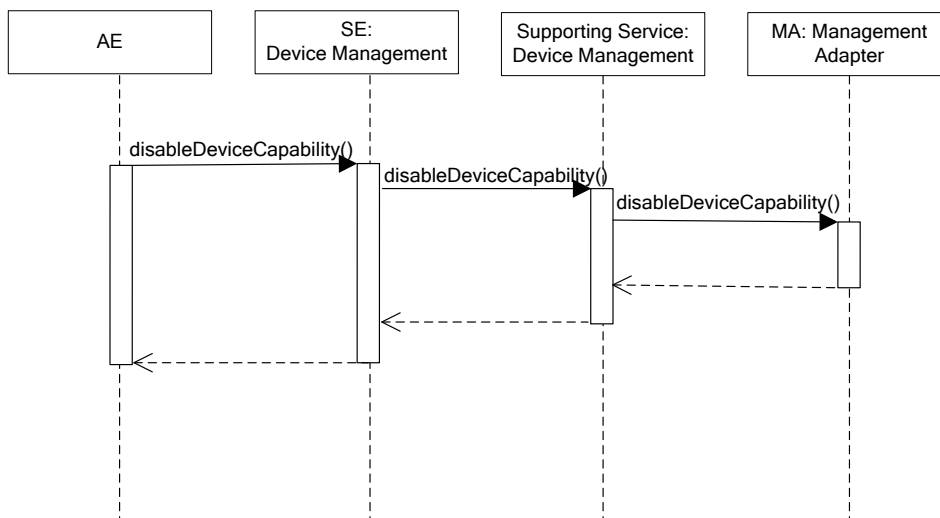
Figure 6.6.3.10.4-1: disableDeviceCapability Diagram

6.6.3.10.5 Post-Conditions

The Management Adapter has submitted a request to the Management Server to disable device capability.

6.6.3.10.6 Exceptions

Not Applicable.

6.6.3.10.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.6.3.10.8 oneM2M Resource Interworking

This service capability is used to disable device capability. The service capability aligns with the <deviceCapability> resource and maps to the UPDATE procedure for the attribute disable of the resource.

6.6.3.11   getAreaNetworks

6.6.3.11.1   Description

This service capability provides the ability for AEs to get area networks information.

6.6.3.11.2   Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the M2M Service Capability and area network exist.

6.6.3.11.3   Signature - getAreaNetworks

Table 6.6.3.11.3-1: Device Management Service -getAreaNetworks capability

Parameter name	Direction	Optional	Description
areaNwks	OUT	YES	Array of area network. Type AreaNwkInfo, see clause 6.6.2.2.14.
responseType	OUT	YES	Unique response types for this service (see note): • Issuer does not have a Management Adapter for the requested operation.
NOTE: Consumed services also provide response types.			

6.6.3.11.4   Service Interactions

The interactions of service capabilities required for this service capability:

1)   Issue the request to the Supporting Service to perform the operation.
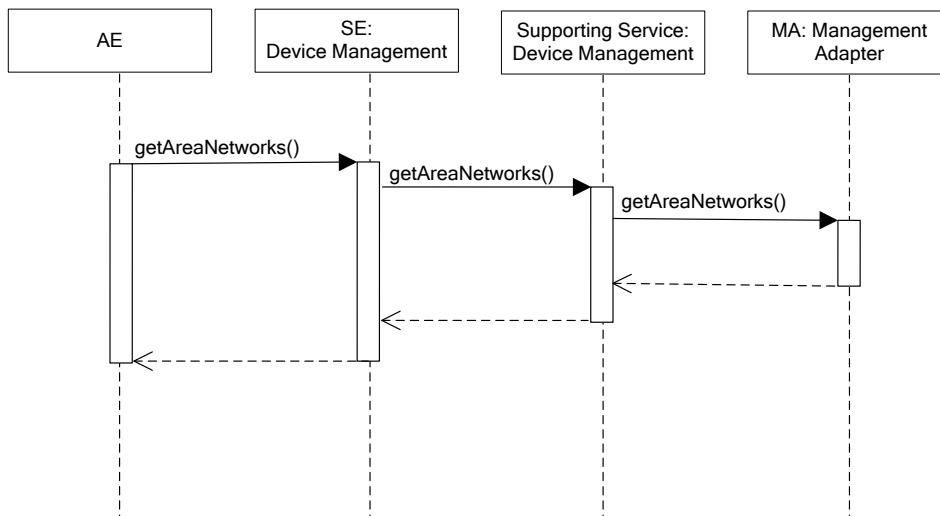
Figure 6.6.3.11.4-1: getAreaNetworks Diagram

6.6.3.11.5   Post-Conditions

The Management Adapter has submitted a request to the Management Server to get area networks information.

6.6.3.11.6   Exceptions

Not Applicable.

6.6.3.11.7   Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed

6.6.3.11.8 oneM2M Resource Interworking

This service capability is used to get area networks information. The service capability aligns with the <areaNwkInfo> resource and maps to the RETRIEVE procedure for the resource. The service capability aligns with the <areaNwkDeviceInfo> resource and maps to the Retrieve procedure for the resource.

6.6.3.12 updateDeviceForAreaNetwork

6.6.3.12.1 Description

This service capability provides the ability for AEs to update device information for area network.

6.6.3.12.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the M2M Service Capability, the device and area network exist.

6.6.3.12.3 Signature - updateDeviceForAreaNetwork

Table 6.6.3.12.3-1: Device Management Service - updateDeviceForAreaNetwork capability

Parameter name	Direction	Optional	Description
areaNwkId	IN	NO	The unique area network identifier.
deviceId	IN	NO	The unique device identifier in the context of the M2M Service Subscription.
areaNwkDeviceInfo	IN	YES	The existing areaNwkDeviceInfo are replaced with the information in this parameter. Type AreaNwkDeviceInfo, see clause 6.6.2.2.16.
lastModifiedTime	OUT	NO	The modified time.
responseType	OUT	YES	Unique response types for this service. NOTE: Consumed services also provide response types. • Issuer does not have a Management Adapter for the requested operation

6.6.3.12.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the request to the Supporting Service to perform the operation
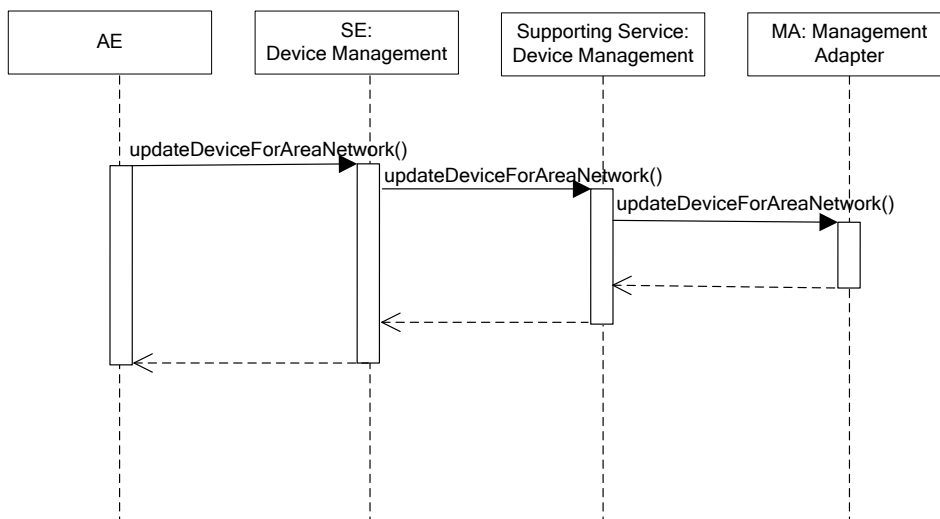
Figure 6.6.3.12.4-1: updateDeviceForAreaNetwork Diagram

6.6.3.12.5 Post-Conditions

The Management Adapter has submitted a request to the Management Server to update device information for area network.

6.6.3.12.6 Exceptions

Not Applicable.

6.6.3.12.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.6.3.12.8 oneM2M Resource Interworking

The service capability aligns with the <areaNwkDeviceInfo> resource and maps to the Update procedure for attribute devType, sleepInterval, sleepDuration, status, listOfNeighbors of the resource.

6.6.3.13 rebootDevice

6.6.3.13.1 Description

This service capability provides the ability for AEs to reboot device.

6.6.3.13.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the M2M Service Capability and device exist.

6.6.3.13.3 Signature - rebootDevice

Table 6.6.3.13.3-1: Device Management Service -rebootDevice capability

Parameter name	Direction	Optional	Description
deviceId	IN	NO	The unique device identifier in the context of the M2M Service Subscription.
reportPolicy	IN	YES	The policy used to report the state of the operation to the originating AE. Type ReportPolicy, see clause 6.6.2.2.1.
responseType	OUT	YES	Unique response types for this service (see note): - Issuer does not have a Management Adapter for the requested operation. - report policy does not supported by the Management Adapter.
NOTE: Consumed services also provide response types.			

6.6.3.13.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the request to the Supporting Service to perform the operation.

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Figure 6.6.3.13.4-1: rebootDevice Diagram

6.6.3.13.5 Post-Conditions

The Management Adapter has submitted a request to the Management Server to reboot device.

6.6.3.13.6 Exceptions

Not Applicable.

6.6.3.13.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.6.3.13.8 oneM2M Resource Interworking

This service capability is used to reboot device. The service capability aligns with the <reboot> resource and maps to the Execute procedure for the attribute reboot of the resource.

6.6.3.14 resetDevice

6.6.3.14.1 Description

This service capability provides the ability for AEs to reset device.

6.6.3.14.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the M2M Service Capability and device exist.

6.6.3.14.3 Signature - resetDevice

Table 6.6.3.14.3-1: Device Management Service -resetDevice capability

Parameter name	Direction	Optional	Description
deviceId	IN	NO	The unique device identifier in the context of the M2M Service Subscription.
reportPolicy	IN	YES	The policy used to report the state of the operation to the originating AE. Type ReportPolicy, see clause 6.6.2.2.1.
responseType	OUT	YES	Unique response types for this service (see note): • Issuer does not have a Management Adapter for the requested operation. • report policy does not supported by the Management Adapter.
NOTE: Consumed services also provide response types.			

6.6.3.14.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the request to the Supporting Service to perform the operation.
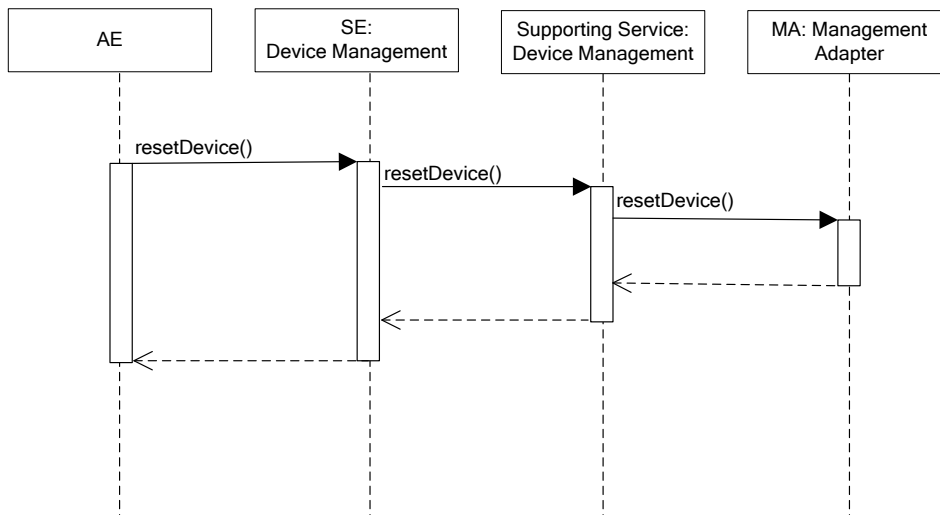
Figure 6.6.3.14.4-1: resetDevice Diagram

6.6.3.14.5 Post-Conditions

The Management Adapter has submitted a request to the Management Server to reset device.

6.6.3.14.6 Exceptions

Not Applicable.

6.6.3.14.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.6.3.14.8 oneM2M Resource Interworking

This service capability is used to reset device. The service capability aligns with the <reboot> resource and maps to the Execute procedure for the attribute factoryReset of the resource.

6.6.3.15 uploadDeviceLog

6.6.3.15.1 Description

This service capability provides the ability for AEs to upload device log.

6.6.3.15.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the M2M Service Capability and device exist.

6.6.3.15.3 Signature - uploadDeviceLog

Table 6.6.3.15.3-1: Device Management Service - uploadDeviceLog capability

Parameter name	Direction	Optional	Description
deviceId	IN	NO	The unique device identifier in the context of the M2M Service Subscription.
logInfo	IN	NO	The log information. Type LogInfo, see clause 6.6.2.2.19.
reportPolicy	IN	YES	The policy used to report the state of the operation to the originating AE. See clause 6.6.2.2.1.
logURL	OUT	YES	The URL from which the log can be uploaded.
responseType	OUT	YES	Unique response types for this service (see note): • Issuer does not have a Management Adapter for the requested operation. • report policy does not supported by the Management Adapter.
NOTE: Consumed services also provide response types.			

6.6.3.15.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the request to the Supporting Service to perform the operation.
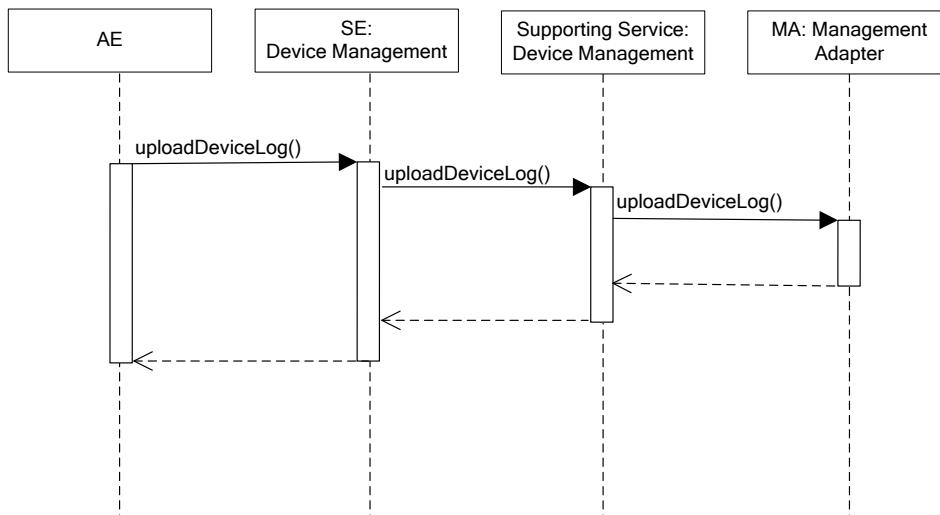
Figure 6.6.3.15.4-1: uploadDeviceLog Diagram

6.6.3.15.5 Post-Conditions

The Management Adapter has submitted a request to the Management Server to upload device log.

6.6.3.15.6 Exceptions

Not Applicable.

6.6.3.15.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.6.3.15.8 oneM2M Resource Interworking

This service capability is used to upload device log. The service capability aligns with the <eventLog> resource and maps to the Update procedure for the resource.

6.6.3.16 getDeviceLogs

6.6.3.16.1 Description

This service capability provides the ability for AEs to get all logs of a device.

6.6.3.16.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the M2M Service Capability and device exist.
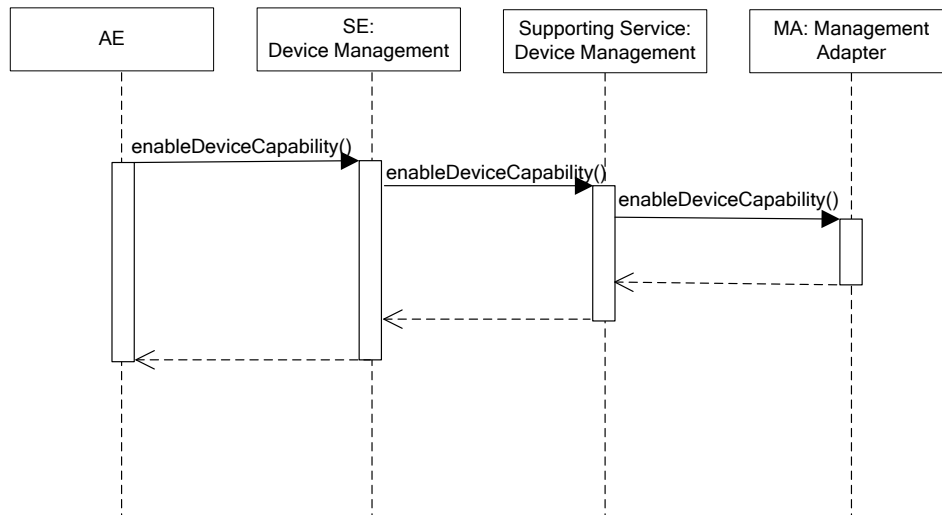
6.6.3.16.3 Signature - getDeviceLogs

Table 6.6.3.16.3-1: Device Management Service - getDeviceLogs capability

Parameter name	Direction	Optional	Description
deviceId	IN	NO	The unique device identifier in the context of the M2M Service Subscription.
logList	OUT	YES	Array of log. Type Log, see clause 6.6.2.2.21.
responseType	OUT	YES	Unique response types for this service (see note): • Issuer does not have a Management Adapter for the requested operation.
NOTE: Consumed services also provide response types.			

6.6.3.16.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the request to the Supporting Service to perform the operation.
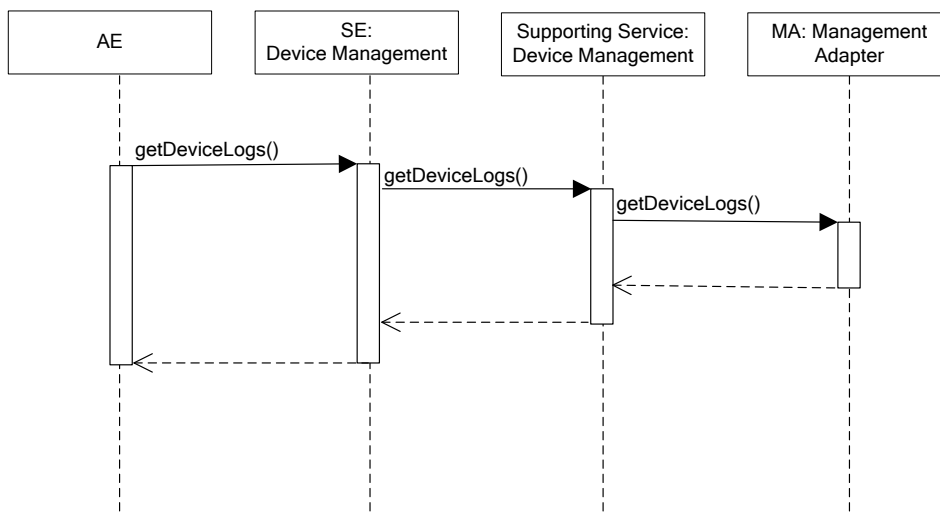
Figure 6.6.3.16.4-1: getDeviceLogs Diagram

6.6.3.16.5 Post-Conditions

The Management Adapter has submitted a request to the Management Server to get all logs of a device.

6.6.3.16.6 Exceptions

Not Applicable.

6.6.3.16.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.6.3.16.8 oneM2M Resource Interworking

This service capability is used to get all logs of a device. The service capability aligns with the <eventLog> resource and maps to the Retrieve procedure for the resource.

6.6.3.17 getDeviceLogInformation

6.6.3.17.1 Description

This service capability provides the ability for AEs to get a device log information.

6.6.3.17.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the M2M Service Capability and device exist.

6.6.3.17.3 Signature - getDeviceLogInformation

Table 6.6.3.17.3-1: Device Management Service - getDeviceLogInformation capability

Parameter name	Direction	Optional	Description
deviceId	IN	NO	The unique device identifier in the context of the M2M Service Subscription.
filterCriteria	IN	YES	See table 6.6.2.2.22-1.
logURL	IN	YES	The URL from which the log can be accessed.
log	OUT	YES	Type Log, see clause 6.6.2.2.21.
responseType	OUT	YES	Unique response types for this service (see note): • Issuer does not have a Management Adapter for the requested operation.
NOTE: Consumed services also provide response types.			

6.6.3.17.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the request to the Supporting Service to perform the operation.

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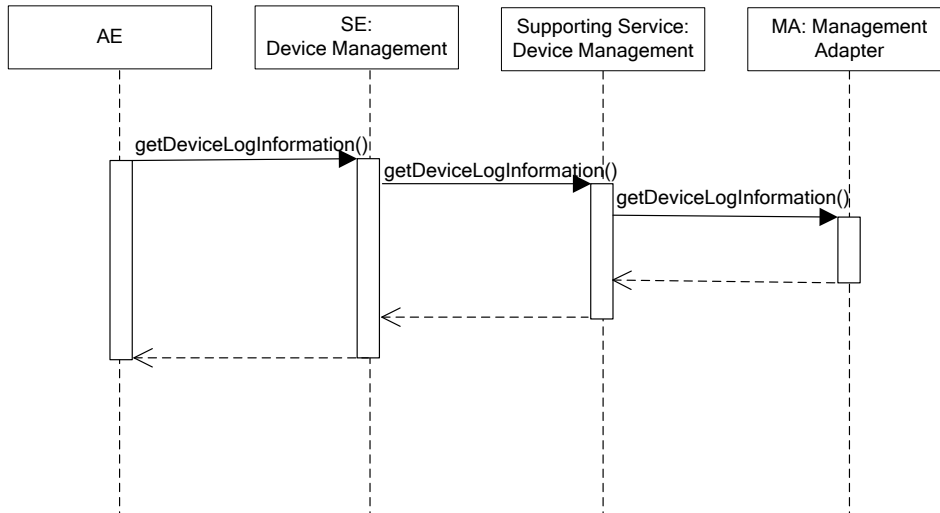
Figure 6.6.3.17.4-1: getDeviceLogInformation Diagram

6.6.3.17.5 Post-Conditions

The Management Adapter has submitted a request to the Management Server to get a device log information.

6.6.3.17.6 Exceptions

Not Applicable.

6.6.3.17.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.6.3.17.8 oneM2M Resource Interworking

This service capability is used to a device log information. The service capability aligns with the <eventLog> resource and maps to the Retrieve procedure for the resource.

6.6.3.18 getSoftwareInformation

6.6.3.18.1 Description

This service capability provides the ability for AEs to get application software information.

6.6.3.18.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the M2M Service Capability and device exist.

6.6.3.18.3 Signature - getSoftwareInformation

Table 6.6.3.18.3-1: Device Management Service -getSoftwareInformation capability

Parameter name	Direction	Optional	Description
deviceId	IN	NO	The unique device identifier in the context of the M2M Service Subscription.
version	OUT	YES	The version of the software.
name	OUT	YES	The name of the software.
URL	OUT	YES	The URL from which the software package can be downloaded.
installStatus	OUT	YES	Indicates the status of the install. Enum ActionStatus, see clause 6.6.2.2.26.
activeStatus	OUT	YES	The status of active or deactivate action. Enum ActionStatus, see clause 6.6.2.2.26.
responseType	OUT	YES	Unique response types for this service (see note): • Issuer does not have a Management Adapter for the requested operation.
NOTE: Consumed services also provide response types.			

6.6.3.18.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the request to the Supporting Service to perform the operation.
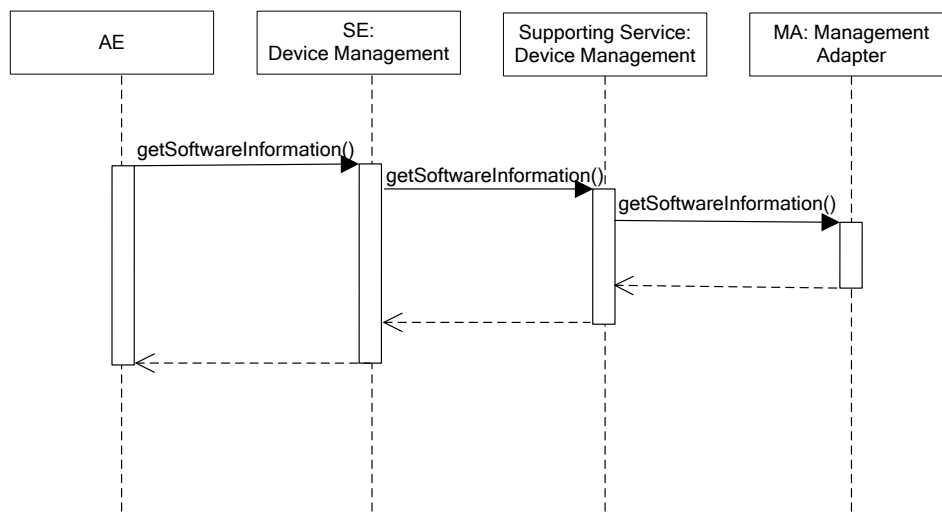
Figure 6.6.3.18.4-1: getSoftwareInformation Diagram

6.6.3.18.5 Post-Conditions

The Management Adapter has submitted a request to the Management Server to get application software information.

6.6.3.18.6 Exceptions

Not Applicable.

6.6.3.18.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.6.3.18.8 oneM2M Resource Interworking

This service capability is used to get application software information. The service capability aligns with the <software> resource and maps to the Retrieve procedure for the resource.

6.6.3.19 downloadSoftware

6.6.3.19.1 Description

This service capability provides the ability for AEs to download application software.

6.6.3.19.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the M2M Service Capability and device exist.

6.6.3.19.3 Signature -downloadSoftware

Table 6.6.3.19.3-1: Device Management Service -downloadSoftware capability

Parameter name	Direction	Optional	Description
deviceId	IN	NO	The unique device identifier in the context of the M2M Service Subscription.
version	IN	NO	The version of the software.
name	IN	NO	The name of the software.
URL	IN	NO	The URL from which the software package can be downloaded.
reportPolicy	IN	YES	The policy used to report the state of the operation to the originating AE. See clause 6.6.2.2.1.
responseType	OUT	YES	Unique response types for this service (see note): • Issuer does not have a Management Adapter for the requested operation. • report policy does not supported by the Management Adapter.
NOTE: Consumed services also provide response types.			

6.6.3.19.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the request to the Supporting Service to perform the operation.
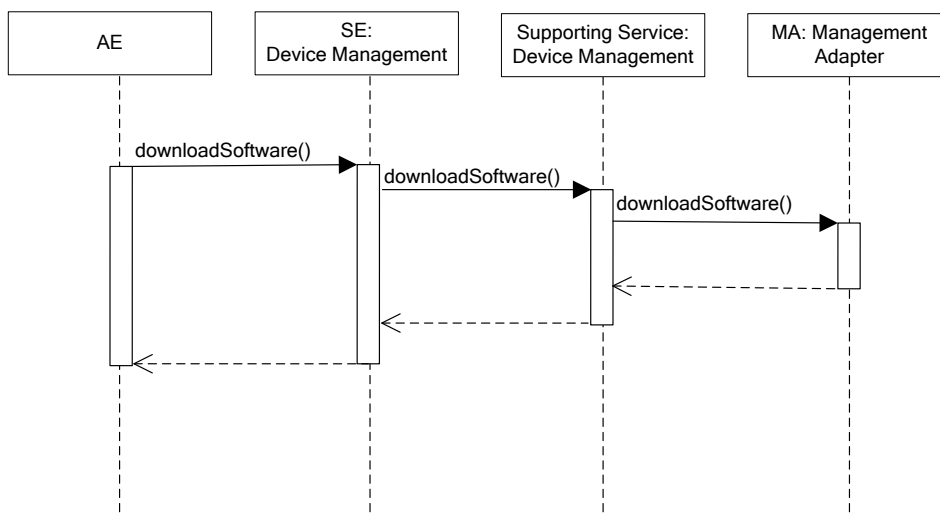
Figure 6.6.3.19.4-1: downloadSoftware Diagram

6.6.3.19.5 Post-Conditions

The Management Adapter has submitted a request to the Management Server to download application software.

6.6.3.19.6 Exceptions

Not Applicable.

6.6.3.19.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.6.3.19.8 oneM2M Resource Interworking

This service capability is used to download application software. The service capability aligns with the <software> resource and maps to the UPDATE procedure for the attribute install of the resource. The service capability also aligns with the <mgmtCmd> resource and maps to the EXECUTE procedure for the resource.

6.6.3.20 installSoftware

6.6.3.20.1 Description

This service capability provides the ability for AEs to install application software.

6.6.3.20.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the M2M Service Capability and device exist.
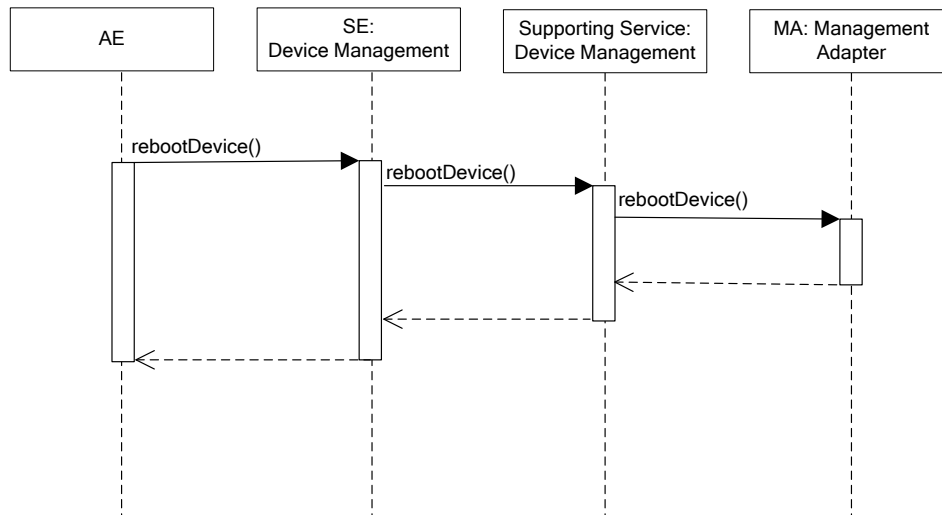
6.6.3.20.3 Signature -installSoftware

Table 6.6.3.20.3-1: Device Management Service -installSoftware capability

Parameter name	Direction	Optional	Description
deviceId	IN	NO	The unique device identifier in the context of the M2M Service Subscription.
version	IN	NO	The version of the software.
name	IN	NO	The name of the software.
reportPolicy	IN	YES	The policy used to report the state of the operation to the originating AE. See clause 6.6.2.2.1.
responseType	OUT	YES	Unique response types for this service (see note): • Issuer does not have a Management Adapter for the requested operation. • report policy does not supported by the Management Adapter.
NOTE: Consumed services also provide response types.			

6.6.3.20.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the request to the Supporting Service to perform the operation.
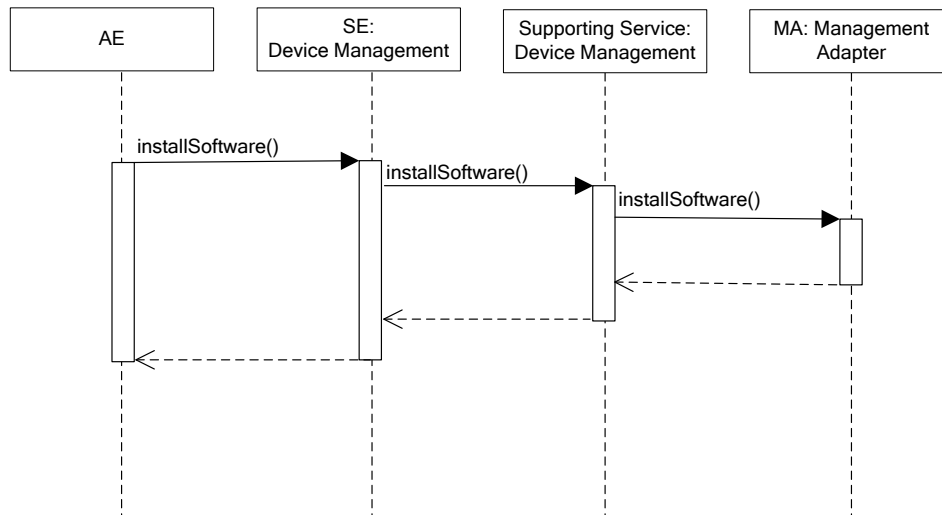
Figure 6.6.3.20.4-1: installSoftware Diagram

6.6.3.20.5 Post-Conditions

The Management Adapter has submitted a request to the Management Server to install application software.

6.6.3.20.6 Exceptions

Not Applicable.

6.6.3.20.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.6.3.20.8 oneM2M Resource Interworking

This service capability is used to install application software. The service capability aligns with the <software> resource and maps to the UPDATE procedure for the attribute install of the resource. The service capability also aligns with the <mgmtCmd> resource and maps to the EXECUTE procedure for the resource.

6.6.3.21 activateSoftware

6.6.3.21.1 Description

This service capability provides the ability for AEs to activate software previously installed.

6.6.3.21.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the M2M Service Capability and device exist.

6.6.3.21.3 Signature -activateSoftware

Table 6.6.3.21.3-1: activateSoftware capability

Parameter name	Direction	Optional	Description
deviceId	IN	NO	The unique device identifier in the context of the M2M Service Subscription.
version	IN	NO	The version of the software.
name	IN	NO	The name of the software.
reportPolicy	IN	YES	The policy used to report the state of the operation to the originating AE. See clause 6.6.2.2.1.
responseType	OUT	YES	Unique response types for this service (see note): • Issuer does not have a Management Adapter for the requested operation. • report policy does not supported by the Management Adapter.
NOTE: Consumed services also provide response types.			

6.6.3.21.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the request to the Supporting Service to perform the operation.
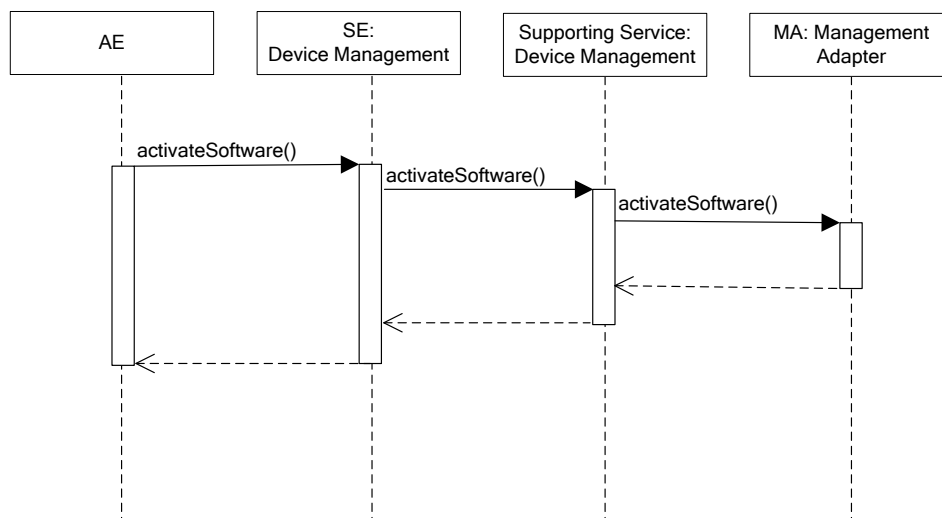
Figure 6.6.3.21.4-1: activateSoftware Diagram

6.6.3.21.5 Post-Conditions

The Management Adapter has submitted a request to the Management Server to activate software previously installed.

6.6.3.21.6 Exceptions

Not Applicable.

6.6.3.21.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.6.3.21.8 oneM2M Resource Interworking

This service capability is used to activate software previously installed. The service capability aligns with the <software> resource and maps to the UPDATE procedure for the attribute activate of the resource. The service capability also aligns with the <mgmtCmd> resource and maps to the EXECUTE procedure for the resource.

6.6.3.22 deactivateSoftware

6.6.3.22.1 Description

This service capability provides the ability for AEs to deactivates software.

6.6.3.22.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the M2M Service Capability and the device exist.

6.6.3.22.3 Signature -deactivateSoftware

Table 6.6.3.22.3-1: deactivateSoftware capability

Parameter name	Direction	Optional	Description
deviceId	IN	NO	The unique device identifier in the context of the M2M Service Subscription.
version	IN	NO	The version of the software.
name	IN	NO	The name of the software.
reportPolicy	IN	YES	The policy used to report the state of the operation to the originating AE. See clause 6.6.2.2.1.
responseType	OUT	YES	Unique response types for this service (see note): • Issuer does not have a Management Adapter for the requested operation. • report policy does not supported by the Management Adapter.
NOTE: Consumed services also provide response types.			

6.6.3.22.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the request to the Supporting Service to perform the operation.
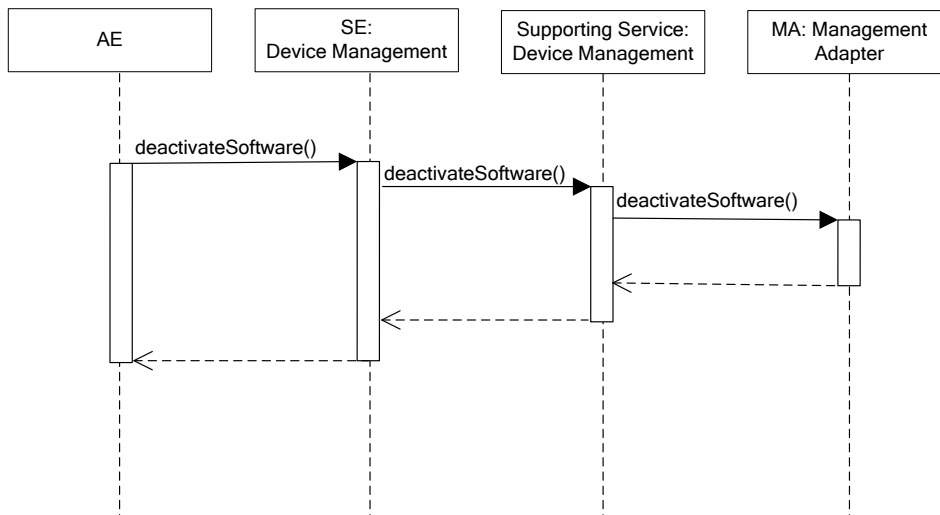
Figure 6.6.3.22.4-1: deactivateSoftware Diagram

6.6.3.22.5 Post-Conditions

The Management Adapter has submitted a request to the Management Server to deactivates software.

6.6.3.22.6 Exceptions

Not Applicable.

6.6.3.22.7　　　Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.6.3.22.8　　　oneM2M Resource Interworking

This service capability is used to deactivates software. The service capability aligns with the <software> resource and maps to the UPDATE procedure for the attribute deactivate of the resource. The service capability also aligns with the <mgmtCmd> resource and maps to the EXECUTE procedure for the resource.

6.6.3.23　　　removeSoftware

6.6.3.23.1　　　Description

This service capability provides the ability for AEs to uninstall the software.

6.6.3.23.2　　　Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the M2M Service Capability and the device exist.

6.6.3.23.3　　　Signature - removeSoftware

Table 6.6.3.23.3-1: Device Management Service -removeSoftware capability

Parameter name	Direction	Optional	Description
deviceId	IN	NO	The unique device identifier in the context of the M2M Service Subscription.
version	IN	NO	The version of the software.
name	IN	NO	The name of the software.
reportPolicy	IN	YES	The policy used to report the state of the operation to the originating AE. See clause 6.6.2.2.1.
responseType	OUT	YES	Unique response types for this service (see note): • Issuer does not have a Management Adapter for the requested operation. • report policy does not supported by the Management Adapter.
NOTE: Consumed services also provide response types.			

6.6.3.23.4　　　Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the request to the Supporting Service to perform the operation.
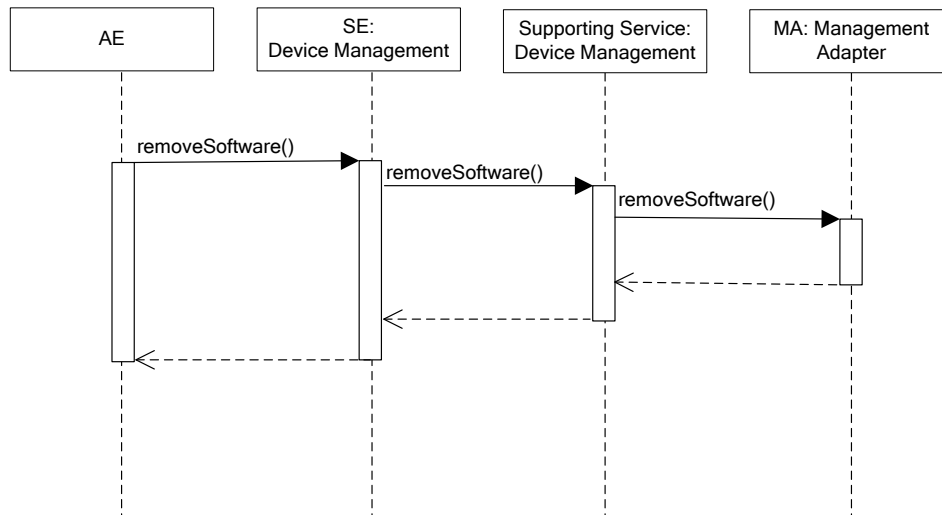
Figure 6.6.3.23.4-1: removeSoftware Diagram

6.6.3.23.5 Post-Conditions

The Management Adapter has submitted a set of requests to the Management Server to uninstall the software.

6.6.3.23.6 Exceptions

Not Applicable.

6.6.3.23.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.6.3.23.8 oneM2M Resource Interworking

This service capability is used to install application software. The service capability aligns with the <software> resource and maps to the UPDATE procedure for the attribute uninstall of the resource. The service capability also aligns with the <mgmtCmd> resource and maps to the EXECUTE procedure for the resource.

6.7 Management Adapter

6.7.1 Overview

The Management Adapter service provides the ability to adapt the M2M Service Layer operations to the technology specific operations of the Management Server.

6.7.2 Service Capabilities

6.7.2.1 downloadFirmware

6.7.2.1.1 Description

This service capability provides the ability to download the specific device firmware.

6.7.2.1.2 Pre-Conditions

A correlation between a Management Server, the service capability and device exist.

6.7.2.1.3 Signature - downloadFirmware

Table 6.7.2.1.3-1: Management Adapter -downloadFirmware capability

Parameter name	Direction	Optional	Description
firmwareInfo	IN	NO	The device firmware information. Type FirmwareInfo, see clause 6.6.2.2.5.
deviceId	IN	YES	The unique device identifier in the context of the M2M Service Subscription.
reportPolicy	IN	YES	The policy used to report the state of the operation to the originating AE. See clause 6.6.2.2.1.
requestId	IN	NO	The M2M Request Identifier (M2M-Request-ID).
responseType	OUT	YES	Unique response types for this service (see note): • Report policy is not supported by the Management Adapter. • Firmware download failure, e.g. firmware is missing dependency on the device, firmware is too large for available program or data memory.
NOTE: Consumed services also provide response types.			

6.7.2.1.4 Post-Conditions

The Management Adapter has submitted a request to the Management Server to download the firmware.

6.7.2.1.5 Exceptions

Not Applicable.

6.7.2.1.6 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.7.2.1.7 oneM2M Resource Interworking

This service capability is used to download firmware. The service capability aligns with the <firmware> resource and maps to the UPDATE procedure for the attribute update of the resource. The service capability also aligns with the <mgmtCmd> resource and maps to the EXECUTE procedure for the resource.

6.7.2.2 installFirmware

6.7.2.2.1 Description

This service capability provides the ability to install firmware on a device.

6.7.2.2.2 Pre-Conditions

A correlation between a Management Server, the M2M Service Capability and device exist.

6.7.2.2.3 Signature -installFirmware

Table 6.7.2.2.3-1: Management Adapter -installFirmware capability

Parameter name	Direction	Optional	Description
firmwareInfo	IN	NO	The device firmware information. Type FirmwareInfo, see clause 6.6.2.2.5.
deviceId	IN	YES	The unique device identifier in the context of the M2M Service Subscription.
reportPolicy	IN	YES	The policy used to report the state of the operation to the originating AE.
requestId	IN	NO	The M2M Request Identifier (M2M-Request-ID).
responseType	OUT	YES	Unique response types for this service (see note): • Report policy does not supported by the Management Adapter. • Firmware install failure, e.g. firmware is missing dependency on the device, firmware is too large for available program or data memory.
NOTE: Consumed services also provide response types.			

6.7.2.2.4 Post-Conditions

The Management Adapter has submitted a request to the Management Server to install firmware.

6.7.2.2.5 Exceptions

Not Applicable.

6.7.2.2.6 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.7.2.2.7 oneM2M Resource Interworking

This service capability is used to install firmware. The service capability aligns with the <firmware> resource and maps to the UPDATE procedure for the attribute update of the resource. The service capability also aligns with the <mgmtCmd> resource and maps to the EXECUTE procedure for the resource.

6.7.2.3 getFirmwareInformation

6.7.2.3.1 Description

This service capability provides the ability to retrieve the information related to the firmware on a device.

6.7.2.3.2 Pre-Conditions

A correlation between a Management Server, the M2M Service Capability and device exist.

6.7.2.3.3 Signature -getFirmwareInformation

Table 6.7.2.3.3-1: Management Adapter -getFirmwareInformation capability

Parameter name	Direction	Optional	Description
deviceId	IN	YES	The unique device identifier in the context of the M2M Service Subscription.
requestId	IN	NO	The M2M Request Identifier (M2M-Request-ID).
firmwareInfo	OUT	YES	The device firmware information. Type FirmwareInfo, see clause 6.6.2.2.5.
responseType	OUT	YES	Unique response types for this service (see note): • Exception: Request may not have been completed.
NOTE: Consumed services also provide response types.			

6.7.2.3.4 Post-Conditions

The Management Adapter has submitted a request to the Management Server to get the firmware information.

6.7.2.3.5 Exceptions

Not Applicable.

6.7.2.3.6 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.7.2.3.7 oneM2M Resource Interworking

This service capability is used to get firmware information. The service capability aligns with the <firmware> resource and maps to the RETRIEVE procedure for the attribute version, name, URL of the resource.

6.7.2.4 getFirmwareExecStatus

6.7.2.4.1 Pre-Conditions

This service capability provides the ability to get state of firmware management operation for a specific device.

6.7.2.4.2 Pre-Conditions

A correlation between a Management Server, the M2M Service Capability and previously submitted firmware request exist.

6.7.2.4.3 Signature -getFirmwareExecInstance

Table 6.7.2.4.3-1: Management Adapter -getFirmwareExecStatus capability

Parameter name	Direction	Optional	Description
operationRequestId	IN	NO	The M2M Request Identifier of previously submitted firmware request (M2M-Request-ID).
deviceId	IN	YES	The unique device identifier in the context of the M2M Service Subscription. When provided the FirmwareReport type is generated for only the specified device.
firmwareReport	OUT	YES	The firmware management operation execution result or status. Type FirmwareReport, see clause 6.6.2.2.3.
responseType	OUT	YES	Unique response types for this service: • The previously submitted firmware request does not exist.
NOTE: Consumed services also provide response types.			

6.7.2.4.4 Post-Conditions

The Management Adapter has submitted a request to the Management Server to get the firmware operation execution status or result for each device in the operation request.

6.7.2.4.5 Exceptions

Not Applicable.

6.7.2.4.6 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.7.2.4.7 oneM2M Resource Interworking

This service capability is used to get state of firmware management operation. The service capability aligns with the <firmware> resource and maps to the RETRIEVE procedure for the attribute updateStatus of the resource. The service capability also aligns with the <execInstance> resource and maps to the RETRIEVE procedure for the attribute execStatus, execResult of the resource.

6.7.2.5 deviceManagementReport

6.7.2.5.1 Description

This service capability provides the ability for the Management Adapter to report the device management operation execution result or status information. The Management Adapter can send one or multiple reports according to the report policy.

6.7.2.5.2 Pre-Conditions

A correlation between a Management Server, the M2M Service Capability and previously submitted requests exist.

6.7.2.5.3 Signature -deviceManagementReport

Table 6.7.2.5.3-1: Management Adapter -deviceManagementReport capability

Parameter name	Direction	Optional	Description
to	IN	NO	The identifier of the AE that is to receive the data (M2M-AppInst-ID).
isLastReport	IN	NO	Boolean, whether it is the last report.
sequenceNumber	IN	NO	The report sequence number.
firmwareReportList	IN	YES	Array of firmwareReport. Type FirmwareReport, see clause 6.6.2.2.3.
troubleshootingReportList	IN	YES	Array of troubleshootingReport. Type TroubleshootingReport, see clause 6.6.2.2.20.
softwareReportList	IN	YES	Array of softwareReport. Type SoftwareReport, see clause 6.6.2.2.27.
responseType	OUT	YES	Unique response types for this service (see note): • The target AE does not exist.
NOTE: Consumed services also provide response types.			

6.7.2.5.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the request to the Supporting Service to perform the operation.
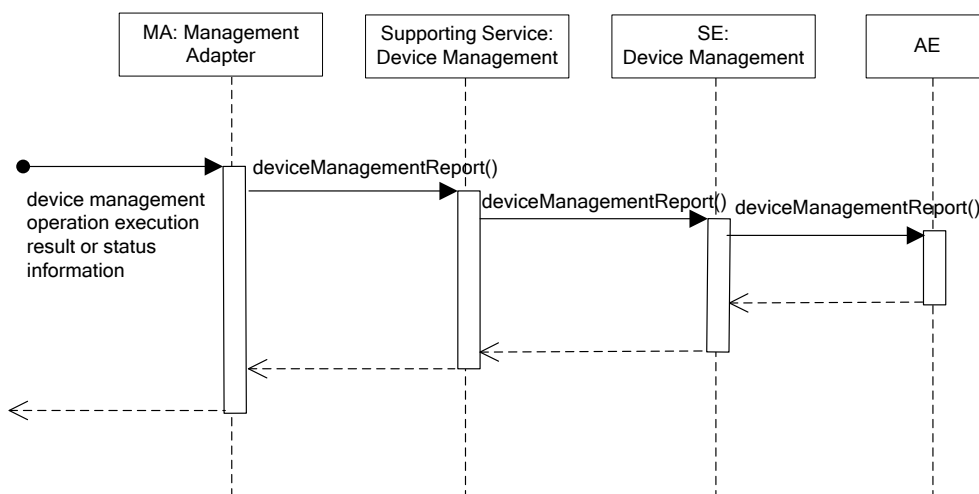
Figure 6.7.2.5.4-1: deviceManagementReport Diagram

6.7.2.5.5 Post-Conditions

The M2M System maintains the state of the report (i.e. sequence number) according to the report policy.

6.7.2.5.6 Exceptions

Not Applicable.

6.7.2.5.7 Policies for Use

Message Exchange Patterns: Not Applicable.

Transaction Pattern: Not Applicable.

6.7.2.5.7 oneM2M Resource Interworking

Not Applicable.

6.7.2.6 getDeviceInformation

6.7.2.6.1 Description

This service capability provides the ability to get the specific device information.

6.7.2.6.2 Pre-Conditions

A correlation between a Management Server, the M2M Service Capability and device exist.

6.7.2.6.3 Signature -getDeviceInformation

Table 6.7.2.6.3-1: Management Adapter -getDeviceInformation capability

Parameter name	Direction	Optional	Description
deviceId	IN	NO	The unique device identifier in the context of the M2M Service Subscription.
deviceInfo	OUT	YES	The device information. Type DeviceInfo, see clause 6.6.2.2.7.
memory	OUT	YES	The memory information. Type Memory, see clause 6.6.2.2.8.
battery	OUT	YES	The battery information. Type Battery, see clause 6.6.2.2.9.
lockStatus	OUT	YES	The device lock status. Enum LockStatus, see clause 6.6.2.2.13.
responseType	OUT	YES	Unique response types for this service (see note): • Exception: Request may not have been completed.
NOTE: Consumed services also provide response types.			

6.7.2.6.4 Post-Conditions

The Management Adapter has submitted a request to the Management Server to get the device information.

6.7.2.6.5 Exceptions

Not Applicable.

6.7.2.6.6 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.7.2.6.7 oneM2M Resource Interworking

This service capability is used to get device information. The service capability aligns with the <deviceInfo> resource and maps to the RETRIEVE procedure for the resource. The service capability aligns with the <memory> resource and maps to the Retrieve procedure for the resource. The service capability aligns with the <battery> resource and maps to the Retrieve procedure for the resource.

6.7.2.7 getDeviceCapabilities

6.7.2.7.1 Description

This service capability provides the ability to get device capabilities.

6.7.2.7.2 Pre-Conditions

A correlation between a Management Server, the M2M Service Capability and device exist.

6.7.2.7.3 Signature -getDeviceCapabilities

Table 6.7.2.7.3-1: Management Adapter -getDeviceCapabilities capability

Parameter name	Direction	Optional	Description
deviceId	IN	NO	The unique device identifier in the context of the M2M Service Subscription.
deviceCapabilities	OUT	YES	Array of deviceCapability. Type DeviceCapability, see clause 6.6.2.2.10.
responseType	OUT	YES	Unique response types for this service (see note): • Exception: Request may not have been completed.
NOTE: Consumed services also provide response types.			

6.7.2.7.4 Post-Conditions

The Management Adapter has submitted a request to the Management Server to get device capabilities.

6.7.2.7.5 Exceptions

Not Applicable.

6.7.2.7.6 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.7.2.7.7 oneM2M Resource Interworking

This service capability is used to get device capabilities. The service capability aligns with the<deviceCapability> resource and maps to the RETRIEVE procedure for the resource.

6.7.2.8 enableDeviceCapability

6.7.2.8.1 Description

This service capability provides the ability to enable device capability.

6.7.2.8.2 Pre-Conditions

A correlation between a Management Server, the M2M Service Capability and device exist.

6.7.2.8.3 Signature -enableDeviceCapability

Table 6.7.2.8.3-1: Management Adapter -enableDeviceCapability capability

Parameter name	Direction	Optional	Description
deviceId	IN	NO	The unique device identifier in the context of the M2M Service Subscription.
name	IN	NO	The name of the capability. Enum DeviceCapabilityName, see clause 6.6.2.2.12.
state	OUT	NO	Indicates if the capability is enabled or disabled.
responseType	OUT	YES	Unique response types for this service (see note)! • Exception: Request may not have been completed.
NOTE: Consumed services also provide response types.			

6.7.2.8.4 Post-Conditions

The Management Adapter has submitted a request to the Management Server to enable device capability.

6.7.2.8.5 Exceptions

Not Applicable.

6.7.2.8.6 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.7.2.8.7 oneM2M Resource Interworking

This service capability is used to enable device capability. The service capability aligns with the <deviceCapability> resource and maps to the UPDATE procedure for the attribute enable of the resource.

6.7.2.9 disableDeviceCapability

6.7.2.9.1 Description

This service capability provides the ability to disable device capability.

6.7.2.9.2 Pre-Conditions

A correlation between a Management Server, the M2M Service Capability and device exist.

6.7.2.9.3 Signature -disableDeviceCapability

Table 6.7.2.9.3-1: Management Adapter -disableDeviceCapability capability

Parameter name	Direction	Optional	Description
deviceId	IN	NO	The unique device identifier in the context of the M2M Service Subscription.
name	IN	NO	The name of the capability. Enum DeviceCapabilityName, see clause 6.6.2.2.12.
state	OUT	NO	Indicates if the capability is enabled or disabled.
responseType	OUT	YES	Unique response types for this service (see note): • Exception: Request may not have been completed.
NOTE: Consumed services also provide response types.			

6.7.2.9.4 Post-Conditions

The Management Adapter has submitted a request to the Management Server to disable device capability.

6.7.2.9.5 Exceptions

Not Applicable.

6.7.2.9.6 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.7.2.9.7 oneM2M Resource Interworking

This service capability is used to disable device capability. The service capability aligns with the <deviceCapability> resource and maps to the UPDATE procedure for the attribute disable of the resource.

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6.7.2.10 getAreaNetworks

6.7.2.10.1 Description

This service capability provides the ability to get area networks information.

6.7.2.10.2 Pre-Conditions

A correlation between a Management Server, the M2M Service Capability and area network exist.

6.7.2.10.3 Signature -getAreaNetworks

Table 6.7.2.10.3-1: Management Adapter -getAreaNetworks capability

Parameter name	Direction	Optional	Description
AreaNwks	OUT	YES	Array of area network. Type AreaNwkInfo, see clause 6.6.2.2.13.
responseType	OUT	YES	Unique response types for this service (see note): • Exception: Request may not have been completed.
NOTE: Consumed services also provide response types.			

6.7.2.10.4 Post-Conditions

The Management Adapter has submitted a request to the Management Server to get area networks information.

6.7.2.10.5 Exceptions

Not Applicable.

6.7.2.10.6 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.7.2.10.7 oneM2M Resource Interworking

This service capability is used to get area networks information. The service capability aligns with the <areaNwkInfo> resource and maps to the RETRIEVE procedure for the resource. The service capability aligns with the <areaNwkDeviceInfo> resource and maps to the Retrieve procedure for the resource.

6.7.2.11 updateDeviceForAreaNetwork

6.7.2.11.1 Description

This service capability provides the ability for the Management Adapter to update device information for area network.

6.7.2.11.2 Pre-Conditions

A correlation between a Management Server, the M2M Service Capability, the device and area network exists.

6.7.2.11.3 Signature -updateDeviceForAreaNetwork

Table 6.7.2.11.3-1: Management Adapter -updateDeviceForAreaNetwork capability

Parameter name	Direction	Optional	Description
areaNwkId	IN	NO	The unique area network identifier.
deviceId	IN	NO	The unique device identifier in the context of the M2M Service Subscription.
areaNwkDeviceInfo	IN	YES	The existing areaNwkDeviceInfo are replaced with the information in this parameter. Type AreaNwkDeviceInfo, see clause 6.6.2.2.15.
lastModifiedTime	OUT	NO	The modified time.
responseType	OUT	YES	Unique response types for this service (see note): • Exception: Request may not have been completed.
NOTE: Consumed services also provide response types.			

6.7.2.11.4 Post-Conditions

The Management Adapter has submitted a request to the Management Server to update device information for area network.

6.7.2.11.5 Exceptions

Not Applicable.

6.7.2.11.6 Policies for Use

Message Exchange Patterns: Not Applicable.

Transaction Pattern: Not Applicable

6.7.2.11.7 oneM2M Resource Interworking

The service capability aligns with the <areaNwkDeviceInfo> resource and maps to the Update procedure for attribute devType, sleepInterval , sleepDuration , status , listOfNeighbors of the resource.

6.7.2.12 rebootDevice

6.7.2.12.1 Description

This service capability provides the ability to reboot the specific device.

6.7.2.12.2 Pre-Conditions

A correlation between a Management Server, the M2M Service Capability and device exist.

6.7.2.12.3 Signature - rebootDevice

Table 6.7.2.12.3-1: Management Adapter - rebootDevice capability

Parameter name	Direction	Optional	Description
deviceId	IN	NO	The unique device identifier in the context of the M2M Service Subscription.
reportPolicy	IN	YES	The policy used to report the state of the operation to the originating AE. See clause 6.6.2.2.1.
responseType	OUT	YES	Unique response types for this service (see note): • Exception: Request may not have been completed.
NOTE: Consumed services also provide response types.			

6.7.2.12.4 Post-Conditions

The Management Adapter has submitted a request to the Management Server to reboot the device.

6.7.2.12.5 Exceptions

Not Applicable.

6.7.2.12.6 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.7.2.12.7 oneM2M Resource Interworking

This service capability is used to reboot device. The service capability aligns with the <reboot> resource and maps to the Execute procedure for the attribute reboot of the resource.

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6.7.2.13   resetDevice

6.7.2.13.1   Description

This service capability provides the ability to reset device.

6.7.2.13.2   Pre-Conditions

A correlation between a Management Server, the M2M Service Capability and device exist.

6.7.2.13.3   Signature - resetDevice

Table 6.7.2.13.3-1: Management Adapter - resetDevice capability

Parameter name	Direction	Optional	Description
deviceId	IN	NO	The unique device identifier in the context of the M2M Service Subscription.
reportPolicy	IN	YES	The policy used to report the state of the operation to the originating AE. See clause 6.6.2.2.1.
responseType	OUT	YES	Unique response types for this service (see note): • Exception: Request may not have been completed.
NOTE: Consumed services also provide response types.			

6.7.2.13.4   Post-Conditions

The Management Adapter has submitted a request to the Management Server to reset device.

6.7.2.13.5   Exceptions

Not Applicable.

6.7.2.13.6   Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.7.2.13.7   oneM2M Resource Interworking

This service capability is used to reset device. The service capability aligns with the <reboot> resource and maps to the Execute procedure for the attribute factoryReset of the resource.

6.7.2.14   uploadDeviceLog

6.7.2.14.1   Description

This service capability provides the ability to upload device log.

6.7.2.14.2   Pre-Conditions

A correlation between a Management Server, the M2M Service Capability and device exist.

6.7.2.14.3 Signature - uploadDeviceLog

Table 6.7.2.14.3-1: Management Adapter - uploadDeviceLog capability

Parameter name	Direction	Optional	Description
deviceId	IN	NO	The unique device identifier in the context of the M2M Service Subscription.
logInfo	IN	NO	The log information. Type LogInfo, see clause 6.6.2.2.19.
reportPolicy	IN	YES	The policy used to report the state of the operation to the originating AE. See clause 6.6.2.2.1.
logURL	OUT	YES	The URL from which the log can be uploaded.
responseType	OUT	YES	Unique response types for this service (see note): • Exception: Request may not have been completed.
NOTE: Consumed services also provide response types.			

6.7.2.14.4 Post-Conditions

The Management Adapter has submitted a request to the Management Server to upload device log.

6.7.2.14.5 Exceptions

Not Applicable.

6.7.2.14.6 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.7.2.14.7 oneM2M Resource Interworking

This service capability is used to upload device log. The service capability aligns with the <eventLog> resource and maps to the Update procedure for the resource.

6.7.2.15 getDeviceLogs

6.7.2.15.1 Description

This service capability provides the ability to get all logs of a device.

6.7.2.15.2 Pre-Conditions

A correlation between a Management Server, the M2M Service Capability and device exist.

6.7.2.15.3 Signature -getDeviceLogs

Table 6.7.2.15.3-1: Management Adapter -getDeviceLogs capability

Parameter name	Direction	Optional	Description
deviceId	IN	NO	The unique device identifier in the context of the M2M Service Subscription.
logList	OUT	YES	Array of log. Type Log, see clause 6.6.2.2.21.
responseType	OUT	YES	Unique response types for this service (see note): • Exception: Request may not have been completed.
NOTE: Consumed services also provide response types.			

6.7.2.15.4 Post-Conditions

The Management Adapter has submitted a request to the Management Server to get all logs of a device.

6.7.2.15.5 Exceptions

Not Applicable.

6.7.2.15.6 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.7.2.15.7 oneM2M Resource Interworking

This service capability is used to get all logs of a device. The service capability aligns with the <eventLog> resource and maps to the Retrieve procedure for the resource.

6.7.2.16 getDeviceLogInformation

6.7.2.16.1 Description

This service capability provides the ability to get a device log information.

6.7.2.16.2 Pre-Conditions

A correlation between a Management Server, the M2M Service Capability and device exist.

6.7.2.16.3 Signature - getDeviceLogInformation

Table 6.7.2.16.3-1: Management Adapter - getDeviceLogInformation capability

Parameter name	Direction	Optional	Description
deviceId	IN	NO	The unique device identifier in the context of the M2M Service Subscription.
filterCriteria	IN	YES	See table 6.6.2.2.22-1.
logURL	IN	YES	The URL from which the log can be accessed.
log	OUT	YES	Type Log, see clause 6.6.2.2.21.
responseType	OUT	YES	Unique response types for this service (see note): • Exception: Request may not have been completed.
NOTE: Consumed services also provide response types.			

6.7.2.16.4 Post-Conditions

The Management Adapter has submitted a request to the Management Server to get a device log information.

6.7.2.16.5 Exceptions

Not Applicable.

6.7.2.16.6 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.7.2.16.7 oneM2M Resource Interworking

This service capability is used to get device log information. The service capability aligns with the <eventLog> resource and maps to the Retrieve procedure for the resource.

6.7.2.17 getSoftwareInformation

6.7.2.17.1 Description

This service capability provides the ability to get application software information.

6.7.2.17.2 Pre-Conditions

A correlation between a Management Server, the M2M Service Capability and device exist.

6.7.2.17.3 Signature -getSoftwareInformation

Table 6.7.2.17.3-1: Management Adapter -getSoftwareInformation capability

Parameter name	Direction	Optional	Description
deviceId	IN	NO	The unique device identifier in the context of the M2M Service Subscription.
version	OUT	YES	The version of the software.
name	OUT	YES	The name of the software.
url	OUT	YES	The URL from which the software package can be downloaded.
installStatus	OUT	YES	Indicates the status of the install. Enum ActionStatus, see clause 6.6.2.2.26.
activeStatus	OUT	YES	The status of active or deactivate action. Enum ActionStatus, see clause 6.6.2.2.26.
responseType	OUT	YES	Unique response types for this service (see note): • Exception: Request may not have been completed.
NOTE: Consumed services also provide response types.			

6.7.2.17.4 Post-Conditions

The Management Adapter has submitted a request to the Management Server to get application software information.

6.7.2.17.5 Exceptions

Not Applicable.

6.7.2.17.6 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.7.2.17.7 oneM2M Resource Interworking

This service capability is used to get application software information. The service capability aligns with the <software> resource and maps to the Retrieve procedure for the resource.

6.7.2.18 downloadSoftware

6.7.2.18.1 Description

This service capability provides the ability to download application software.

6.7.2.18.2 Pre-Conditions

A correlation between a Management Server, the M2M Service Capability and device exist.

6.7.2.18.3 Signature -downloadSoftware

Table 6.7.2.18.3-1: Management Adapter -downloadSoftware capability

Parameter name	Direction	Optional	Description
deviceId	IN	NO	The unique device identifier in the context of the M2M Service Subscription.
version	IN	NO	The version of the software.
name	IN	NO	The name of the software.
url	IN	NO	The URL from which the software package can be downloaded.
reportPolicy	IN	YES	The policy used to report the state of the operation to the originating AE. See clause 6.6.2.2.1.
responseType	OUT	YES	Unique response types for this service (see note): • Exception: Request may not have been completed.
NOTE: Consumed services also provide response types.			

6.7.2.18.4 Post-Conditions

The Management Adapter has submitted a request to the Management Server to download application software.

6.7.2.18.5 Exceptions

Not Applicable.

6.7.2.18.6 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.7.2.18.7 oneM2M Resource Interworking

This service capability is used to download application software. The service capability aligns with the <software> resource and maps to the UPDATE procedure for the attribute install of the resource. The service capability also aligns with the <mgmtCmd> resource and maps to the EXECUTE procedure for the resource.

6.7.2.19 installSoftware

6.7.2.19.1 Description

This M2M Service Capability provides the ability to install application software.

6.7.2.19.2 Pre-Conditions

A correlation between a Management Server, the service capability and device exist.

6.7.2.19.3 Signature -installSoftware

Table 6.7.2.19.3-1: Management Adapter -installSoftware capability

Parameter name	Direction	Optional	Description
deviceId	IN	NO	The unique device identifier in the context of the M2M Service Subscription.
version	IN	NO	The version of the software.
name	IN	NO	The name of the software.
reportPolicy	IN	YES	The policy used to report the state of the operation to the originating AE. See clause 6.6.2.2.1.
responseType	OUT	YES	Unique response types for this service (see note): • Exception: Request may not have been completed.
NOTE: Consumed services also provide response types.			

6.7.2.19.4 Post-Conditions

The Management Adapter has submitted a request to the Management Server to install application software.

6.7.2.19.5 Exceptions

Not Applicable.

6.7.2.19.6 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.7.2.19.7 oneM2M Resource Interworking

This service capability is used to install application software. The service capability aligns with the <software> resource and maps to the UPDATE procedure for the attribute install of the resource. The service capability also aligns with the <mgmtCmd> resource and maps to the EXECUTE procedure for the resource.

6.7.2.20 activateSoftware

6.7.2.20.1 Description

This service capability provides the ability to activate software previously installed.

6.7.2.20.2 Pre-Conditions

A correlation between a Management Server, the M2M Service Capability and device exist.

6.7.2.20.3 Signature - activateSoftware

Table 6.7.2.20.3-1: Management Adapter - activateSoftware capability

Parameter name	Direction	Optional	Description
deviceId	IN	NO	The unique device identifier in the context of the M2M Service Subscription.
version	IN	NO	The version of the software.
name	IN	NO	The name of the software.
reportPolicy	IN	YES	The policy used to report the state of the operation to the originating AE. See clause 6.6.2.2.1.
responseType	OUT	YES	Unique response types for this service (see note): • Exception: Request may not have been completed.
NOTE: Consumed services also provide response types.			

6.7.2.20.4 Post-Conditions

The Management Adapter has submitted a request to the Management Server to activate software previously installed.

6.7.2.20.5 Exceptions

Not Applicable.

6.7.2.20.6 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.7.2.20.7 oneM2M Resource Interworking

This service capability is used to activate software previously installed. The service capability aligns with the <software> resource and maps to the UPDATE procedure for the attribute activate of the resource. The service capability also aligns with the <mgmtCmd> resource and maps to the EXECUTE procedure for the resource.

6.7.2.21 deactivateSoftware

6.7.2.21.1 Description

This service capability provides the ability for the Management Adapter to deactivates software.

6.7.2.21.2 Pre-Conditions

A correlation between a Management Server, the M2M Service Capability and device exist.

6.7.2.21.3 Signature -deactivateSoftware

Table 6.7.2.21.3-1: Management Adapter -deactivateSoftware capability

Parameter name	Direction	Optional	Description
deviceId	IN	NO	The unique device identifier in the context of the M2M Service Subscription.
version	IN	NO	The version of the software.
name	IN	NO	The name of the software.
reportPolicy	IN	YES	The policy used to report the state of the operation to the originating AE. See clause 6.6.2.2.1.
responseType	OUT	YES	Unique response types for this service (see note): • Exception: Request may not have been completed.
NOTE: Consumed services also provide response types.			

6.7.2.21.4 Post-Conditions

The Management Adapter has submitted a request to the Management Server to deactivates software.

6.7.2.21.5 Exceptions

Not Applicable.

6.7.2.21.6 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.7.2.21.7 oneM2M Resource Interworking

This service capability is used to deactivates software. The service capability aligns with the <software> resource and maps to the UPDATE procedure for the attribute deactivate of the resource. The service capability also aligns with the <mgmtCmd> resource and maps to the EXECUTE procedure for the resource.

6.7.2.22 removeSoftware

6.7.2.22.1 Description

This service capability provides the ability for the Management Adapter to uninstall the software.

6.7.2.22.2 Pre-Conditions

A correlation between a Management Server, the M2M Service Capability and device exist.

6.7.2.22.3 Signature -removeSoftware

Table 6.7.2.22.3-1: Management Adapter -removeSoftware capability

Parameter name	Direction	Optional	Description
deviceId	IN	NO	The unique device identifier in the context of the M2M Service Subscription.
version	IN	NO	The version of the software.
name	IN	NO	The name of the software.
reportPolicy	IN	YES	The policy used to report the state of the operation to the originating AE. See clause 6.6.2.2.1.
responseType	OUT	YES	Unique response types for this service (see note): • Exception: Request may not have been completed.
NOTE: Consumed services also provide response types.			

6.7.2.22.4 Post-Conditions

The Management Adapter has submitted a request to the Management Server to uninstall the software.

6.7.2.22.5　Exceptions

Not Applicable.

6.7.2.22.6　Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.7.2.22.7　oneM2M Resource Interworking

This service capability is used to install application software. The service capability aligns with the <software> resource and maps to the UPDATE procedure for the attribute uninstall of the resource. The service capability also aligns with the <mgmtCmd> resource and maps to the EXECUTE procedure for the resource.

6.8　Service Administration

6.8.1　Overview

The Service Administration service provides the capability to administer the following across the Msc Reference Points:

- Administration of M2M Service attributes.

- Association of M2M Services to corresponding Service Roles.

- Association of Service Roles to M2M Service Capabilities.

6.8.2　Service Administration Entities

6.8.2.1　Overview

The information elements that relate M2M Services to Service Roles and Service Roles to M2M Service Capabilities is depicted below:

- Each instance of an M2M Service contains zero or instances of a Service Role.

- The M2M Service can be obtained from the Service Role. The Service Roles from the M2M Service can be obtained from the M2M Service.

- Each instance of a Service Role is associated with zero or more instances of a M2M Service Capability.

- The M2M Service can be obtained from the Service Role. The Service Roles associated with the M2M Service can be obtained from the M2M Service.

- Each instance of a M2M Service Capability is associated with zero or more instances of a Service Role.

- The M2M Service Capabilities that are associated with a Service Role can be obtained from the Service Role. Likewise the Service Roles associated with the M2M Service Capability can be obtained from the M2M Service Capability.

- Each operation that is defined within the Service Exposure Component is assigned to exactly one M2M Service Capability.
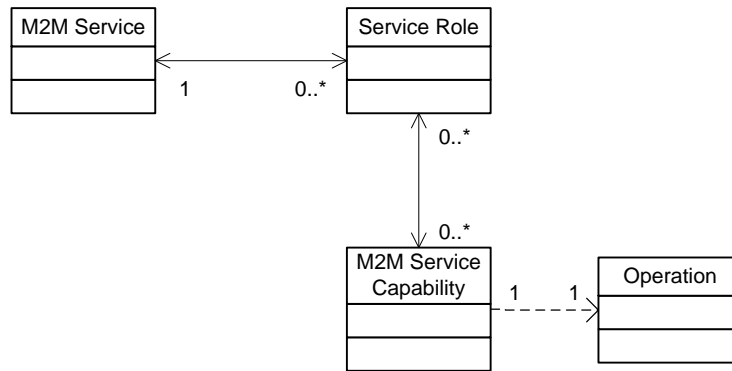
Figure 6.8.2.1-1: M2M Service Entity Relationships

6.8.2.2   M2M Service Entity

The Service is a primary entity that provides the attributes to identify the M2M Service and associated Service Roles within the oneM2M System. These M2M Services and associated Service Roles shall be maintained by the M2M Service Provider.

Table 6.8.2.2-1: M2M Service Entity

Attribute name	Description
serviceId	The M2M Service Identifier (M2M-Serv-ID).
serviceRoleIds	List of Service Role Identifiers (SRole-ID) associated with the Service.

6.8.2.3   M2M Service Filter Criteria

Table 6.8.2.3-1: M2M Service Filter Criteria

Criterion name	Description
serviceIds	List of the Service Identifiers (M2M-Serv-ID).
serviceRoleIds	One or more Service Role Identifiers (SRole-ID) associated with the M2M Service entity.

6.8.3   Service Capabilities

6.8.3.1   createM2MService

6.8.3.1.1   Description

This service capability provides the ability to create a M2M Service.

6.8.3.1.2   Pre-Conditions

Not Applicable.

6.8.3.1.3   Signature - createM2MService

Table 6.8.3.1.3-1: Service Administration - createM2M Service capability

Parameter name	Direction	Optional	Description
name	IN	NO	The unique name of the M2M Service.
description	IN	YES	The description of the M2M Service.
serviceId	OUT	NO	The identifier of the created M2M Service (M2M-Serv-ID).
responseType	OUT	YES	Unique response types for this service: • M2M Service exists for the name parameter. • M2M Service Role exists for M2M Service.

6.8.3.1.4   Service Interactions

The interactions of service capabilities required for this service capability:

1)   Issue this capability.
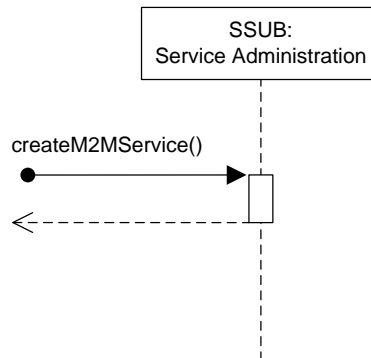
Figure 6.8.3.1.4-1: Service Administration - createM2MService Diagram

6.8.3.1.5   Post-Conditions

Not Applicable.

6.8.3.1.6   Exceptions

Not Applicable.

6.8.3.1.7   Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.8.3.1.8   oneM2M Resource Interworking

This service capability creates the M2M Service. The M2M Service entity is described in the Annex G of the oneM2M Functional Architecture [2]. The M2M-Serv-ID created using this capability shall map to the M2M-Serv-ID of the oneM2M Functional Architecture [2].

6.8.3.2   deleteM2MService

6.8.3.2.1   Description

This service capability provides the ability to delete a M2M Service. This service capability shall be restricted to the Msc Reference Point.

6.8.3.2.2   Pre-Conditions

The M2M Service's Service Roles are not associated with any M2M Service Subscriptions.

6.8.3.2.3   Signature - deleteM2MService

Table 6.8.3.2.3-1: Service Administration - deleteM2MService capability

Parameter name	Direction	Optional	Description
serviceId	IN	NO	The M2M Service Identifier (M2M-Serv-ID).
responseType	OUT	YES	Unique response types for this service: • M2M Service does not exist. • M2M Service has Service Roles associated with M2M Service Subscriptions.

6.8.3.2.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue this capability.
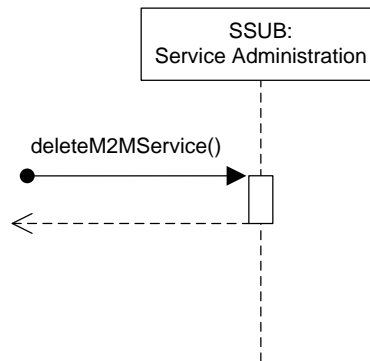
Figure 6.8.3.2.4-1: Service Administration - deleteM2MService Diagram

6.8.3.2.5 Post-Conditions

The M2M Service is deleted along with any associations has to the Service Roles. The Node information associated with the M2M Service is also deleted.

6.8.3.2.6 Exceptions

Not Applicable.

6.8.3.2.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.8.3.2.8 oneM2M Resource Interworking

This service capability deletes the M2M Service. The M2M Service entity is described in the Annex G of the oneM2M Functional Architecture [2].

6.8.3.3 addRoleToM2MService

6.8.3.3.1 Description

This service capability provides the ability to add new Service Roles to a M2M Service. This service capability shall be restricted to the Msc Reference Point.

6.8.3.3.2 Pre-Conditions

M2M Service exists.

6.8.3.3.3 Signature - addRoleToM2MService

Table 6.8.3.3.3-1: Service Administration - addRoleToM2MService capability

Parameter name	Direction	Optional	Description
serviceId	IN	NO	The M2M Service Identifier (M2M-Serv-ID).
serviceRoleIds	IN	NO	List of Service Role Identifiers (SRole-ID) to be associated with the M2M Service. If a SRole-ID in the parameter is already associated with the M2M Service, nothing is done for the SRole-ID as it already is associated.
responseType	OUT	YES	Unique response types for this service: • M2M Service does not exist.

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6.8.3.3.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue this capability.
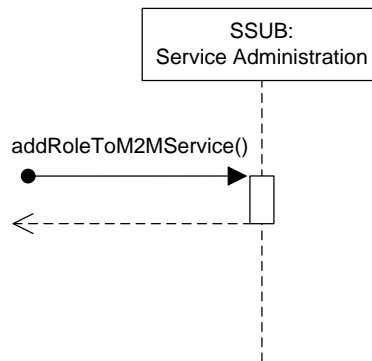
Figure 6.8.3.3.4-1: Service Administration - addRoleToM2MService Diagram

6.8.3.3.5 Post-Conditions

The associations that M2M Service has to the Service Role(s) are updated.

6.8.3.3.6 Exceptions

Not Applicable.

6.8.3.3.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.8.3.3.8 oneM2M Resource Interworking

This service capability updates the M2M Service with the respective M2M Service Roles. The M2M Service entity is described in the Annex G of the oneM2M Functional Architecture [2].

6.8.3.4 deleteRoleFromM2MService

6.8.3.4.1 Description

This service capability provides the ability to delete existing Service Roles from a M2M Service. This service capability shall be restricted to the Msc Reference Point.

6.8.3.4.2 Pre-Conditions

The Service Role is not associated with any M2M Service Subscriptions.

6.8.3.4.3 Signature - deleteRoleFromM2MService

Table 6.8.3.4.3-1: Service Administration - deleteRoleFromM2MService capability

Parameter name	Direction	Optional	Description
serviceId	IN	NO	The M2M Service Identifier (M2M-Serv-ID).
serviceRoleIds	IN	NO	List of Service Role Identifiers (SRole-ID) to be deleted from the association with the M2M Service.
responseType	OUT	YES	Unique response types for this service: • M2M Service does not exist. • Service Role does not exist. • Service Role is associated with a M2M Service Subscription.

6.8.3.4.4   Service Interactions

The interactions of service capabilities required for this service capability:

1)   Issue this capability.
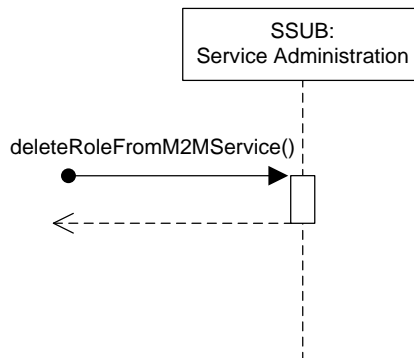
Figure 6.8.3.4.4-1: Service Administration - deleteRoleFromM2MService Diagram

6.8.3.4.5   Post-Conditions

The M2M Service is updated with associations of the identified Service Roles deleted.

6.8.3.4.6   Exceptions

Not Applicable.

6.8.3.4.7   Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.8.3.4.8   oneM2M Resource Interworking

This service capability updates the M2M Service with the respective Service Roles removed. The M2M Service entity is described in the Annex G of the oneM2M Functional Architecture [2].

6.8.3.5   getM2MService

6.8.3.5.1   Description

This service capability provides the ability to retrieve the existing M2M Service. This service capability shall be restricted to the Msc Reference Points.

6.8.3.5.2   Pre-Conditions

Not Applicable.

6.8.3.5.3   Signature - getM2MService

Table 6.8.3.5.2-1: Service Administration - getM2MService capability

Parameter name	Direction	Optional	Description
filterCriteria	IN	NO	See M2M Service Filter Criteria table 6.8.2.3-1.
services	OUT	NO	The resulting M2M Service entities in table 6.8.2.2-1.
responseType	OUT	YES	Unique response types for this service: • None.

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6.8.3.5.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue this capability.
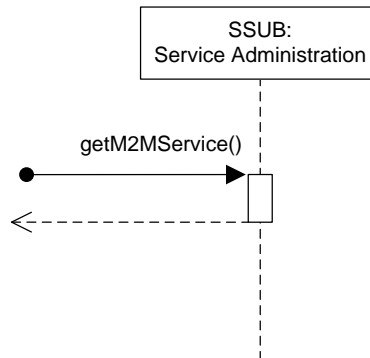
Figure 6.8.3.5.4-1: Service Administration - getM2MService Diagram

6.8.3.5.5 Post-Conditions

Not Applicable.

6.8.3.5.6 Exceptions

Not Applicable.

6.8.3.5.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.8.3.5.8 oneM2M Resource Interworking

This service capability retrieves the M2M Service. The M2M Service entity is described in the Annex G of the oneM2M Functional Architecture [2].

6.8.3.6 addServiceCapabilityToRole

6.8.3.6.1 Description

This service capability adds a M2M Service Capability to one or more Service Roles.

6.8.3.6.2 Pre-Conditions

Service Roles exist.

6.8.3.6.3 Signature - addServiceCapabilityToRole

Table 6.8.3.6.3-1: Service Administration - addServiceCapabilityToRole capability

Parameter name	Direction	Optional	Description
serviceCapId	IN	NO	The M2M Service Capability Identifier (M2M-Serv-Cap-ID).
serviceRoleIds	IN	NO	List of Service Role Identifiers (SRole-ID) to be associated with the M2M Service Capability.
responseType	OUT	YES	Response types: • Service Role does not exist. • M2M Service Capability is not part of the capabilities of M2M Service associated with the Service Role.

6.8.3.6.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue this capability:
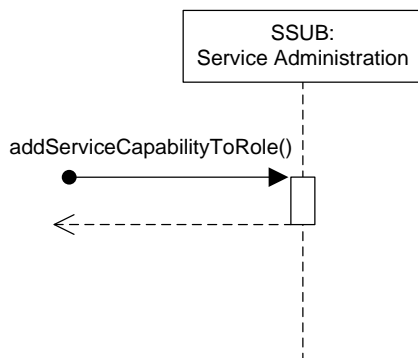
Figure 6.8.3.6.4-1: Service Administration - addServiceCapabilityToRole Diagram

6.8.3.6.5 Post-Conditions

Not Applicable.

6.8.3.6.6 Exceptions

Not Applicable.

6.8.3.6.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.8.3.6.8 oneM2M Resource Interworking

Not Applicable.

6.8.3.7 deleteServiceCapabilityFromRole

6.8.3.7.1 Description

This service capabilitydelete a M2M Service Capability from one or more Service Roles.

6.8.3.7.2 Pre-Conditions

The association between the M2M Service Capability and Service Role exists.

6.8.3.7.3 Signature - deleteServiceCapabilityFromRole

Table 6.8.3.7.3-1: Service Administration - deleteServiceCapabilityFromRole capability

Parameter name	Direction	Optional	Description
serviceCapId	IN	NO	The M2M Service Capability Identifier (M2M-Serv-Cap-ID).
serviceRoleIds	IN	NO	List of Service Role Identifiers (SRole-ID) to be associated with the M2M Service Capability to be removed.
responseType	OUT	YES	Response types: • Service Role does not exist. • Service Role is not associated with a M2M Service Capability.

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6.8.3.7.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue this capability.
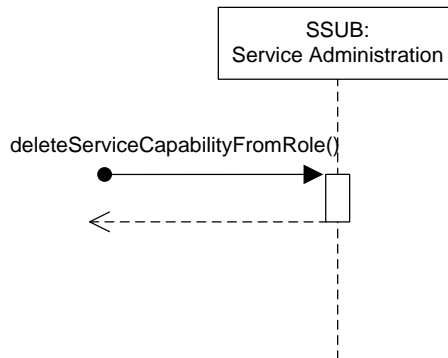
Figure 6.8.3.7.4-1:Service Administration - deleteServiceCapabilityFromRole Diagram

6.8.3.7.5 Post-Conditions

The association of the M2M Service Capability and Service Role is deleted.

6.8.3.7.6 Exceptions

Not Applicable.

6.8.3.7.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.8.3.7.8 oneM2M Resource Interworking

Not Applicable.

6.8.3.8 getServiceCapability

6.8.3.8.1 Description

This service capability retrieves the M2M Service Capability and associated Service Roles for a specified requested operation.

6.8.3.8.2 Pre-Conditions

There is a correlation to the service capabilities' operation (signature) and the M2M Service Capability. In many deployments the service capabilities' signature serves as the M2M Service Capability.

6.8.3.8.3 Signature - getServiceCapability

Table 6.8.3.8.3-1: Service Administration - getServiceCapability capability

Parameter name	Direction	Optional	Description
operation	IN	NO	Request operation - Common to all requests.
serviceCapId	OUT	NO	The M2M Service Capability Identifier (M2M-Serv-Cap-ID).
serviceRoleIds	OUT	NO	List of the M2M Service Roles Identifiers (SRole-ID) associated with the M2M Service Capabilities.
responseType	OUT	YES	Response types: • Unable to determine M2M Service Capability from the operation.

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6.8.3.8.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue this capability.
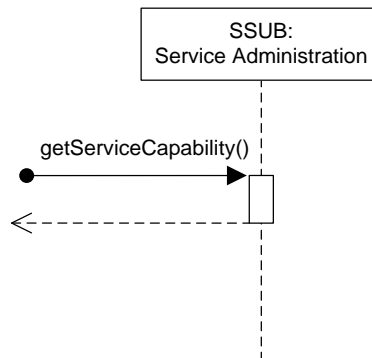
Figure 6.8.3.8.4-1: Service Administration - getServiceCapability Diagram

6.8.3.8.5 Post-Conditions

Not Applicable.

6.8.3.8.6 Exceptions

Not Applicable.

6.8.3.8.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.8.3.8.8 oneM2M Resource Interworking

Not Applicable.

6.9 Service Subscription Administration

6.9.1 Overview

The Service Subscription Administration service provides the capability to administer the following across the Mca and Msc Reference Points:

- Maintenance of M2M Services Subscriptions.

- Association of M2M Nodes and Application Rules to the M2M Service Subscription.

The M2M Service Subscription defines the technical part of the contract between a M2M Subscriber (typically an M2M Application Service Provider) and a M2M Service Provider. Each M2M Service Subscription has a unique identifier (M2M-Service-Profile-ID).

A M2M Service Subscription establishes an association between one or more M2M Application Rules and one or more M2M Nodes. In addition, the M2M Service Subscription is associated with one or more Service Roles.

A M2M Service Subscription shall be used for the following purposes:

- Serve as a basis for authorization for service capabilities.

- Serve as the basis for charging.

- Identify which devices and M2M Applications are part of this M2M Service Subscription.

6.9.2 Service Subscription Entities

6.9.2.1 Service Subscription Entity

Table 6.9.2.1-1: Service Subscription Entity

Attribute name	Description
serviceSubscriptionId	The M2M Service Subscription Identifier (M2M-Service-Profile-ID).
serviceRoleIds	List of Service Role Identifiers (SRole-ID) associated with the M2M Service Subscription.

6.9.2.2 Service Subscription Filter Criteria

Table 6.9.2.2-1: Service Subscription Filter Criteria

Criterion name	Description
serviceSubscriptionIds	List of the M2M Service Subscription Identifiers (M2M-Service-Profile-ID).
serviceRoleIds	List of Service Role Identifiers (SRole-ID) associated with the M2M Service Subscription entity.

6.9.2.3 M2M Node Entity for Service Subscription

Table 6.9.2.3-1: M2M Node Entity for Service Subscription

Attribute name	Description
serviceSubscriptionId	The M2M Service Subscription Identifier (M2M-Service-Profile-ID) for the Device.
nodeId	The unique M2M Node identifier in the context of the M2M Service Subscription.
externalIds	List of URNs that represent the external identifiers associated with this M2M Node.
applicationRuleIds	List of Application Rules Identifiers associated with the M2M Node.

6.9.2.4 M2M Node Filter Criteria

Table 6.9.2.4-1: M2M Node Filter Criteria

Criterion name	Description
serviceSubscriptionIds	List of the M2M Service Subscription Identifier (M2M-Service-Profile-ID) for the Device.
nodeIds	List of the unique M2M Node identifier in the context of the M2M Service Subscription.
externalIds	List of URNs that represent the external identifiers associated with this M2M Node.
applicationRuleIds	List of Application Rule identifiers associated with the M2M Node.

6.9.2.5 Application Rule

Table 6.9.2.5-1: Application Rule Entity

Criterion name	Description
applicationRuleId	The unique Application Rule identifier in the context of the M2M Service Subscription.
credentialIds	List of credential identifiers for which this Application Rule is applicable, i.e. for registration requests coming into a CSE via a Security Association Endpoint (SEA) [i.4], that was authenticated using credentials that match with any of these credential identifiers, the current Application Rule applies. This can contain a '*' for any credential identifier or 'None' for not authenticated case. Also Wildcards within an element of this list are possible (e.g. 'C123*X' for any credential identifier that starts with 'C123' and ends with 'X') to define sets or ranges of credential identifiers.
allowedApplicationIds	List of M2M Application Identifiers (App-ID) that shall be considered to be allowed for AE registration requests received via Security Association Endpoint (SEA) [i.4]. This can contain '*' for any App-ID. Also Wildcards within an element of this list are possible (e.g. 'C123*X' for any App-ID that starts with 'C123' and ends with 'X') to define sets or ranges of App-IDs.
allowedAEIds	List of M2M Application Entity Identifiers (AE-ID) that shall be considered to be allowed for AE registration requests. This can contain zero or more specific AE identifier values, 'S*' for any Service Provider AE-ID, 'C*' for any system assigned AE-ID, or '*' for any AE-ID. Also Wildcards within an element of this list are possible (e.g. 'C123*X' for any AE-ID that starts with 'C123' and ends with 'X') to define sets or ranges of AE-ID.

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6.9.2.6 Application Rule Filter Criteria

Table 6.9.2.6-1: Application Rule Filter Criteria

Criterion name	Description
applicationRuleIds	List of the unique Application Rule identifier in the context of the M2M Service Subscription.
credentialIds	List of credential identifiers for which this Application Rule is applicable, i.e. for registration requests coming into the M2M System via a Security Association Endpoint (SEA) [i.1], that was authenticated using credentials that match with any of these credential identifiers, the current Application Rule applies. This can contain a '*' for any credential identifier or 'None' for not authenticated case. Also Wildcards within an element of this list are possible (e.g. 'C123*X' for any credential identifier that starts with 'C123' and ends with 'X') to define sets or ranges of credential identifiers.
allowedApplicationIds	List of M2M Application Identifiers (App-ID) that shall be considered to be allowed for AE registration requests received via Security Association Endpoint (SEA) [i.2]. This can contain '*' for any App-ID. Also Wildcards within an element of this list are possible (e.g. 'C123*X' for any App-ID that starts with 'C123' and ends with 'X') to define sets or ranges of App-IDs.
allowedAEIds	List of M2M Application Entity Identifiers (AE-ID) that shall be considered to be allowed for AE registration requests. This can contain zero or more specific AE identifier values, 'S*' for any Service Provider AE-ID, 'C*' for any system assigned AE-ID, or '*' for any AE-ID. Also Wildcards within an element of this list are possible (e.g. 'C123*X' for any AE-ID that starts with 'C123' and ends with 'X') to define sets or ranges of AE-ID.

6.9.2.7 Supporting Rules

6.9.2.7.1 Schedule Type

The Schedule is a simple type that describes the schedule information.

Table 6.9.2.7.1-1: Type: Schedule

Parameter	Optional	Description
scheduleElement	NO	Expresses time periods defined by second, minute, hour day of month, month, and year. Supports repeating periods, and wildcards expressed as a list. The definition of a schedule is defined in clause 7.3.9 of oneM2M TS-0004 [i.5].

6.9.3 Service Capabilities

6.9.3.1 createServiceSubscription

6.9.3.1.1 Description

This service capability provides the ability to create a M2M Service Subscription. This service capability shall be restricted to the Msc Reference Point.

6.9.3.1.2 Pre-Conditions

Not Applicable.

6.9.3.1.3 Signature - createServiceSubscription

Table 6.9.3.1.3-1: Service Subscription Administration - createServiceSubscription capability

Parameter name	Direction	Optional	Description
serviceSubscriptionId	IN-OUT	YES	The M2M Service Subscription Identifier (M2M-Service-Profile-ID). If the attribute is not provided on input, the oneM2M System shall assign the M2M-Service-Profile-ID. The M2M-Service-Profile-ID is unique for the oneM2M System.
serviceRoleIds	IN	NO	List of Service Role Identifiers (SRole-ID) to be associated with the M2M Service Subscription.
responseType	OUT	YES	Unique response types for this service: • M2M Service Subscription exists. • Service Role does not exist.

6.9.3.1.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the createServiceSubscription capability.
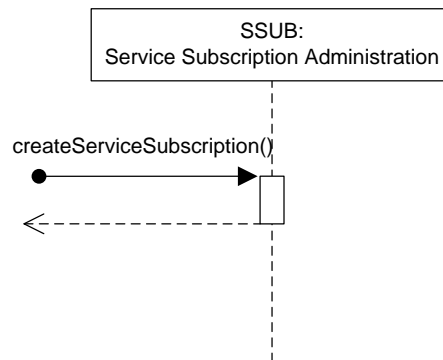
Figure 6.9.3.1.4-1: Service Subscription Administration - createServiceSubscription Diagram

6.9.3.1.5 Post-Conditions

The M2M Service Subscription is created and any Service Roles are associated with the M2M Service Subscription.

6.9.3.1.6 Exceptions

Not Applicable.

6.9.3.1.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.9.3.1.8 oneM2M Resource Interworking

This service capability creates the M2M Service Subscription with the identifier (M2M-Service-Profile-ID) and maps to the CREATE procedure for the <m2mServiceSubscriptionProfile> resource.

This service capability utilizes the access management services with the privileges associated with the associated Service Role. As such the accessControlPolicyIDs attribute of the <m2mServiceSubscriptionProfile> resource is not used within this service capability.

6.9.3.2 deleteServiceSubscription

6.9.3.2.1 Description

This service capability provides the ability to delete a M2M Service Subscription. This service capability shall be restricted to the Msc Reference Point.

6.9.3.2.2 Pre-Conditions

Not Applicable.

6.9.3.2.3 Signature - deleteServiceSubscription

Table 6.9.3.2.3-1: Service Subscription Administration - deleteServiceSubscription capability

Parameter name	Direction	Optional	Description
serviceSubscriptionId	IN	NO	The M2M Service Subscription Identifier (M2M-Service-Profile-ID).
responseType	OUT	YES	Unique response types for this service: • M2M Service Subscription does not exist.

6.9.3.2.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the deleteServiceSubscription capability.
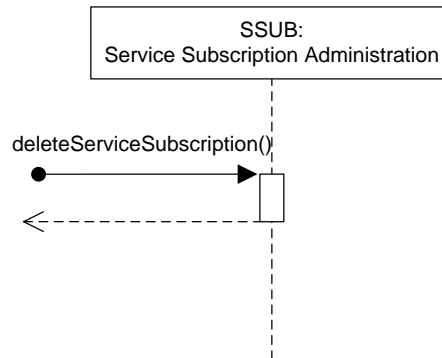
Figure 6.9.3.2.4-1: Service Subscription Administration - deleteServiceSubscription Diagram

6.9.3.2.5 Post-Conditions

The M2M Service Subscription is deleted along with any associations of the M2M Service Subscription has to the Service Roles. The Node information (e.g. devices, M2M Applications) associated with the M2M Service Subscription is also deleted.

6.9.3.2.6 Exceptions

Not Applicable.

6.9.3.2.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.9.3.2.8 oneM2M Resource Interworking

This service capability deletes the M2M Service Subscription with the identifier (M2M-Service-Profile-ID) and maps to the DELETE procedure for the <m2mServiceSubscriptionProfile> resource.

6.9.3.3 updateServiceSubscription

6.9.3.3.1 Description

This service capability provides the ability to update a M2M Service Subscription. This service capability shall be restricted to the Msc Reference Point.

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6.9.3.3.2 Pre-Conditions

Not Applicable.

6.9.3.3.3 Signature - updateServiceSubscription

Table 6.9.3.3.3-1: Service Subscription Administration - updateServiceSubscription capability

Parameter name	Direction	Optional	Description
serviceSubscriptionId	IN	NO	The M2M Service Subscription Identifier (M2M-Service-Profile-ID).
serviceRoleIds	IN	YES	List of Service Role Identifiers (SRole-ID) to be associated with the M2M Service Subscription. If supplied, SRole-IDs in the list that are not already associated with the M2M Service Subscription are added. SRole-IDs that are associated with the M2M Service Subscription but not in the list are deleted.
roleIdResult	OUT	YES	If the parameter serviceRoleIds is present, this parameter provides the results (added, deleted) for each affected Service Roles.
responseType	OUT	YES	Unique response types for this service: • M2M Service Subscription does not exist. • Service Role does not exist for a Supporting Service.

6.9.3.3.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the updateServiceSubscription capability.
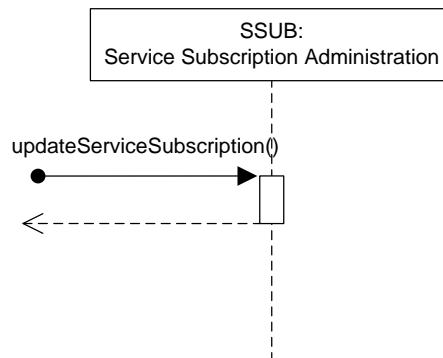
Figure 6.9.3.3.4-1: Service Subscription Administration - updateServiceSubscription Diagram

6.9.3.3.5 Post-Conditions

The M2M Service Subscription is updated along with any associations of the M2M Service Subscription has to the Service Roles.

6.9.3.3.6 Exceptions

Not Applicable.

6.9.3.3.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

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6.9.3.3.8 oneM2M Resource Interworking

This service capability updates the M2M Service Subscription with the identifier (M2M-Service-Profile-ID) and maps to the UPDATE procedure for the <m2mServiceSubscriptionProfile> resource.

6.9.3.4 addRoleToServiceSubscription

6.9.3.4.1 Description

This service capability provides the ability to add new Service Roles to a M2M Service Subscription. This service capability shall be restricted to the Msc Reference Point.

6.9.3.4.2 Pre-Conditions

Not Applicable.

6.9.3.4.3 Signature - addRoleToServiceSubscription

Table 6.9.3.4.3-1: Service Subscription Administration - addRoleToServiceSubscription capability

Parameter name	Direction	Optional	Description
serviceSubscriptionId	IN	NO	The M2M Service Subscription Identifier (M2M-Service-Profile-ID).
serviceRoleIds	IN	NO	List of Service Role Identifiers (SRole-ID) to be associated with the M2M Service Subscription. If a SRole-ID in the parameter is already associated with the M2M Service Subscription, nothing is done for the SRole-ID as it already is associated.
responseType	OUT	YES	Unique response types for this service. • M2M Service Subscription does not exist • Service Role does not exist for a Supporting Service

6.9.3.4.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the addRoleToServiceSubscription capability.
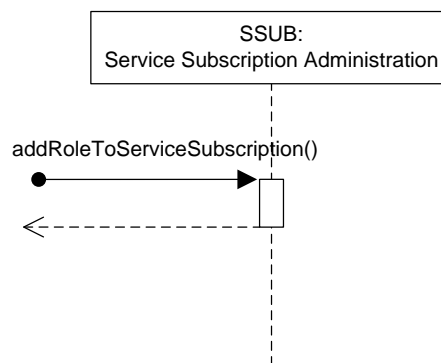
Figure 6.9.3.4.4-1: Service Subscription Administration - addRoleToServiceSubscription Diagram

6.9.3.4.5 Post-Conditions

The M2M Service Subscription is updated with any associations of the M2M Service Subscription has to the Service Roles.

6.9.3.4.6 Exceptions

Not Applicable.

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6.9.3.4.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.9.3.4.8 oneM2M Resource Interworking

This service capability updates the M2M Service Subscription with the identifier (M2M-Service-Profile-ID) and maps to the UPDATE procedure for the <m2mServiceSubscriptionProfile> resource for the serviceRoles attribute.

6.9.3.5 deleteRoleFromServiceSubscription

6.9.3.5.1 Description

This service capability provides the ability to delete existing Service Roles from a M2M Service Subscription. This service capability shall be restricted to the Msc Reference Point.

6.9.3.5.2 Pre-Conditions

Not Applicable.

6.9.3.5.3 Signature - deleteRoleFromServiceSubscription

**Table 6.9.3.5.3-1: Service Subscription Administration -
deleteRoleFromServiceSubscription capability**

Parameter name	Direction	Optional	Description
serviceSubscriptionId	IN	NO	The M2M Service Subscription Identifier (M2M-Service-Profile-ID).
serviceRoleIds	IN	NO	List of Service Role Identifiers (SRole-ID) to be deleted from the association with the M2M Service Subscription.
responseType	OUT	YES	Unique response types for this service: • M2M Service Subscription does not exist. • Service Role does not exist for a Supporting Service.

6.9.3.5.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the deleteRoleFromServiceSubscription capability.
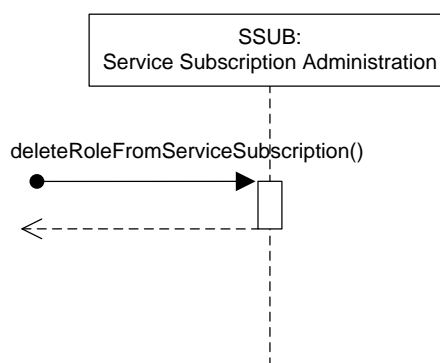
**Figure 6.9.3.5.4-1: Service Subscription Administration -
deleteRoleFromServiceSubscription Diagram**

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6.9.3.5.5 Post-Conditions

The M2M Service Subscription is updated with associations of the identified Service Roles deleted.

6.9.3.5.6 Exceptions

Not Applicable.

6.9.3.5.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.9.3.5.8 oneM2M Resource Interworking

This service capability updates the M2M Service Subscription with the identifier (M2M-Service-Profile-ID) and maps to the UPDATE procedure for the <m2mServiceSubscriptionProfile> resource for the serviceRoles attribute.

6.9.3.6 getServiceSubscription

6.9.3.6.1 Description

This service capability provides the ability to retrieve the existing M2M Service Subscription. This service capability shall be restricted to the Msc and Mca Reference Points.

6.9.3.6.2 Pre-Conditions

Not Applicable.

6.9.3.6.3 Signature - getServiceSubscription

Table 6.9.3.6.3-1: Service Subscription Administration - getServiceSubscription capability

Parameter name	Direction	Optional	Description
filterCriteria	IN	NO	See table 6.9.2.2-1.
serviceSubscriptions	OUT	NO	The resulting M2M Service Subscription entities in table 6.9.2.3-1.
responseType	OUT	YES	Unique response types for this service: • None.

6.9.3.6.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the getServiceSubscription capability.

Figure 6.9.3.6.4-1: Service Subscription Administration - getServiceSubscription Diagram

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6.9.3.6.5 Post-Conditions

Not Applicable.

6.9.3.6.6 Exceptions

Not Applicable.

6.9.3.6.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.9.3.6.8 oneM2M Resource Interworking

This service capability retrieves the M2M Service Subscription for the specified filter criteria and maps to the RETRIEVE procedure for the <m2mServiceSubscription> resource.

6.9.3.7 addNodeToServiceSubscription

6.9.3.7.1 Description

This service capability provides the ability to add a M2M Node to the existing M2M Service Subscription. This service capability shall be restricted to the Msc and Mca Reference Points.

6.9.3.7.2 Pre-Conditions

Not Applicable.

### 6.9.3.7.3 Signature - addNodeToServiceSubscription

Table 6.9.3.7.3-1: Service Subscription Administration - addNodeToServiceSubscription capability

Parameter name	Direction	Optional	Description
serviceSubscriptionId	IN	NO	The M2M Service Subscription (M2M-Service-Profile-ID) to add the Device
externalIds	IN	YES	A List of URNs that represent the external identifiers associated with this M2M Node.
applicationRuleIds	IN	YES	A list of Application Rules associated with this Node.
nodeId	OUT	NO	The unique M2M Node identifer for this entity.
responseType	OUT	YES	Unique response types for this service: • M2M Service Subscription does not exist.

6.9.3.7.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the addNodeToServiceSubscription capability

Figure 6.9.3.7.4-1: Service Subscription Administration - addNodeToServiceSubscription Diagram

6.9.3.7.5 Post-Conditions

Not Applicable.

6.9.3.7.6 Exceptions

Not Applicable.

6.9.3.7.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.9.3.7.8 oneM2M Resource Interworking

This service capability adds the M2M Node information for the M2M Service Subscription. This capability maps to the CREATE procedure of the <serviceSubscribedNode> resource.

6.9.3.8 deleteNodesFromServiceSubscription

6.9.3.8.1 Description

This service capability provides the ability to delete M2M Nodes from the existing M2M Service Subscription. This service capability shall be restricted to the Msc and Mca Reference Points.

6.9.3.8.2 Pre-Conditions

Not Applicable.

6.9.3.8.3 Signature - deleteNodesFromServiceSubscription

Table 6.9.3.8.3-1: Service Subscription Administration - deleteNodesFromServiceSubscription capability

Parameter name	Direction	Optional	Description
serviceSubscriptionId	IN	NO	The M2M Service Subscription (M2M-Service-Profile-ID) for the Devices.
nodeIds	IN	NO	List of M2M Node identifiers to be deleted from the M2M Service Subscription.
responseType	OUT	YES	Unique response types for this service: • M2M Service Subscription does not exist. • M2M Node does not exist for this M2M Service Subscription.

6.9.3.8.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the deleteNodesFromServiceSubscription capability.

```
                    ┌─────────────────────────────┐
                    │   SE and SSUB:              │
                    │ Service Subscription Administration │
                    └─────────────────────────────┘
                                    ┆
        deleteNodesFromServiceSubscription()
           ●──────────────────────────────▶┌─┐
                                            │ │
           ◀ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ └─┘
                                    ┆
                                    ┆
```

**Figure 6.9.3.8.4-1: Service Subscription Administration -
deleteNodesFromServiceSubscription Diagram**

6.9.3.8.5   Post-Conditions

Not Applicable.

6.9.3.8.6   Exceptions

Not Applicable.

6.9.3.8.7   Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.9.3.8.8   oneM2M Resource Interworking

This service capability removes the M2M Node from the M2M Service Subscription. This capability maps to the DELETE procedure of the <serviceSubscribedNode> resource.

6.9.3.9   getNodesForServiceSubscription

6.9.3.9.1   Description

This service capability provides the ability to retrieve M2M Nodes for an existing M2M Service Subscription. This service capability shall be restricted to the Msc and Mca Reference Points.

6.9.3.9.2   Pre-Conditions

Not Applicable.

### 6.9.3.9.3   Signature - getNodesForServiceSubscription

Table 6.9.3.9.3-1: Service Subscription Administration - getNodesForServiceSubscription capability

Parameter name	Direction	Optional	Description
filterCriteria	IN	NO	See table 6.9.2.4-1.
nodes	OUT	NO	The resulting M2M Node entities in table 6.9.2.3-1.
responseType	OUT	YES	Unique response types for this service: • None.

6.9.3.9.4   Service Interactions

The interactions of service capabilities required for this service capability:

1)   Issue the getNodesForServiceSubscription capability.

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Figure 6.9.3.9.4-1: Service Subscription Administration - getNodesForServiceSubscription Diagram

6.9.3.9.5   Post-Conditions

Not Applicable.

6.9.3.9.6   Exceptions

Not Applicable.

6.9.3.9.7   Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.9.3.9.8   oneM2M Resource Interworking

This service capability retrieves the devices for a M2M Service Subscription for the specified filter criteria and maps to the RETRIEVE procedure for the <serviceSubscribedNode> resource.

6.9.3.10   createApplicationRule

6.9.3.10.1   Description

This service capability provides the ability to create a M2M Application Rule to be associated with one or more M2M Nodes. This service capability shall be restricted to the Msc and Mca Reference Points.

6.9.3.10.2   Pre-Conditions

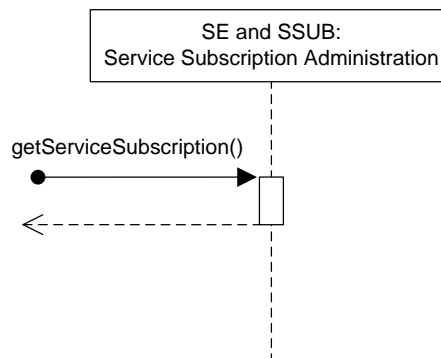Not Applicable.

6.9.3.10.3   Signature - createApplicationRule

Table 6.9.3.10.3-1: Service Subscription Administration - createApplicationRule capability

Parameter name	Direction	Optional	Description
credentialIds	IN	YES	List of credential identifiers for which this Application Rule is applicable, i.e. for registration requests coming into the M2M System via a Security Association Endpoint (SEA) [i.3], that was authenticated using credentials that match with any of these credential identifiers, the current Application Rule applies.
allowedApplicationIds	IN	YES	List of M2M Application Identifiers (App-ID) that shall be considered to be allowed for AE registration requests received via Security Association Endpoint (SEA) [i.4].
allowedAEIds	IN	YES	List of M2M Application Entity Identifiers (AE-ID) that shall be considered to be allowed for AE registration requests.
applicationRuleId	OUT	NO	The unique Application Rule identifier in the context of the M2M Service Subscription.
responseType	OUT	YES	Unique response types for this service: • None.

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6.9.3.10.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the createApplicationRule capability.
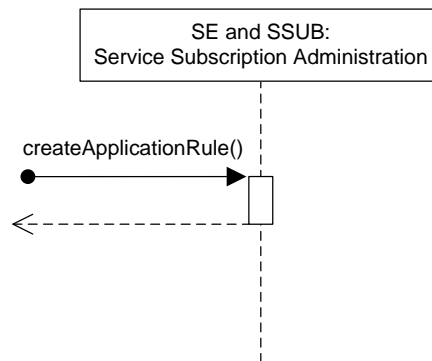
Figure 6.9.3.10.4-1: Service Subscription Administration - createApplicationRule Diagram

6.9.3.10.5 Post-Conditions

Not Applicable.

6.9.3.10.6 Exceptions

Not Applicable.

6.9.3.10.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.9.3.10.8 oneM2M Resource Interworking

This service capability adds an Application Rule. This capability maps to the CREATE procedure of the <serviceSubscribedAppRule> resource.

6.9.3.11 deleteApplicationRules

6.9.3.11.1 Description

This service capability provides the ability to delete Application Rules and any references to the Application Rule made by M2M Nodes to the Application Rules. This service capability shall be restricted to the Msc and Mca Reference Points.

6.9.3.11.2 Pre-Conditions

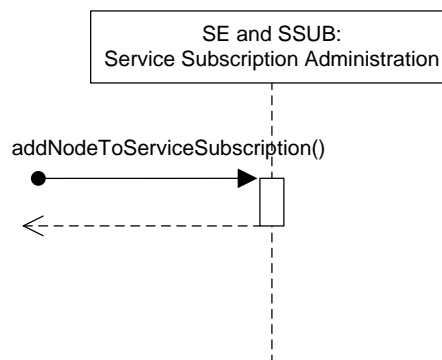Not Applicable.

6.9.3.11.3 Signature - deleteApplicationRules

Table 6.9.3.11.3-1: Service Subscription Administration - deleteApplicationRules capability

Parameter name	Direction	Optional	Description
applicationRuleIds	IN	NO	A list of Application Rule identifiers.
responseType	OUT	YES	Unique response types for this service: • Application Rule does not exis.t

6.9.3.11.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the deleteApplicationRules capability.

Figure 6.9.3.11.4-1: Service Subscription Administration - deleteApplicationRules Diagram

6.9.3.11.5 Post-Conditions

Not Applicable.

6.9.3.11.6 Exceptions

Not Applicable.

6.9.3.11.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.9.3.11.8 oneM2M Resource Interworking

This service capability adds Application Rules. This capability maps to the DELETE procedure of the <serviceSubscribedAppRule> resource.

6.9.3.12 getApplicationRules

6.9.3.12.1 Description

This service capability provides the ability to retrieve the Application Rules. This service capability shall be restricted to the Msc and Mca Reference Points.

6.9.3.12.2 Pre-Conditions

Not Applicable.

6.9.3.12.3 Signature - getApplicationRules

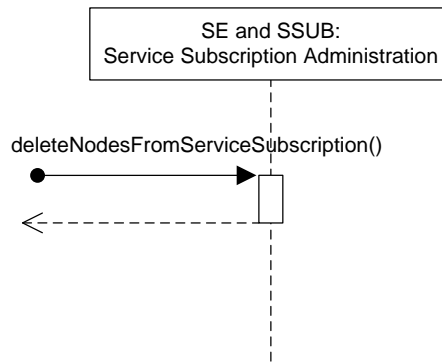**Table 6.9.3.12.3-1: Service Subscription Administration - getApplicationRules capability**

Parameter name	Direction	Optional	Description
filterCriteria	IN	NO	See table 6.9.2.6-1.
applicationRules	OUT	NO	The resulting M2M Node entities in table 6.9.2.5-1.
responseType	OUT	YES	Unique response types for this service: • None.

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6.9.3.12.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the getApplicationRules capability.

Figure 6.9.3.12.4-1: Service Subscription Administration - getApplicationRules Diagram

6.9.3.12.5 Post-Conditions

Not Applicable.

6.9.3.12.6 Exceptions

Not Applicable.

6.9.3.12.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.9.3.12.8 oneM2M Resource Interworking

This service capability retrieves Application Rules. This capability maps to the RETRIEVE procedure of the <serviceSubscribedAppRule> resource.

6.9.3.13 updateNodeForServiceSubscription

6.9.3.13.1 Description

This service capability provides the ability to update the Application Rules and External Identifiers to be associated to a Node within the context of a M2M Service Subscription. This service capability shall be restricted to the Msc and Mca Reference Points.

6.9.3.13.2 Pre-Conditions

Not Applicable.

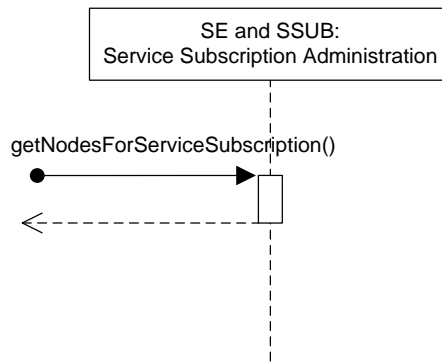#### 6.9.3.13.3 updateNodeForServiceSubscription

**Table 6.9.3.13.3-1: Service Subscription Administration -
updateNodeForServiceSubscription capability**

Parameter name	Direction	Optional	Description
serviceSubscriptionId	IN	NO	The M2M Service Subscription (M2M-Service-Profile-ID) for the device.
nodeId	IN	NO	The unique M2M Node identifier in the context of the M2M Service Subscription.
applicationRuleIds	IN	YES	A list of Application Rule Identifier. When present this list will overlay the list of Applications associated with the Node.
externalIds	IN	YES	List of URNs that represent the external identifiers associated with this device. When present this list will overlay the list of external identifiers associated with the Node.
responseType	OUT	YES	Unique response types for this service: • M2M Service Subscription does not exist. • M2M Node does not exist for the M2M Service Subscription.

6.9.3.13.4 Service Interactions

The interactions of service capabilities required for this service capability:

1)   Issue the updateNodeForServiceSubscription capability.
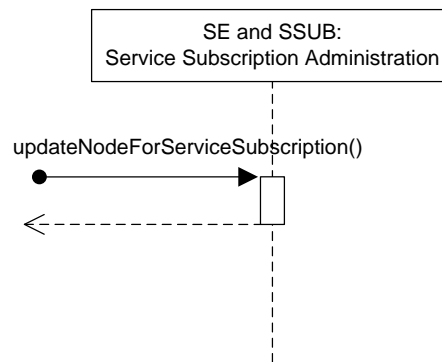
**Figure 6.9.3.13.4-1: Service Subscription Administration -
updateNodeForServiceSubscription Diagram**

6.9.3.13.5 Post-Conditions

When parameters are present, the M2M Applications and External Identifiers are replaced for the M2M Node.

6.9.3.13.6 Exceptions

Not Applicable.

6.9.3.13.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.9.3.13.8 oneM2M Resource Interworking

This service capability updates the M2M Application and/or External Identifier list(s) for the Node in the context of the M2M Service Subscription Profile. This capability maps to the UPDATE procedure of the <serviceSubscribedNode> resource.

6.9.3.14 updateApplicationRule

6.9.3.14.1 Description

This service capability provides the ability to update an Application Rule. This service capability shall be restricted to the Msc and Mca Reference Points.

6.9.3.14.2 Pre-Conditions

Not Applicable.

#### 6.9.3.14.3 Signature - updateApplicationRule

Table 6.9.3.14.3-1: Service Subscription Administration - updateApplicationRule capability

Parameter name	Direction	Optional	Description
applicationRuleId	IN	NO	The unique Application Rule identifier in the context of the M2M Service Subscription.
credentialIds	IN	YES	List of credential identifiers for which this Application Rule is applicable, i.e. for registration requests coming into the M2M System via a Security Association Endpoint (SEA) [i.3], that was authenticated using credentials that match with any of these credential identifiers, the current Application Rule applies. When present this list will overlay the list of credential identifiers.
allowedApplicationIds	IN	YES	List of M2M Application Identifiers (App-ID) that shall be considered to be allowed for AE registration requests received via Security Association Endpoint (SEA) [i.3]. When present this list will overlay the list of allowed App-IDs.
allowedAEIds	IN	YES	List of M2M Application Entity Identifiers (AE-ID) that shall be considered to be allowed for AE registration requests. When present this list will overlay the list of allowed AE-IDs.
responseType	OUT	YES	Unique response types for this service: • Application Rule does not exist.

6.9.3.14.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the updateApplicationRule capability.
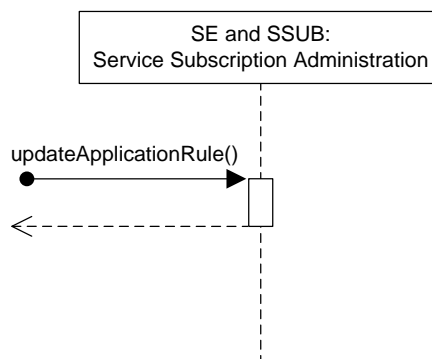
Figure 6.9.3.14.4-1: Service Subscription Administration - updateApplicationRule Diagram

6.9.3.14.5 Post-Conditions

When parameters are present, the Allowed Application, AEs and Credentials are replaced for the Application Rule.

6.9.3.14.6 Exceptions

Not Applicable.

6.9.3.14.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.9.3.14.8 oneM2M Resource Interworking

This service capability updates an Application Rule. This capability maps to the UPDATE procedure of the <serviceSubscribedAppRule> resource.

6.9.3.15 addReachabilitySchedule

6.9.3.15.1 Description

This service capability provides the ability to add a reachability schedule to an AE. This service capability shall be restricted to the Msc and Mca Reference Points.

6.9.3.15.2 Pre-Conditions
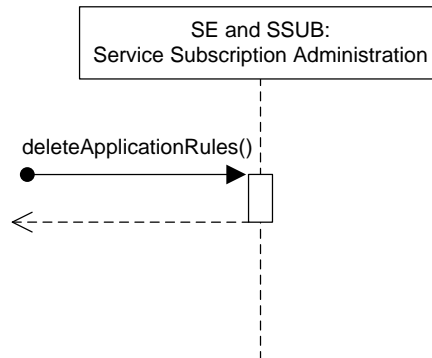
Not Applicable.

6.9.3.15.3 Signature - addReachabilitySchedule

Table 6.9.3.15.3-1: Service Subscription Administration - addReachabilitySchedule capability

Parameter name	Direction	Optional	Description
aeId	IN	NO	The Application Entity Identifier (AE-ID).
reachabilitySchedule	IN	YES	The contact reachability schedule information of the AE associated with the device node. The absence of this parameter implies the AE associated with the device node is always contact reachable. Type Schedule, see clause 6.9.2.7.1.
responseType	OUT	YES	Unique response types for this service: • AE successfully added.

6.9.3.15.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the addReachabilitySchedule capability.
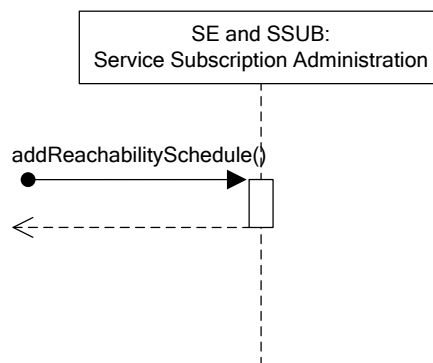
Figure 6.9.3.15.4-1: addReachabilitySchedule Diagram

6.9.3.15.5   Post-Conditions

When parameters are present, the reachability schedule is added for the AE.

6.9.3.15.6   Exceptions

Not Applicable.

6.9.3.15.7   Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.9.3.15.8   oneM2M Resource Interworking

This service capability is used to add AE reachability schedule information. The service capability aligns with the <schedule> resource and maps to the CREATE procedure. However the linkage between the <schedule> resource and the AE does not exist.

6.9.3.16   updateReachabilitySchedule

6.9.3.16.1   Description

This service capability provides the ability to update an AE's reachability schedule information. This service capability shall be restricted to the Msc and Mca Reference Points.

6.9.3.16.2   Pre-Conditions
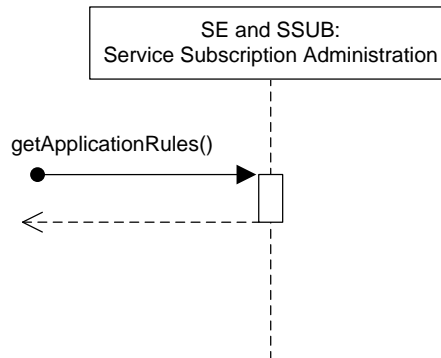
Not Applicable.

6.9.3.16.3   Signature -updateReachabilitySchedule

Table 6.9.3.16.3-1: Service Subscription Administration -updateReachabilitySchedule capability

Parameter name	Direction	Optional	Description
aeId	IN	NO	The Application Entity Identifier (AE-ID).
reachabilitySchedule	IN	YES	The contact reachability schedule information of the AE associated with the device node. The absence of this parameter implies the AE associated with the device node is always contact reachable. Type Schedule, see clause 6.9.2.7.1.
responseType	OUT	YES	Unique response types for this service: • AE successfully updated.

6.9.3.16.4   Service Interactions

The interactions of service capabilities required for this service capability:

1)   Issue the updateReachabilitySchedule capability.
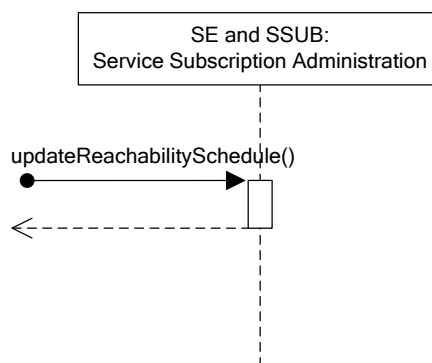
Figure 6.9.3.16.4-1: updateReachabilitySchedule Diagram

6.9.3.16.5 Post-Conditions

When parameters are present, the reachability schedule is updated for the AE.

6.9.3.16.6 Exceptions

Not Applicable.

6.9.3.16.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.9.3.16.8 oneM2M Resource Interworking

This service capability is used to update AE's reachability schedule information. The service capability aligns with the <schedule> resource and maps to the UPDATE procedure. The reference between an AE and a <schedule> resource does not exist as an oneM2M Resource attribute.

6.9.3.17 getReachabilitySchedule

6.9.3.17.1 Description

This service capability provides the ability to get an AE's reachability schedule information. This service capability shall be restricted to the Msc and Mca Reference Points.

### 6.9.3.17.2 Pre-Conditions

Not Applicable.

6.9.3.17.3 Signature - getReachabilitySchedule

Table 6.9.3.17.3-1: Service Subscription Administration - getReachabilitySchedule capability

Parameter name	Direction	Optional	Description
aeId	IN	NO	The Application Entity Identifier (AE-ID).
reachabilitySchedule	OUT	YES	The contact reachability schedule information of the AE associated with the device node. The absence of this parameter implies the AE associated with the device node is always contact reachable. Type Schedule, see clause 6.9.2.7.1.
responseType	OUT	YES	Unique response types for this service: • not successfully.

6.9.3.17.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the getReachabilitySchedule capability.
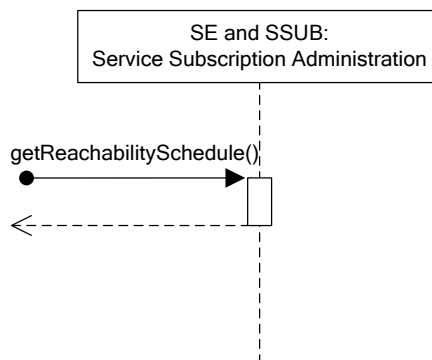
Figure 6.9.3.17.4-1: getReachabilitySchedule Diagram

6.9.3.17.5 Post-Conditions

When parameters are present, the reachability schedule is gotten from the AE.

6.9.3.17.6 Exceptions

Not Applicable.

6.9.3.17.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.9.3.17.8 oneM2M Resource Interworking

This service capability is used to get an AE's reachability schedule information. The service capability aligns with the <schedule> resource and maps to the RETRIEVE procedure. The reference between an AE and a <schedule> resource does not exist as an oneM2M Resource attribute.

6.9.3.18 deleteReachabilitySchedule

6.9.3.18.1 Description

This service capability provides the ability to delete a reachability schedule for an AE. This service capability shall be restricted to the Msc and Mca Reference Points.

6.9.3.18.2 Pre-Conditions

Not Applicable.

6.9.3.18.3 Signature - deleteReachabilitySchedule

Table 6.9.3.18.3-1: Service Subscription Administration - deleteReachabilitySchedule capability

Parameter name	Direction	Optional	Description
aeId	IN	NO	The Application Entity Identifier (AE-ID).
responseType	OUT	YES	Unique response types for this service: • AE successfully deleted.

6.9.3.18.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the deleteReachabilitySchedule capability.
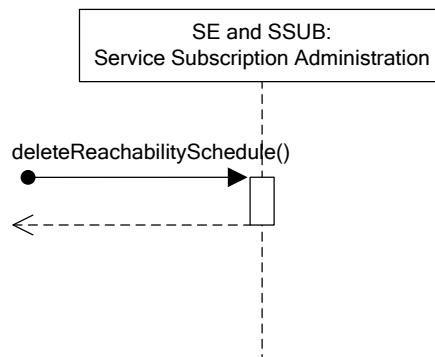
Figure 6.9.3.18.4-1: deleteReachabilitySchedule Diagram

6.9.3.18.5 Post-Conditions

When parameters are present, the reachability schedule is deleted from the AE.

6.9.3.18.6 Exceptions

Not Applicable.

6.9.3.18.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.9.3.18.8 oneM2M Resource Interworking

This service capability is used to delete an AE's reachability schedule information. The service capability aligns with the <schedule> resource and maps to the DELETE procedure. The reference between an AE and a <schedule> resource does not exist as an oneM2M Resource attribute.

6.10 Event Collection

6.10.1 Overview

The Event Collection service provides the capability to record events for accounting purposes.

6.10.2 Event Collection Entities

6.10.2.1 Event Collection Types

6.10.2.1.1 Event Collection Record

Table 6.10.1.1-1: Type: Event Record Template

Information Element	Optional	Description
eventRecordID	NO	It is the unique ID that identifies a specific event record.
eventCollectionTriggerID	NO	It is the unique ID that identifies a specific event collection triggering scenario, which triggers information recording for a specific event.
collectingEntityID	NO	This is the unique ID of the entity that collects the statistics. It can be an AE-ID or M2M Service Capability Identifier (M2M-Serv-Cap-ID).
collectedEntityID	NO	This is the unique ID of the entity whose service layer operation statistics are being collected. It can be an AE-ID or M2M Service Capability Identifier (M2M-Serv-Cap-ID).
serviceProfileID	YES	An M2M Service Profile Identifier defines M2M Services and/or M2M Service Roles and AEs applicable to M2M Nodes.
eventDescription	NO	Describes the event triggered at the service. It is a subset of the eventConfig data structure. The specific structure depends on the specific event defined by the Event Collection Trigger.
Vendor Specific Information	YES	Defines Vendor specific information.

6.10.2.1.2 Event Configuration Type

Table 6.10.2.1.2-1 Type: Event Collection - eventConfig

Parameter name	Optional	Description
eventType	NO	This attribute indicates the type of the event, such as "subscribeComplete", "downloadFirmware ", "timer based",, "storage based", etc. The eventType can be a combination of multiple sub-types, for example, it can be based on both "subscribeComplete" and a timer.
serviceRoleIds	YES	Defines the specific service role.
eventStart	YES	This attribute indicates the start time of the event. It is mandatory if the eventType includes "timer based".
eventEnd	YES	This attribute indicates the end time of the event. It is mandatory if the eventType includes "timer based".
dataSize	YES	This attribute defines the data size if an event is triggered when the stored data exceeds a certain size. It is mandatory if the eventType is "storage based".

6.10.2.1.3 getEventCollectionPolicy Filter Criteria

Table 6.10.2.1.3-1: getEventCollectionPolicy Filter Criteria

Criterion name	Description
eventType	See table 6.10.2.1.2-1.
eventStart	See table 6.10.2.1.2-1. This criterion may only be used when the eventType criterion is set to "timer based".
eventEnd	See table 6.10.2.1.2-1. This criterion may only be used when the eventType criterion is set to "timer based".
dataSize	See table 6.10.2.1.2-1. This criterion may only be used when the eventType criterion is set to "storage based".

6.10.2.1.4 getEventCollectionTriggers Filter Criteria

Table 6.10.2.1.4-1: getEventCollectionTriggers Filter Criteria

Criterion name	Description
eventCollectionPolicyID	See table 6.10.3.3.2-1.
collectingEntityID	See table 6.10.3.3.2-1.
collectedEntityID	See table 6.10.3.3.2-1.
eventReceiverID	See table 6.10.3.3.2-1.
serviceID	See table 6.10.3.3.2-1.
triggerStatus	See table 6.10.3.3.2-1.

6.10.2.1.5 getEventRecords Filter Criteria

Table 6.10.2.1.5-1: getEventRecords Filter Criteria

Criterion name	Description
eventCollectionTriggerID	See table 6.10.1.1-1.
collectingEntityID	See table 6.10.1.1-1.
collectedEntityID	See table 6.10.1.1-1.
serviceProfileID	See table 6.10.1.1-1.
eventDescription	See table 6.10.1.1-1. In the filterCriteria, the eventDescription can be a string that partially matches the eventDescription parameter in the record.

6.10.3 Service Capabilities

6.10.3.1 setEventCollectionPolicy

6.10.3.1.1 Description

This service capability provides the ability for AEs to configure event collection policies for statistics and charging purposes. This service capability applies to the Mca Reference Point.

6.10.3.1.2 Pre-Conditions

The Originator can be an AE, and the Originator wants to configure event collection policies at a receiving service capability. The receiving service capability conducts event collection according to the policies. The receiving service capability may establish its own event collection policies.

The Originator, if different from the receiving service capability, is subscribed and registered to the receiving service capability.

6.10.3.1.3 Signature - setEventCollectionPolicy

Table 6.10.3.1.3-1: Event Collection - setEventCollectionPolicy capability

Parameter name	Direction	Optional	Description
serviceId	IN	NO	The M2M Service Identifier (M2M-Serv-ID)
eventConfig	IN	NO	The configuration of the event collection policy. Defined in table 6.10.2.1.2-1.
eventCollectionPolicyID	OUT	NO	The receiving service capability generates a unique policy ID for each policy.
responseType	OUT	YES	Unique response types for this service. Exception: • Policy already exists.

6.10.3.1.4 Post-Conditions

Not Applicable.

6.10.3.1.5 Exceptions

The Originator has no access right to create the policy.

6.10.3.1.6 Policies for Use

Message Exchange Patterns: In-Out.

6.10.3.1.7 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the request to the Supporting Service to perform the operation.
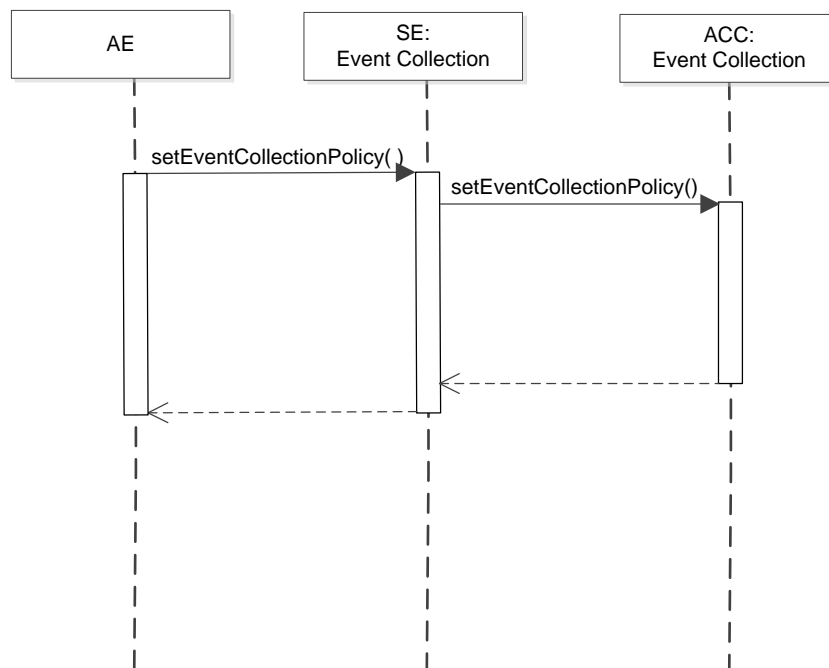
Figure 6.10.3.1.7-1: setEventCollectionPolicy Diagram

6.10.3.1.8 oneM2M Resource Interworking

The service capability aligns with the <eventConfig> resource and maps to the CREATE procedure for the resource.

6.10.3.2 getEventCollectionPolicy

6.10.3.2.1 Description

This service capability provides the ability for entities, such as an AE or a service capability, to retrieve the existing policies stored at a service capability. This service capability applies to the Mca and Msc Reference Point.

6.10.3.2.2 Pre-Conditions

The Originator can be an AE or a service capability, and the Originator wants to retrieve event collection policies at a receiving service capability.

The Originator, if different from the receiving service capability, is subscribed and registered to the receiving service capability. The Originator is only allowed to retrieve with the proper access right.

6.10.3.2.3 Signature - getEventCollectionPolicy

Table 6.10.3.2.3-1: Event Collection - getEventCollectionPolicy capability

Parameter name	Direction	Optional	Description
eventCollectionPolicyID	IN	NO	See table 6.10.3.1.3-1 The eventCollectionPolicyID specifies the specific event collection policy to retrieve, if the Originator has such information. If the Originator does not have the information regarding eventCollectionPolicyID, it indicates eventCollectionPolicyID with a specific value that represents "any IDs", and uses the filterCriteria to filter selected policies.
filterCriteria	IN	YES	See table 6.10.2.1.3-1.
responseType	OUT	YES	Unique response types for this service. Exception: • eventCollectionPolicyID does not exist

6.10.3.2.4 Post-Conditions

Not Applicable.

6.10.3.2.5 Exceptions

The Originator has no access right to retrieve the policy

6.10.3.2.6 Policies for Use

Message Exchange Patterns: In-Out.

6.10.3.2.7 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the request to the Supporting Service to perform the operation.

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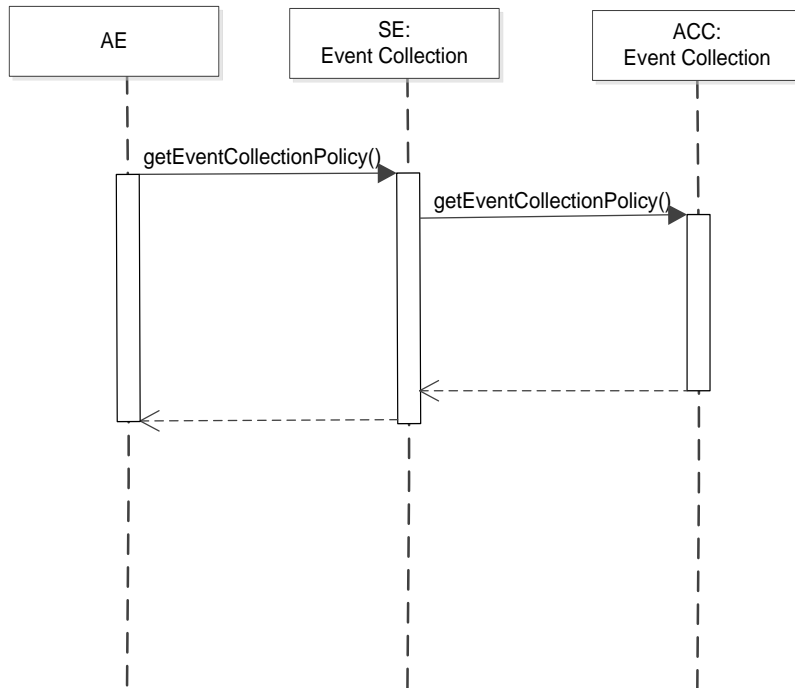
Figure 6.10.3.2.7-1: getEventCollectionPolicy Diagram

6.10.3.2.8 oneM2M Resource Interworking

The service capability aligns with the <eventConfig> resource and maps to the RETRIEVE procedure for the resource.

6.10.3.3 setEventCollectionTriggers

6.10.3.3.1 Description

This service capability provides the ability for AEs and service capabilities to configure specific triggers for event collection, based on the Event Collection Policy. This service capability applies to the Mca and Msc Reference Point.

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6.10.3.3.2 Pre-Conditions

The Originator can be an AE or a service capability, and the Originator wants to configure event collection triggers based on existing event collection policy available at the collecting service capability.

6.10.3.3.3 Signature - setEventCollectionTriggers

Table 6.10.3.3.3-1: Event Collection - setEventCollectionTriggers capability

Parameter name	Direction	Optional	Description
eventCollectionPolicyID	IN	NO	This attribute specify the policy used to define the specific event collection trigger.
collectingEntityID	IN	NO	This is the ID of the entity where the event is being collected. If not specified, the default collecting entity is the receiving service capability.
collectedEntityID	IN	NO	This is the ID of the entity that triggered the event collection. If not specified, the default is all entities triggered the event at the collecting entity.
eventReceiverID	IN	YES	In cases when there is another entity, other than the collecting entity (such as a service capability), wants to receive the collected event, this attribute provides the unique ID of this entity.
serviceRoleIds	IN	YES	Specifies the service roles that trigger the event collection.
serviceId	IN	YES	Specifies the services that trigger the event collection.
triggerStatus	IN	YES	This attribute indicates if the trigger is activated or not. If not defined, the trigger is activated.
eventCollectionTriggerID	OUT	NO	The receiving service capability generates a unique ID for each event collection trigger.
responseType	OUT	YES	Unique response types for this service. Exception: • eventCollectionPolicyID is invalid. • collectingEntityID is invalid. • collectedEntityID is invalid. • eventReceiverID is invalid. • triggerStatus is invalid.

6.10.3.3.4 Post-Conditions

After the successful creation of event collection triggers, when the defined event happens at the collectingEntity, and when the event collection trigger status is ACTIVE, the collectingEntity shall collect the event. The supporting service shall send a recordEvent message to the Event Collection entity.

6.10.3.3.5 Exceptions

The Originator has no access right to create the event collection triggers.

6.10.3.3.6 Policies for Use

Message Exchange Patterns: In-Out.

6.10.3.3.7 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the request to the Supporting Service to perform the operation.

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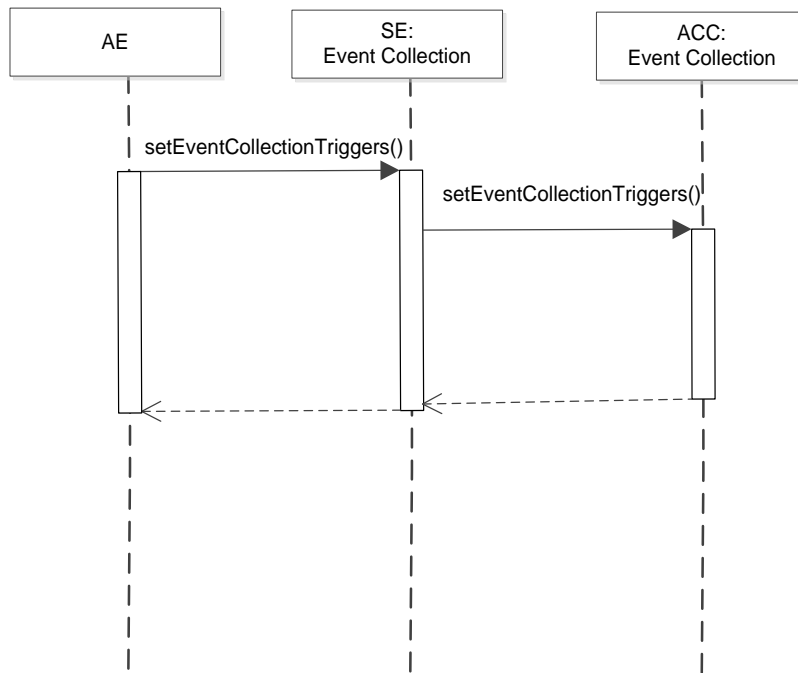
Figure 6.10.3.3.7-1: setEventCollectionTriggers Diagram

6.10.3.3.8 oneM2M Resource Interworking

The service capability aligns with the <statsCollect> resource and maps to the CREATE procedure for the resource.

6.10.3.4 getEventCollectionTriggers

6.10.3.4.1 Description

This service capability provides the ability for AEs and service capabilities to retrieve event collection triggers at a receiving service capability. This service capability applies to the Mca and Msc Reference Point.

6.10.3.4.2 Pre-Conditions

Originating AEs and service capabilities are subscribed and registered to the receiving service capability. Originator has the access right to retrieve.

6.10.3.4.3 Signature - getEventCollectionTriggers

Table 6.10.3.4.3-1: Event Collection - getEventCollectionTriggers capability

Parameter name	Direction	Optional	Description
eventCollectionTriggerID	IN	YES	This attribute specifies which event collection triggers to retrieve. If not specified, any event collection trigger matching the filter criteria should be retrieved. If the Originator does not have the information regarding eventCollectionTriggerID, it indicates with a specific value that represents "any IDs", and uses the filterCriteria to filter selected event triggers.
filterCriteria	IN	YES	See table 6.10.2.1.4-1.
responseType	OUT	YES	Unique response types for this service. Exception: • eventCollectionTriggerID does not exist.

6.10.3.4.4 Post-Conditions

Not Applicable.

6.10.3.4.5 Exceptions

The Originator has no access right to retrieve the event collection triggers.

6.10.3.4.6 Policies for Use

Message Exchange Patterns: In-Out.

6.10.3.4.7 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue the request to the Supporting Service to perform the operation.
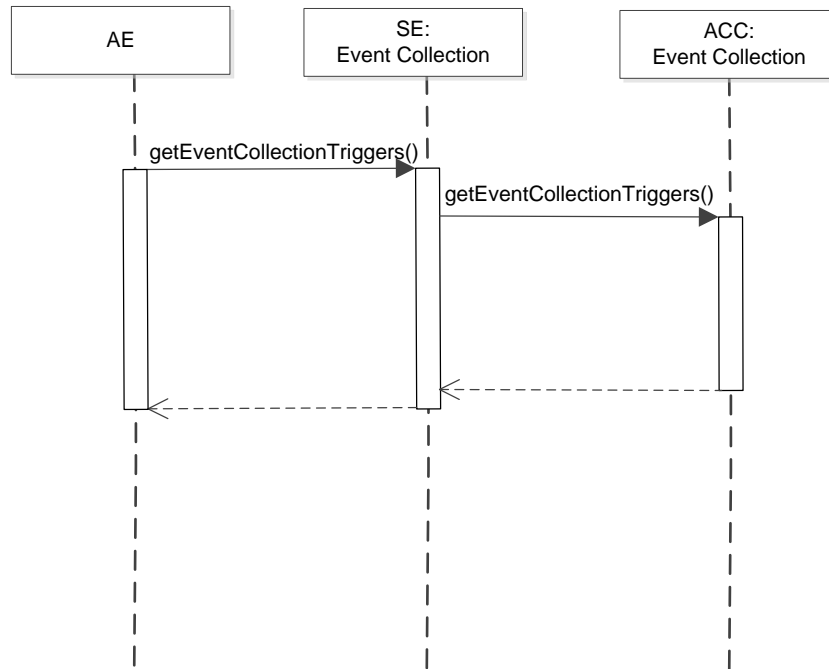
Figure 6.10.3.4.7-1: getEventCollectionTriggers Diagram

6.10.3.4.8 oneM2M Resource Interworking

The service capability aligns with the <statsCollect> resource and maps to the RETRIEVE procedure for the resource.

6.10.3.5 recordEvent

6.10.3.5.1 Description

This service capability provides the ability for a service (such as Data Exchange service) to trigger the event collection service to record an event. This service applies to the Msc Reference Point.

6.10.3.5.2 Pre-Conditions

Event Collection Triggers have been created by the setEventCollectionTriggers capability.

6.10.3.5.3 Signature - recordEvent

Table 6.10.3.5.3-1: Event Collection - recordEvent capability

Parameter name	Direction	Optional	Description
eventCollectionPolicyID	IN	YES	This attribute specify the policy used to define the specific event collection trigger.
eventCollectionTriggerID	IN	NO	The service where the trigger happens provides the eventCollectionTriggerID being used.
eventDescription	IN	NO	This attribute describes the event triggered at the service. It is a subset of the eventConfig data structure. It contains one or more parameters defined in the eventConfig data type.
recordID	OUT	NO	The event collection service generates a unique ID.
responseType	OUT	YES	Unique response types for this service. Exception: • Event recording cannot be completed.

6.10.3.5.4 Post-Conditions

Not Applicable.

6.10.3.5.5 Exceptions

Not Applicable.

6.10.3.5.6 Policies for Use

Message Exchange Patterns: In-Out.

6.10.3.5.7 Service Interactions

The request comes from the service where the event was triggered to the Event Collection entity.
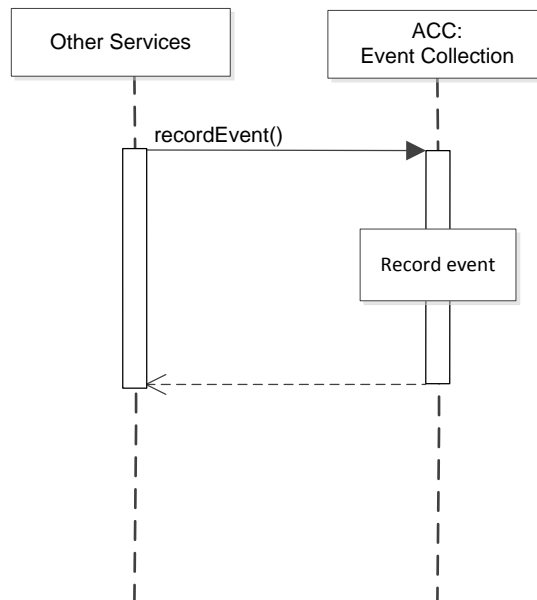
Figure 6.10.3.5.7-1: recordEvent Diagram

6.10.3.5.8 oneM2M Resource Interworking

Not Applicable.

6.10.3.6 getEventRecords

6.10.3.6.1 Description

This service capability provides the ability for AEs and service capabilities to retrieve the recorded events for statistical or charging purposes. This service capability applies to the Mca and Msc Reference Point.

6.10.3.6.2 Pre-Conditions

Originating AEs and service capabilities are subscribed and registered to the receiving service capability.

6.10.3.6.3 Signature - getEventRecords

Table 6.10.3.6.3-1: Event Collection - getRecords capability

Parameter name	Direction	Optional	Description
eventRecordID	IN	NO	This attribute specifies which record to retrieve. If not specified, any event records matching the filter criteria should be retrieved. If the Originator does not have the information regarding the eventRecordID, it indicates with a specific value that represents "any IDs", and use the filterCriteria to filter selected records of events.
filterCriteria	IN	YES	See table 6.10.2.1.5-1.
responseType	OUT	YES	Unique response types for this service. Exception: • The eventRecordID.

6.10.3.6.4 Post-Conditions

Not Applicable.

6.10.3.6.5 Exceptions

Not Applicable.

6.10.3.6.6 Policies for Use

Message Exchange Patterns: In-Out.

6.10.3.6.7　　　Service Interactions

The Originator sends the request to the Event Collection entity to obtain the event records that it is interested in.
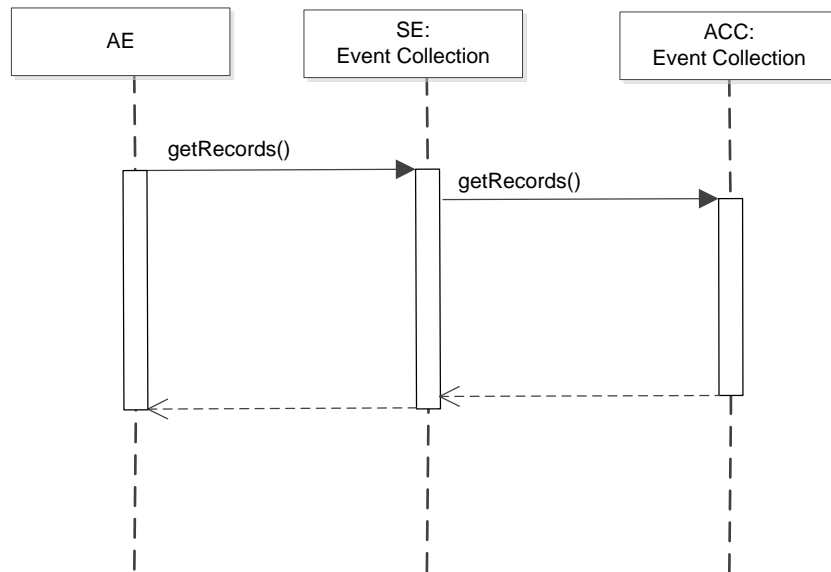
Figure 6.10.3.6.7-1: getEventRecords Diagram

6.10.3.6.8　　　oneM2M Resource Interworking

Not Applicable.

6.11　　Registration

6.11.1　Overview

The Registration service provides the ability for:

- Initial Registration of an AE.

- Refresh an existing Registration of an AE.

- AE initiated termination of an existing Registration.

- Removal of subscriptions to AE Registration events.

6.11.2   Service Capabilities

6.11.2.1   registerAE

6.11.2.1.1   Description

This service capability enables an AE with the proper authorization to register with the M2M System. This service capability shall be restricted across the Mca Reference Point.

6.11.2.1.2   Pre-Conditions

The AE has not registered with the M2M System. An AE identifier may have been already allocated to the registering AE and acquired by the AE by means outside the scope of this present document.

6.11.2.1.3   Signature - registerAE

Table 6.11.2.1.3-1: Registration - registerAE capability

Parameter name	Direction	Optional	Description
pointOf Access	IN	NO	The point of Access of the registered AE.
applicationId	IN	NO	The Application Identifier (App-ID).
credentialId	IN	YES	Application Credential-ID used to identify the Application Entity for the Application. It is used to retrieve the corresponding M2M Service Subscription.
expirationTime	IN	NO	The expiration time of the registration as requested by the Originator.
reachabilitySchedule	IN	YES	The contact reachability schedule information of the AE associated with the device node. The absence of this parameter implies the AE associated with the device node is always contact reachable. Type Schedule, see clause 6.9.2.7.1.
aeId	IN-OUT	Optional for IN only-Not Optional for OUT	Application Entity (AE-ID) is provided back in the response.
responseType	OUT	NO	Unique response types for this service: • AE successfully registered. • AE not successfully registered. • M2M Service Subscription does not exist.. • Invalid Application Credential Identifier.

6.11.2.1.4   Services Interaction

The interactions of service capabilities required for this service capability:

1)   Associate the AE with the M2M Service Subscription.

2)   Issue the request to the Supporting Service.

3)   Send a notification to the Device Onboarding Supporting Service for a first-time application registration in the event there is a subscription of the first contact event by the Supporting Service.
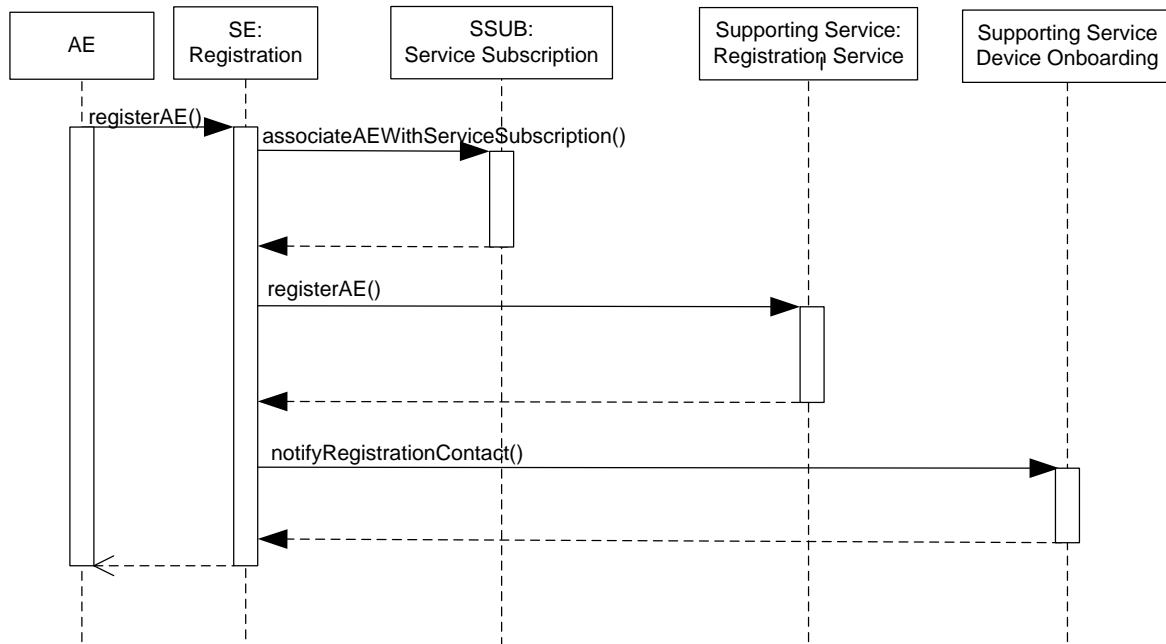
Figure 6.11.2.1.4-1: Registration - registerAE Diagram

6.11.2.1.5 Post-Conditions

AE is registered and can start using service capabilities.

The returned AE-ID shall be used in any subsequent operation related to that application.

6.11.2.1.6 Exceptions

Not Applicable.

6.11.2.1.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.11.2.1.8 oneM2M Resource Interworking

This service capability maps to the CREATE procedure of the <AE> resource.

6.11.2.2 refreshAERegistration

6.11.2.2.1 Description

This service capability enables an AE to refresh an existing AE registration with the M2M System. This service capability shall be restricted to the Mca Reference Points.

6.11.2.2.2 Pre-Conditions

The AE has successfully registered with the M2M System.

6.11.2.2.3 Signature - refreshAERegistration

Table 6.11.2.2.3-1: Registration - refreshAERegistration capability

Parameter name	Direction	Optional	Description
aeId	IN	NO	The Application Entity Identifier (AE-ID) of the request originator.
pointOfAccess	IN	YES	The point of Access of the registered AE. POA is optional only if identical to the one in the refreshed registration
expirationTime	IN	NO	The expiration time of the registration as requested by the Originator.
reachabilitySchedule	IN	YES	The contact reachability schedule information of the AE associated with the device node. The absence of this parameter implies the AE associated with the device node is always contact reachable. Type Schedule, see clause 6.9.2.7.1.
responseType	OUT	NO	Unique response types for this service: • AE successfully refreshed. • Registration does not exist.

6.11.2.2.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Issue a request to refresh the AE association with the M2M Service Profile.

2) Issue the request to the Supporting Service.
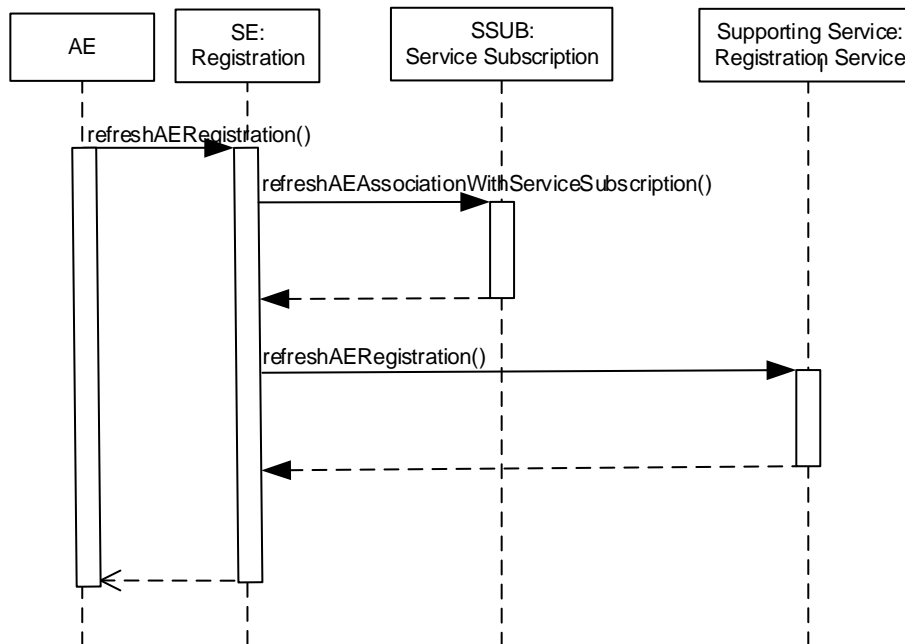
Figure 6.11.2.2.4-1: Registration - refreshAERegistration Diagram

6.11.2.2.5 Post-Conditions

The Application Entity registration is refreshed and can continue using service capabilities.

6.11.2.2.6 Exceptions

Not Applicable.

6.11.2.2.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.11.2.2.8 oneM2M Resource Interworking

This service capability maps to the UPDATE procedure of the <AE> resource.

6.11.2.3 deregisterAE

6.11.2.3.1 Description

This service capability enables an AE to deregister from the M2M System. This service capability shall be restricted to the Mca Reference Points.

6.11.2.3.2 Pre-Conditions

The AE successfully registered with the M2M System.

6.11.2.3.3 Signature - deregisterAE

Table 6.11.2.3.3-1: Registration - deregisterAE capability

Parameter name	Direction	Optional	Description
aeId	IN	NO	The Application Identifier (AE-ID).
responseType	OUT	NO	Unique response types for this service: • AE successfully De-registered. • Registration does not exist.

6.11.2.3.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Disassociate the AE with Service Subscription.

2) Issue the request to Supporting Services.

3) Send a notification to device onboarding service supporting service for application de-registration in the event there is a subscription.
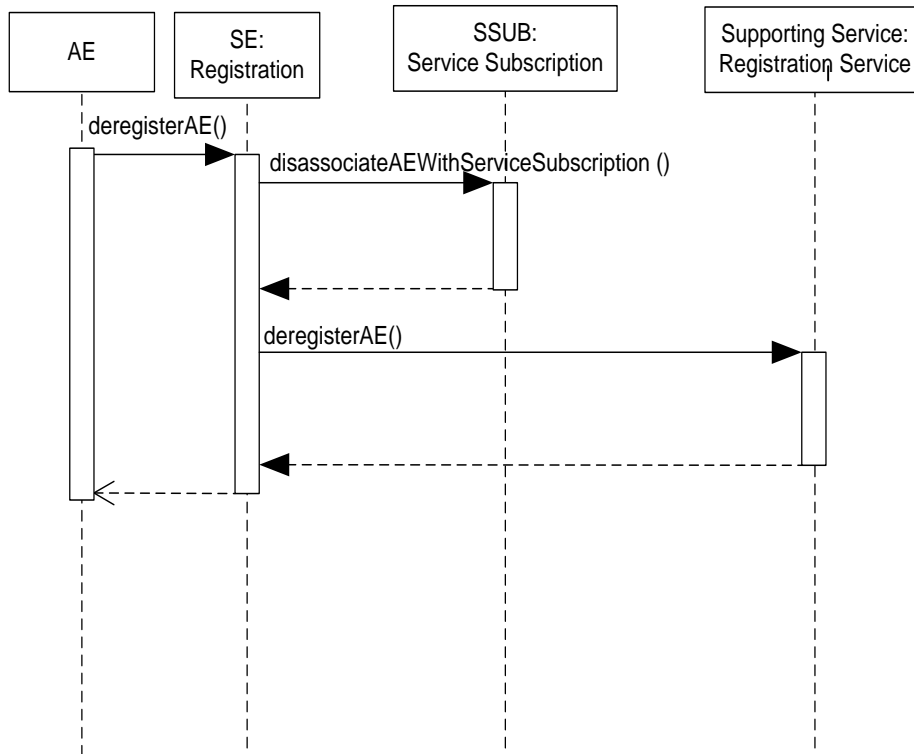
Figure 6.11.2.3.4-1: Registration - deregisterAE Diagram

6.11.2.3.5 Post-Conditions

AE is no longer registered and cannot use any services.

6.11.2.3.6 Exceptions

Not Applicable.

Transaction Pattern: Participation allowed.

6.11.2.3.7 oneM2M Resource Interworking

This service capability maps to the DELETE procedure of the <AE> resource.

6.12 Registration Administration

6.12.1 Overview

The Registration administration service provides the ability for:

- Retrieve the AE's Registration status.

- Revoke an AE existing Registration.

- Permit subscriptions to AE Registration events.

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6.12.2 Service Capabilities

6.12.2.1 getRegistrationStatus

6.12.2.1.1 Description

This service capability enables a Supporting Service authorized for this operation, to retrieve the registration status for an AE. This service capability is restricted to the Msc Reference Point.

6.12.2.1.2 Pre-Conditions

Not Applicable.

6.12.2.1.2 Signature - getRegistrationStatus

Table 6.12.2.1.2-1: Registration Administration - getRegistrationStatus capability

Parameter name	Direction	Optional	Description
aeId	IN	NO	The Application Entity Identifier (AE-ID).
responseType	OUT	NO	Unique response types for this service: • AE is registered. • AE registration does not exist.

6.12.2.1.4 Service Interaction

The interactions of service capabilities required for this service capability:

1) Retrieve the Application Entity information.
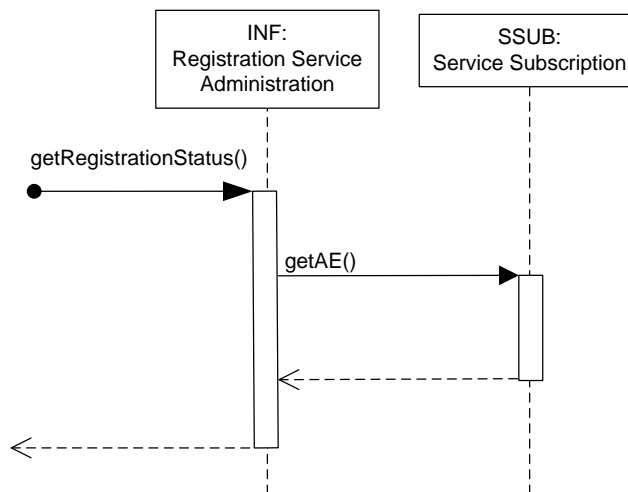
Figure 6.12.2.1.4-1: Registration Administration - getRegistrationStatus Diagram

6.12.2.1.5 Post-Conditions

Not Applicable.

6.12.2.1.6 Exceptions

Not Applicable.

6.12.2.1.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.12.2.1.8 oneM2M Resource Interworking

This service capability maps to the RETRIEVE procedure of the <AE> resource.

6.12.2.2 revokeAERegistration

6.12.2.2.1 Description

This service capability enables a Supporting Service authorized for this operation to revoke an existing AE registration. This service capability shall be restricted to the Msc Reference Points.

6.12.2.2.2 Pre-Conditions

The AE is successfully registered with the M2M System.

6.12.2.2.3 Signature - revokeAERegistration

Table 6.12.2.2.3-1: Registration Administration - revokeAERegistration capability

Parameter name	Direction	Optional	Description
aeId	IN	NO	Application Entity Identifier (AE-ID).
responseType	OUT	NO	Unique response types for this service: • AE successfully De-registered. • Registration does not exist.

6.12.2.2.4 Service Interaction

The interactions of service capabilities required for this service capability:

1) Issue a request to the Service Subscription Administration to fetch the service profile.

2) Disassociate the AE from the M2M Service Subscription.
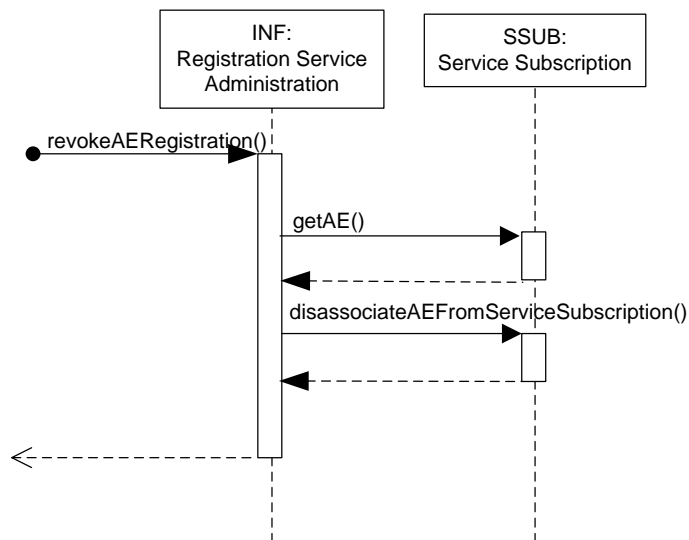
Figure 6.12.2.2.4-1: Registration Administration - revokeAERegistration Diagram

6.12.2.2.5　Post-Conditions

The Application Entity is no longer registered and cannot use any services.

6.12.2.2.6　Exceptions

Not Applicable.

6.12.2.2.7　Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.12.2.2.8　oneM2M Resource Interworking

This service capability maps to the DELETE procedure of the <AE> resource.

6.12.2.3　subscribeInitialAERegistrationEvent

6.12.2.3.1　Description

This service capability enables subscription to the initial (first time only) registration of an AE. This capability shall be restricted to the Msc Reference Point.

6.12.2.3.2　Pre-Conditions

Not Applicable.

6.12.2.3.3　Signature - subscribeInitialAERegistrationEvent

6.12.2.3.3-1: Registration Administration - subscribeInitialAERegistrationEvent capability

Parameter name	Direction	Optional	Description
subscriptionId	OUT	NO	Return subscriptionId in case of a success.
responseType	OUT	NO	Unique response types for this service: • Successfully subscribed. • Not successfully subscribed.

6.12.2.3.4　Service Interaction

The interactions of service capabilities required for this service capability:

1) Subscribe the requesting AE for the initial registration event.

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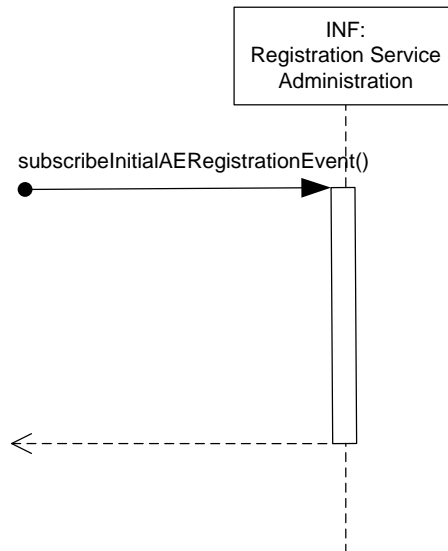
Figure 6.12.2.3.4-1: Registration Administration - subscribeInitialAERegistrationEvent Diagram

6.12.2.3.5 Post-Conditions

A Subscription is created for the Originator to receive initial contact events.

6.12.2.3.6 Exceptions

Not Applicable.

6.12.2.3.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.12.2.3.8 oneM2M Resource Interworking

Not Applicable.

6.12.2.4 unsubscribeInitialAERegistrationEvent

6.12.2.4.1 Description

This service capability enables a Supporting Service for this operation to remove an existing subscription against an AE initial registration. This capability shall be restricted to the Msc Reference Point.

6.12.2.4.2 Pre-Conditions

Not Applicable.

6.12.2.4.3 Signature - unsubcribeInitialAERegistrationEvent

Table 6.12.2.4.3-1: unsubscribeInitialAERegistrationEvent capability

Parameter name	Direction	Optional	Description
subscriptionId	IN	NO	The subscriptionId for the AE initial registration event.
responseType	OUT	NO	Unique response types for this service: • Successfully unsubscribed. • Subscription does not exist.

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6.12.2.4.4 Service Interaction

The interactions of service capabilities required for this service capability:

1) Remove the subscription.
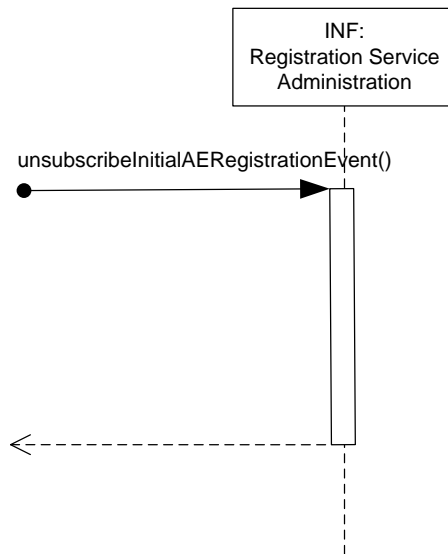
Figure 6.12.2.4.4-1: Registration Administration - unsubscribeInitialAERegistrationEvent Diagram

6.12.2.4.5 Post-Conditions

Subscription to initial registration event is removed.

6.12.2.4.6 Exceptions

Not applicable.

6.12.2.4.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

6.12.2.4.8 oneM2M Resource Interworking

Not applicable.

7 M2M Service Components

7.1 Introduction

This clause describes the M2M Service Components provided by the M2M Services Platform.

An M2M Service Component defines the set of M2M Services that are related in the sense that the M2M Services that comprise the M2M Service Component are typically deployed together in order to support one or more Supporting Services.

The M2M Service Architecture augments the oneM2M Functional Architecture by specifying M2M Services provided to M2M Service Providers. These M2M Services are exposed to the AE across the Mca Reference Point as well as other Service Components across the Msc Reference Point.

7.2 Service Component Interaction Cross Reference

Table 7.2-1: Service Component Cross Reference

Service Component	INF	SSUB	TRA	ACC	SE	MA	DM
INF	NA				C		
SSUB		NA			C	P	
TRA			NA		C		
ACC				NA	C		
SE	P	P	P	P	NA		P
MA		C				NA	P
DM					C	C	NA
Legend:							
NA: Not Applicable							
C: Entry in the Service Component column consumes services							
P: Entry in the Service Component column provides services							

7.3 Infrastructure Component (INF)

7.3.1 introduction

The INF Component provides services that are exposed to other M2M Service Components across the Msc Reference Point. The Services within the INF Component are common and utility type Services needed to enable other M2M Services.

7.3.2 INF to Service Cross Reference

Authorization: All Service Capabilities

Registration Services: All Service Capabilities

7.4 Service Subscription Component (SSUB)

7.4.1 Introduction

The SSUB Component provides services that are necessary to maintain the M2M Service, the associations (e.g. Services Roles) to the M2M Service, M2M Service Subscriptions, the associations (e.g. AE, M2M Nodes) to the M2M

Service Subscription and any external identifiers associated with AE and M2M Nodes. In addition the services used to manage devices and AEs are part of this component.

7.4.2   SSUB to Service Cross Reference

Service Subscription: All Service Capabilities.

Service Administration: All Service Capabilities.

Service Subscription Administration: All Service Capabilities.

7.5   Transport Adapter (TRA)

7.5.1   Introduction

The TRA component provides services are used to integrate or adapt Data Exchange requests to the underlying Data Exchange transport (e.g. XMPP or MQTT Broker).

7.5.2   TRA to Service Cross Reference

Broker: All Service Capabilities

7.6   Accounting (ACC)

7.6.1   Introduction

The ACC Component provides services that are record events necessary to charge for the Services provided to AEs.

7.6.2   Accounting to Service Cross Reference

Event Collection: All Service Capabilities.

7.7   Service Exposure (SE)

7.7.1   Introduction

The SE Component acts as the primary interface for AEs to interact with the M2M Service Layer across the Mca Reference Point.

7.7.2   Service Exposure to Service Cross Reference

Data Exchange: subscribe, publish, sendMessage.

Service Subscription Administration: getServiceSubscription, addNodeToServiceSubscription, deleteNodesFromServiceSubscription, getNodesForServiceSubscription, updateNodeForServiceSubscription, addApplicationRule, deleteApplicationRules, getApplicationRules, updateApplicationRule, addReachabilitySchedule, updateReachabilitySchedule, getReachabilitySchedule, deleteReachabilitySchedule.

Device Management: downloadFirmware, installFirmware, getFirmwareInformation, getFirmwareExecStatus, upgradeFirmware, getDeviceInformation, getDeviceCapabilities, enableDeviceCapability, disableDeviceCapability, getAreaNetworks, updateDeviceForAreaNetwork, rebootDevice, resetDevice, uploadDeviceLog, getDeviceLogs, getDeviceLogInformation, getSoftwareInformation, downloadSoftware, installSoftware, activateSoftware, deactivateSoftware, removeSoftware.

Event Collection: setEventCollectionPolicy, getEventCollectionPolicy, setEventCollectionTriggers, getEventCollectionTriggers, getEventRecords.

Registration Services: registerAE, refreshAERegistration, deregisterAE.

7.8 Management Adapter (MA)

7.8.1 Introduction

The Management Adapter component provides services that are used to integrate or adapt Device Management requests to the Management Servers of existing device management technologies(e.g. BBF TR-069 [i.6], OMA-DM and LWM2M).

7.8.2 Management Adapter to Service Cross Reference

Management Adapter: All Service Capabilities.

Device Management: deviceManagementReport.

7.9 Device Management (DM)

7.9.1 Introduction

The Device Management component provides services to manage devices without consideration of the technology of Underlying Network.

7.9.2 Device Management to Service Cross Reference

Device Management: All Service Capabilities.

Annex A (informative):
Common Request Processing

A.1 Overview

This annex illustrates the usage of the common services described in this technical specification for implementation requests received from AEs across the Mca Reference Point.

A.2 Mca Common Request Processing

A.2.1 Introduction

AEs communicate with the M2M System over the Mca Reference Point through the SE component. The SE component accepts the request from the AE and provides the request to the Supporting Service in order allow the M2M Service Provider to ensure the request is properly authorized and recorded. In addition, the M2M Service Provider is able to orchestrate other capabilities that have not been specified.

A.2.2 Mca Common Request Parameters (normative)

Each request that is received by the SE component across the Mca Reference Point shall have a common set of input parameters as described in table A.2.2-1.

Table A.2.2-1: Mca: Common Request Input Parameters

Parameter name	Direction	Optional	Description
from	IN	NO	The identifier of the Originator of the request (AE-ID).
requestId	IN-OUT	YES	The request identifier. When supplied by the Originator, the same value is returned in the response if the response is applicable for the message exchange pattern. If not supplied by the Originator, the M2M System supplied a globally unique value in the response if the response is applicable for the message exchange pattern.
operation	IN	NO	The signature of the operation that is received or transmitted across the Mca reference point.

Service capabilities in the SE component whose message exchange patterns require a response shall have a common set of output parameters as described in table A.2.2-2.

Table A.2.2-2: Mca: Common Request Output Parameters

Parameter name	Direction	Optional	Description
responseType	OUT	YES	Response types that are relevant to requests from AEs across the Mca Reference Point.

In addition to the parameters in table A.2.2-1, each request that addresses a target AE (e.g. Data Exchange) that is received by the SE component across the Mca Reference Point shall have a common set of input parameters as described in table A.2.2-3.

Table A.2.2-3: Mca: Common Request Input Parameters For Target AEs

Parameter name	Direction	Optional	Description
to	IN	NO	The identifier of the AE that is the target of the request (AE-ID).

A.2.3 Authentication and Authorization of Requests

A.2.3.1 Description

Upon reception of requests across the Mca reference, the request Originator is authenticated and the requested M2M Service Capability is authorized when the:

- Request Originator has a M2M Service Subscription for the requested operation.

- Request Originator is authorized for the requested operation.

A.2.3.2 Pre-Conditions

The external identifiers for the from parameter's AE-ID are assigned to a M2M Service Subscription (M2M-Service-Profile-ID).

A correlation between the service capability and the M2M authorization event has been defined in order to authorize the service capability.

A.2.3.2 Common M2M Service Capability Parameters for Request Authentication and Authorization

**Table A.2.3.2-1: Common M2M Service Capability Parameters
for Request Authentication and Authorization**

Parameter name	Direction	Optional	Description
Mca common request input parameters	IN	NO	The Mca common request input parameters defined in table A.2.2-1.
responseType	OUT	YES	Response types that are relevant to the Authentication and Authorizations of requests from AEs across the Mca Reference Point: • Originator is not authenticated. • Originator does not have a M2M Service Subscription. • Originator not authorized for the M2M Service Capability.

A.2.3.3 Service Interactions

The interactions of service capabilities required to authenticate and authorize a request:

1) Obtain the M2M Service Capability from the requested operation.

2) Obtain the Application Entity and associated M2M Service Subscription.

3) Validate the M2M Service Subscription for the Service Capability.

4) Authorize the use of the M2M Service Capability.
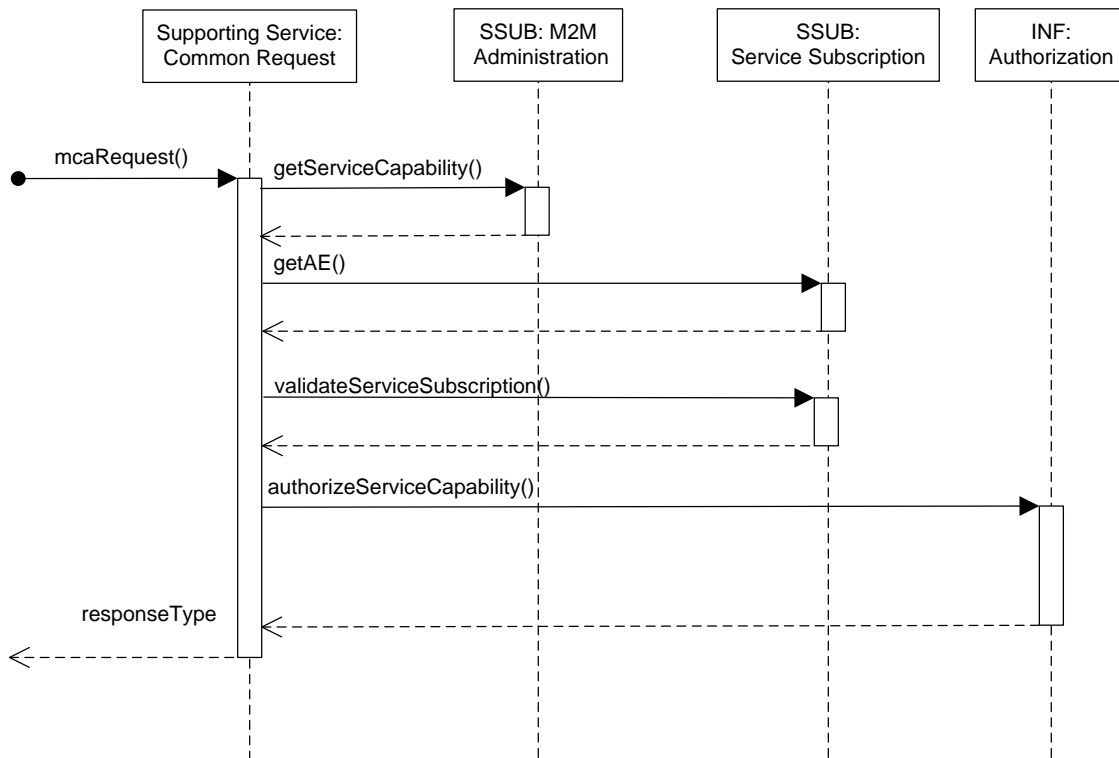
Figure A.2.3.3-1: Mca Common Request Authorization Diagram

A.2.3.4 Post-Conditions

Success case: The request is permitted.

Failure case: The request is not permitted and an optional response type is transmitted back the request Originator.

A.2.3.5 Exceptions

Not Applicable.

A.2.3.6 Policies for Use

Message Exchange Patterns: In-Out., In-Only, Robust In-Only, In-Optional-Out

Transaction Pattern: Participation allowed.

A.3 Msc Common Request Processing

A.3.1 Introduction

Service Components communicate with each other across the Msc Reference Point. Additional input or output parameters are not necessary when invoking service capabilities across the Msc Reference Point. As such signature of the service capability is sufficient for implementing the service capability in clause 6 when the capability is invoked across the Msc Reference Point.

A.3.2 Msc Common Request Data Types (normative)

Each request that is received by the M2M Component across the Msc Reference Point shall have a common set of input parameters as described in table A.3.2-1.

Table A.3.2-1: Msc: Common Request Input Parameters

Parameter name	Direction	Optional	Description
from	IN	NO	The identifier of the Originator of the request. This is typically the Service Capability identifier of the M2M System.
requestId	IN-OUT	NO	The request identifier. When supplied by the Originator, the same value is returned in the response if the response is applicable for the message exchange pattern. If not supplied by the Originator, the M2M System supplied a globally unique value in the response if the response is applicable for the message exchange pattern.

A.4 Common Entity Attributes

A.4.1 Introduction

Information Entities (e.g. M2M Service Subscription) that are maintained using the M2M Service Capabilities have a set of common attributes that are associated with the entity when the information entity is created, updated and retrieved.

A.4.2 System Generated Attributes (normative)

When an information entity is created or updated the system shall update the common attributes as described in Table A.4.2-1. When an information entity is retrieved the system shall return the common attributes as described in Table A.4.2-1.

Table A.4.2-1: System Generated Attributes

Parameter name	Description
creationTime	The date and time that the system created the information entity.
lastModifiedTime	The date and time that the system modified the information entity. The system modifies this attribute when the information entity is created or updated.

A.4.3 User Defined Discovery Attributes (normative)

Information entities are retrieved through the system's service capabilities. Some service capabilities allow for discovery of information elements using user defined discovery attributes.

Table A.4.3-1: User Defined Discovery Attributes

Parameter name	Description
labels	The list of labels that a user can add or modify in creation and update requests for information entities. When a service capability is used to retrieve a list of information elements, the service capability shall have this attribute as a common request input attribute.

A.5 Using Filter Criteria

Service Capabilities have the ability to define a filter criteria entity as part of the Service Capability's input parameters. Filter criteria within the system shall be evaluated using the following rules:

- different elements of the filter criteria entity shall use the "AND" logical operation;

- same elements of the filter criteria entity shall use the "OR" logical operation.

Annex B (informative): Data Exchange Services

B.1 Overview

This annex illustrates the usage of the services for requests to exchange data from AEs across the Mca Reference Point.

B.2 Supporting Services

B.2.1 Subscribe-Publish-Notify Message Exchange

B.2.1.1 Overview

This service provides the capability to exchange data using the publish and subscribe message patterns where AEs:

- Request to receive payloads from a publication resource by subscribing to the publication resource.

- Request to publish a payload to a resource.

B.2.1.2 Service Capabilities

B.2.1.2.1 subscribeRequest

B.2.1.2.1.1 Description

This service capability provides the ability to validate a subscription request from an AE.

B.2.1.2.1.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a M2M Service Subscription, subscribing AE, publication resource and Broker exist.

B.2.1.2.1.3 Signature - subscribeRequest

Table B.2.1.2.1.3-1: Data Exchange Service - subscribeRequest capability

Parameter name	Direction	Optional	Description
Common request input parameters	-	-	See table A.2.2-3.
publicationResource	IN	NO	The publication resource. See clause 6.4.2.1.1.1.
deliveryPolicy	IN	YES	The delivery policy when notifying the subscriber. See clause 6.4.2.1.1.2.
retainmentPolicy	IN	YES	The retainment policy for unconnected subscribers. See clause 6.4.2.1.1.3.
transportAdapter	OUT	YES	The instance of the transport adapter service (broker).
responseType	OUT	YES	Unique response types for this service (see note): • Originator does not have a Broker for the requested Resource. • Delivery policy not supported by the transport adapter. • Retainment policy not supported by the transport adapter.
NOTE: Consumed services also provide response types.			

B.2.1.2.1.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Determine the Broker to be used for the originating AE and publication resource.

2) Perform the Common Request Services for requests across the Mca Reference Point.

3) Validate the delivery and retainment policies.
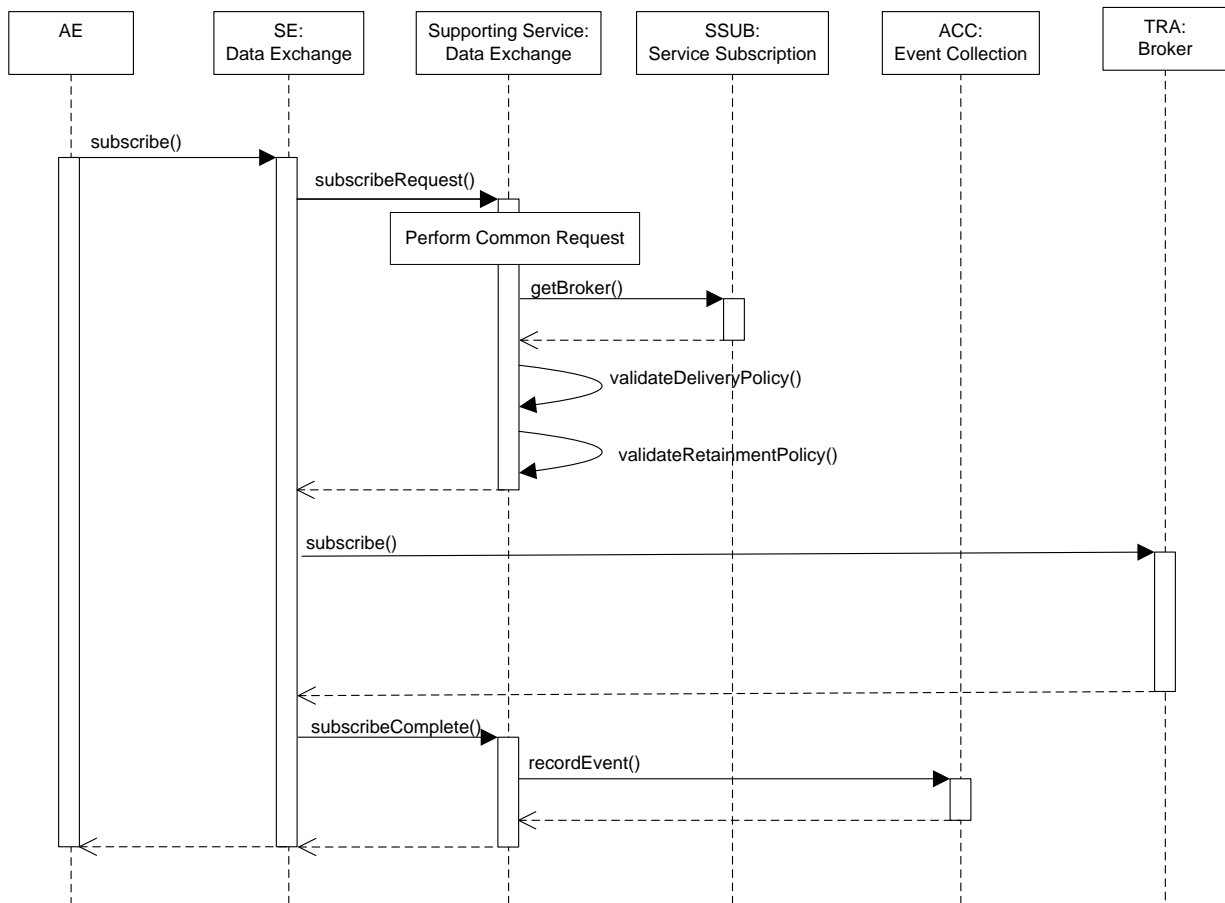
Figure B.2.1.2.1.4-1: subscribeRequest and subscribeComplete Diagram

B.2.1.2.1.5 Post-Conditions

Success case: The request is permitted.

Failure case: The request is not permitted and a response type is transmitted back to the AE.

B.2.1.2.1.6 Exceptions

No unique exceptions for this service capability.

Consumed services may throw exceptions which are forwarded by this service capability.

B.2.1.2.1.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 250 ms.

B.2.1.2.2 subscribeComplete

B.2.1.2.2.1 Description

This service capability provides the ability to complete the actions required once the subscription request has been completed in the Broker.

B.2.1.2.2.2   Pre-Conditions

Not Applicable.

B.2.1.2.2.3   Signature - subscribeComplete

Table B.2.1.2.2.3-1: Data Exchange Service - subscribeComplete capability

Parameter name	Direction	Optional	Description
Common request input parameters	-	-	See table A.2.2-3.
publicationResource	IN	NO	The publication resource. See clause 6.4.2.1.1.1.
deliveryPolicy	IN	YES	The delivery policy when notifying the subscriber. See clause 6.4.2.1.1.2.
retainmentPolicy	IN	YES	The retainment policy for unconnected subscribers. See clause 6.4.2.1.1.3
responseType	OUT	YES	Unique response types for this service (see note): • Exception: Request may not have been completed.
NOTE: Consumed services also provide response types.			

B.2.1.2.2.4   Service Interactions

The interactions of service capabilities required for this service capability as shown in figure B.2.1.2.1.4-1:

1)   Upon a successful subscribe by the Broker, record the event for accounting purposes.

B.2.1.2.2.5   Post-Conditions

Success case: The request is permitted.

Failure case: The request is not permitted and a response type is transmitted back to the AE.

B.2.1.2.2.6   Exceptions

No unique exceptions for this service capability.

Consumed services may throw exceptions which are forwarded by this service capability.

B.2.1.2.2.7   Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 50 ms.

B.2.1.2.3   publishRequest

B.2.1.2.3.1   Description

This service capability provides the ability to validate a publication request from an AE.

As part of the publication, the publishing AE can provide a delivery policy to enhance the robustness of the publication to AEs that have subscribed to the Resource identified in the request.

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B.2.1.2.3.2　　　　Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a M2M Service Subscription, publishing AE, resource to publish the payload and Broker exist.

B.2.1.2.3.3　　　　Signature - publishRequest

Table B.2.1.2.3.3-1: Data Exchange Service - publishRequest capability

Parameter name	Direction	Optional	Description
Common request input parameters	-	-	See table A.2.2-3.
toResource	IN	NO	The leaf node of a publication resource. See clause 6.4.2.1.1.1.
deliveryPolicy	IN	YES	The delivery policy when notifying the subscriber. See clause 6.4.2.1.1.2.
transportAdapter	OUT	YES	The instance of the transport adapter service (broker).
responseType	OUT	YES	Unique response types for this service (see note): - Originator does not have a Broker for the requested resource. - Originator has requested an invalid deliveryPolicy. - Originator has requested an invalid retainmentPolicy. - Delivery policy not supported by the transport adapter. - Exception: Request may not have been completed.
NOTE:　　　Consumed services also provide response types.			

B.2.1.2.3.4　　　　Service Interactions

The interactions of service capabilities required for this service capability:

1) Determine the Broker to be used for the originating AE and resource.

2) Perform the Common Request Services for requests across the Mca Reference Point.

3) Validate the delivery policy for the Broker.

4) Upon a successful publication to the Broker, record the event for accounting purposes.
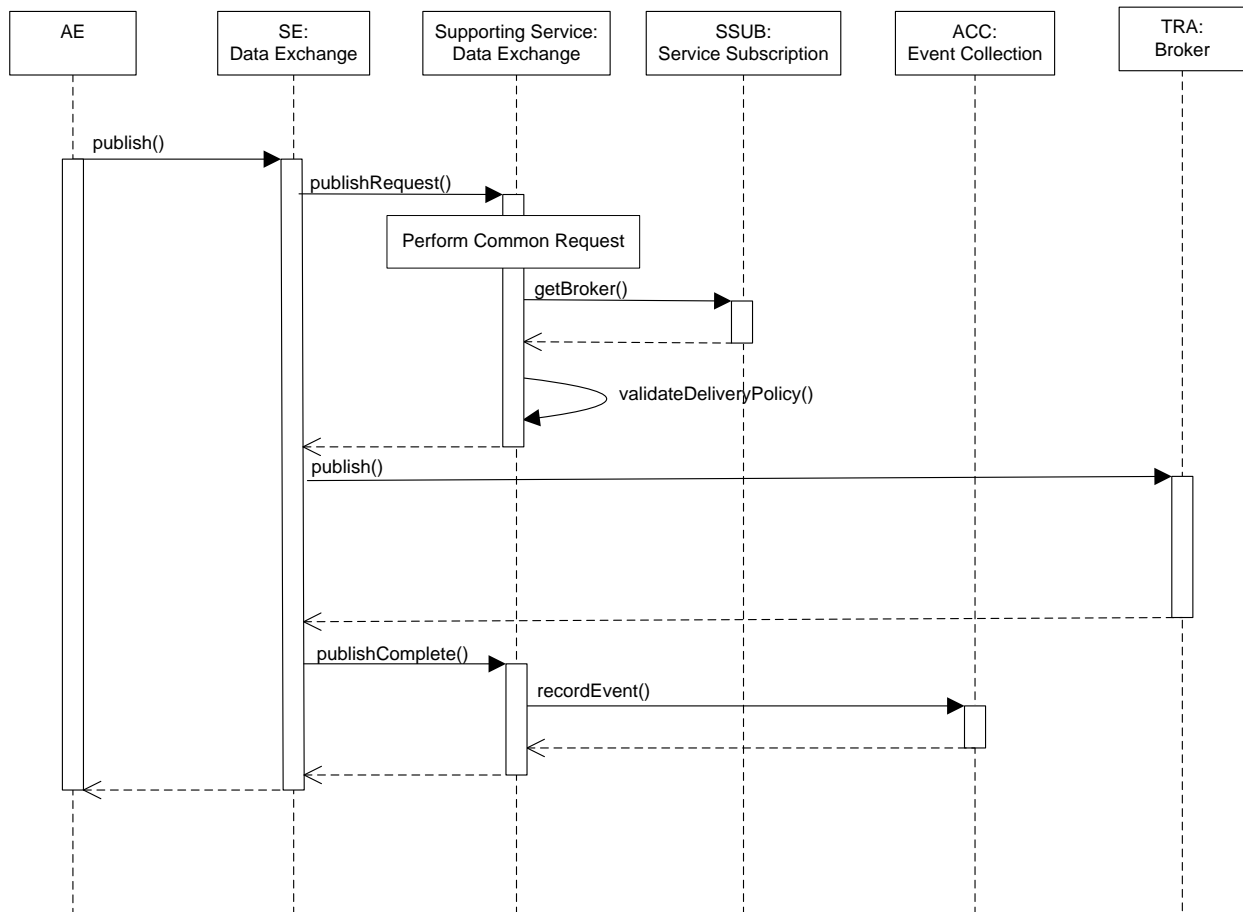
Figure B.2.1.2.3.4-1: publishRequest and publishComplete Diagram

B.2.1.2.3.5   Post-Conditions

Success case: The request is permitted.

Failure case: The request is not permitted and a response type is transmitted back to the AE.

B.2.1.2.3.6   Exceptions

No unique exceptions for this service capability.

Consumed services may throw exceptions which are forwarded by this service capability.

B.2.1.2.3.7   Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 300 ms.

B.2.1.2.4   publishComplete

B.2.1.2.4.1   Description

This service capability provides the ability to complete the actions required once the publication request has been completed in the Broker.

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B.2.1.2.4.2 Pre-Conditions

Not Applicable.

B.2.1.2.4.3 Signature - publishComplete

Table B.2.1.2.4.3-1: Data Exchange Service - pubishComplete capability

Parameter name	Direction	Optional	Description
Common request input parameters	-	-	See table A.2.2-3.
toResource	IN	NO	The leaf node of a publication resource. See clause 6.4.2.1.1.1.
deliveryPolicy	IN	YES	The delivery policy when notifying the subscriber. See clause 6.4.2.1.1.2.
retainmentPolicy	IN	YES	The retainment policy for unconnected subscribers. See clause 6.4.2.1.1.3.
responseType	OUT	YES	Unique response types for this service (see note): • Exception: Request may not have been completed.
NOTE: Consumed services also provide response types.			

B.2.1.2.4.4 Service Interactions

The interactions of service capabilities required for this service capability as shown in figure B.2.1.2.3.4-1:

1) Upon a successful publish by the Broker, record the event for accounting purposes.

B.2.1.2.4.5 Post-Conditions

Success case: The request is permitted.

Failure case: The request is not permitted and a response type is transmitted back to the AE.

B.2.1.2.4.6 Exceptions

No unique exceptions for this service capability.

Consumed services may throw exceptions which are forwarded by this service capability.

B.2.1.2.4.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 50 ms.

B.2.1.2.5 notifyRequest

B.2.1.2.5.1 Description

This service capability provides the ability to validate a notification request to an AE.

As part of the notification, delivery policy that is requested to be used is validated and adjusted if necessary.

B.2.1.2.5.2 Pre-Conditions

A correlation between a M2M Service Subscription, subscribing AE, subscribed resource and Broker exist.

The Pre-Conditions for Mca Received Requests are met.

B.2.1.2.5.3 Signature - notifyRequest

Table B.2.1.2.5.3-1: Data Exchange Service - notifyRequest capability

Parameter name	Direction	Optional	Description
Common request input parameters	-	-	See table A.2.2-1.
fromResource	IN	NO	The leaf node of a publication resource. See clause 6.4.2.1.1.1.
deliveryPolicy	IN-OUT	YES	The delivery policy when notifying the subscriber. See clause 6.4.2.1.1.2.
responseType	OUT	YES	Unique response types for this service (see note): - Originator does not have a Broker for the requested resource. - Originator has requested an invalid delivery policy. - Exception: Request may not have been completed.
NOTE: Consumed services also provide response types.			

B.2.1.2.5.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Perform the Common Request Services for requests across the Mca Reference Point.

2) Validate that the delivery policy requested by the Broker is allowed for the subscribing AE and M2M Service Subscription.
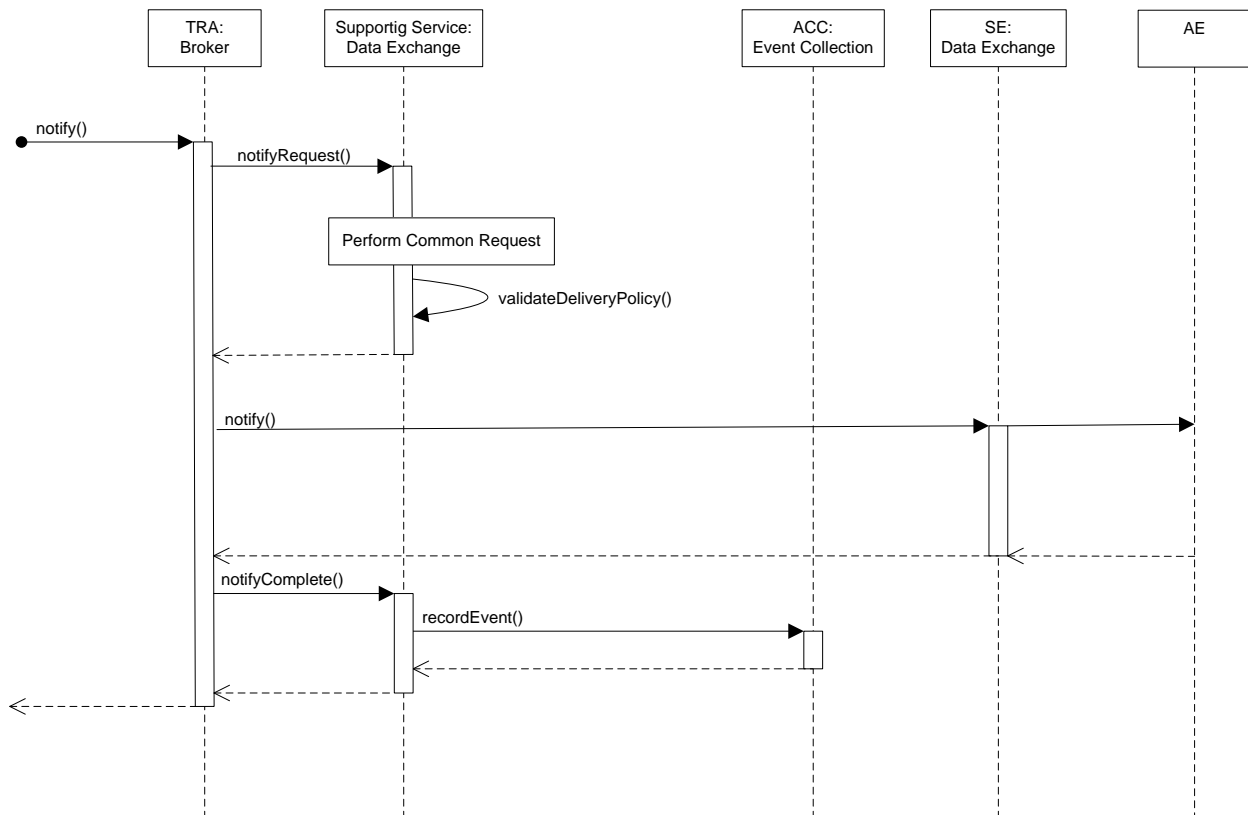
Figure B.2.1.2.5.4-1: notifyRequest and notifyComplete Diagram

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B.2.1.2.5.5　Post-Conditions

Success case: The request is permitted.

Failure case: The request is not permitted and a response type is transmitted back to the transport adapter.

B.2.1.2.5.6　Exceptions

No unique exceptions for this service capability.

Consumed services may throw exceptions which are forwarded by this service capability.

B.2.1.2.5.7　Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 300 ms.

B.2.1.2.6　notifyComplete

B.2.1.2.6.1　Description

This service capability provides the ability to complete the actions required once the notification request has been completed in the Data Exchange service.

B.2.1.2.6.2　Pre-Conditions

Not Applicable.

B.2.1.2.6.3　Signature - notifyComplete

Table B.2.1.2.6.3-1: Data Exchange Service - notifyComplete capability

Parameter name	Direction	Optional	Description
Common request input parameters	-	-	See table A.2.2-3.
fromResource	IN	NO	The leaf node of a publication resource. See clause 6.4.2.1.1.1.
deliveryPolicy	IN	YES	The delivery policy when notifying the subscriber. See clause 6.4.2.1.1.2.
responseType	OUT	YES	Unique response types for this service (see note): Exception: Request may not have been completed.
NOTE: Consumed services also provide response types.			

B.2.1.2.6.4　Service Interactions

The interactions of service capabilities required for this service capability as shown in figure B.2.1.2.5.4-1:

1)　Upon a successful notification by the Data Exchange, record the event for accounting purposes.

B.2.1.2.6.5　Post-Conditions

Success case: The request is permitted.

Failure case: The request is not permitted and a response type is transmitted back to the transport adapter.

B.2.1.2.6.6　Exceptions

No unique exceptions for this service capability.

Consumed services may throw exceptions which are forwarded by this service capability.

B.2.1.2.6.7　Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 50 ms.

B.2.2 Request-Response Message Exchange

B.2.2.1 Overview

This service provides the capability to exchange data using the synchronous request-response message pattern where AEs request to send a message to an AE and wait for a response to the message.

B.2.2.2 Service Capabilities

B.2.2.2.1 sendMessageRequest

B.2.2.2.1.1 Description

This service capability provides the ability to validate a send message request from an AE.

B.2.2.2.1.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a M2M Service Subscription, originating AE and Transport Adapter exist.

B.2.2.2.1.3 Signature - sendMessageRequest

Table B.2.2.2.1.3-1: Data Exchange Service - sendMessageRequest capability

Parameter name	Direction	Optional	Description
Common request input parameters	-	-	See table A.2.2-3.
deliveryPolicy	IN	YES	The delivery policy when sending a request. See clause 6.4.2.1.1.2.
transportAdapter	OUT	YES	The instance of the transport adapter service.
responseType	OUT	YES	Unique response types for this service (see note): • Originator does not have a transport adaptor for the requested AE. • Delivery policy not supported by the underlying transport adapter.
NOTE: Consumed services also provide response types.			

B.2.2.2.1.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Determine the transport adapter to be used for the originating AE and target AE. This example shows the use of the Broker service for the transport adapter.

2) Perform the Common Request Services for requests across the Mca Reference Point.

3) Validate the delivery policy.
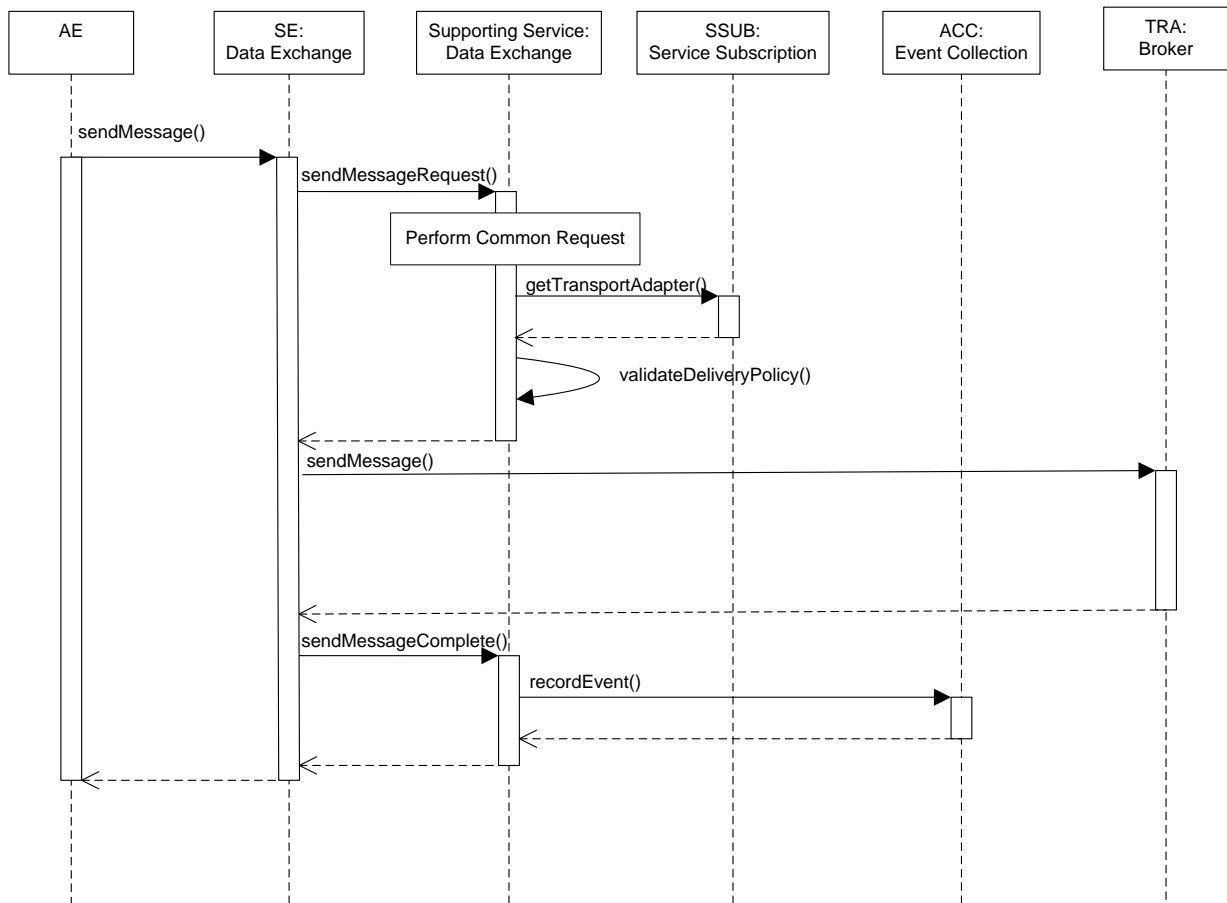
Figure B.2.2.2.1.4-1: sendMessageRequest and sendMessageComplete Diagram

B.2.2.2.1.5 Post-Conditions

Success case: The request is permitted.

Failure case: The request is not permitted and a response type is transmitted back to the AE.

B.2.2.2.1.6 Exceptions

No unique exceptions for this service capability.

Consumed services may throw exceptions which are forwarded by this service capability.

B.2.2.2.1.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 250 ms.

B.2.2.2.2 sendMessageComplete

B.2.2.2.2.1 Description

This service capability provides the ability to complete the actions required once the request has been completed in the Broker.

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B.2.2.2.2.2 Pre-Conditions

Not Applicable.

B.2.2.2.2.3 Signature - sendMessageComplete

Table B.2.2.2.2.3-1: Data Exchange Service - sendMessageComplete capability

Parameter name	Direction	Optional	Description
Common request input parameters	-	-	See table A.2.2-3.
deliveryPolicy	IN	YES	The delivery policy when notifying the subscriber. See clause 6.4.2.1.1.2.
responseType	OUT	YES	Unique response types for this service (see note): • Exception: Request may not have been completed.
NOTE: Consumed services also provide response types.			

B.2.2.2.2.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Upon a successful message send and received from the transport adapter, record the event for accounting purposes.

B.2.2.2.2.5 Post-Conditions

Success case: The request is permitted.

Failure case: The request is not permitted and a response type is transmitted back to the AE.

B.2.2.2.2.6 Exceptions

No unique exceptions for this service capability.

Consumed services may throw exceptions which are forwarded by this service capability.

B.2.2.2.2.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 50 ms.

Annex C (informative): Service Subscription Administration Services

C.1 Overview

This annex illustrates the usage of the services for requests to administer M2M Service Subscriptions from AEs across the Mca Reference Point.

C.2 Supporting Services

C.2.1 Overview

This service provides the capability for AEs to administer the M2M Service Subscriptions that have been previously created by the M2M Service Provider. The following capabilities are provided:

- Retrieval of M2M Service Subscriptions based on a set of filter criteria.

- Administration of the M2M Nodes associated with a M2M Service Subscriptions as well as the Application Rules associated with the M2M Node.

C.2.2 Service Capabilities

C.2.2.1 getServiceSubscription

C.2.2.1.1 Description

This service capability provides the ability for an AE to retrieve the M2M Service Subscription across the Mca Reference Point.

C.2.2.1.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

C.2.2.1.3 Signature - getServiceSubscription

Table C.2.2.1.3-1: Service Subscription Administration - getServiceSubscription capability

Parameter name	Direction	Optional	Description
Mca Common request input parameters	-	-	See table A.2.2-1.
filterCriteria	IN	NO	See table 6.9.2.2-1.
serviceSubscriptions	OUT	NO	The resulting M2M Service Subscription entities in table 6.9.2.3-1.
responseType	OUT	YES	Unique response types for this service: • None.

C.2.2.1.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Perform the common request authorization.

2) Retrieve the M2M Service Subscriptions for the supplied criteria.

3) Account for the event.
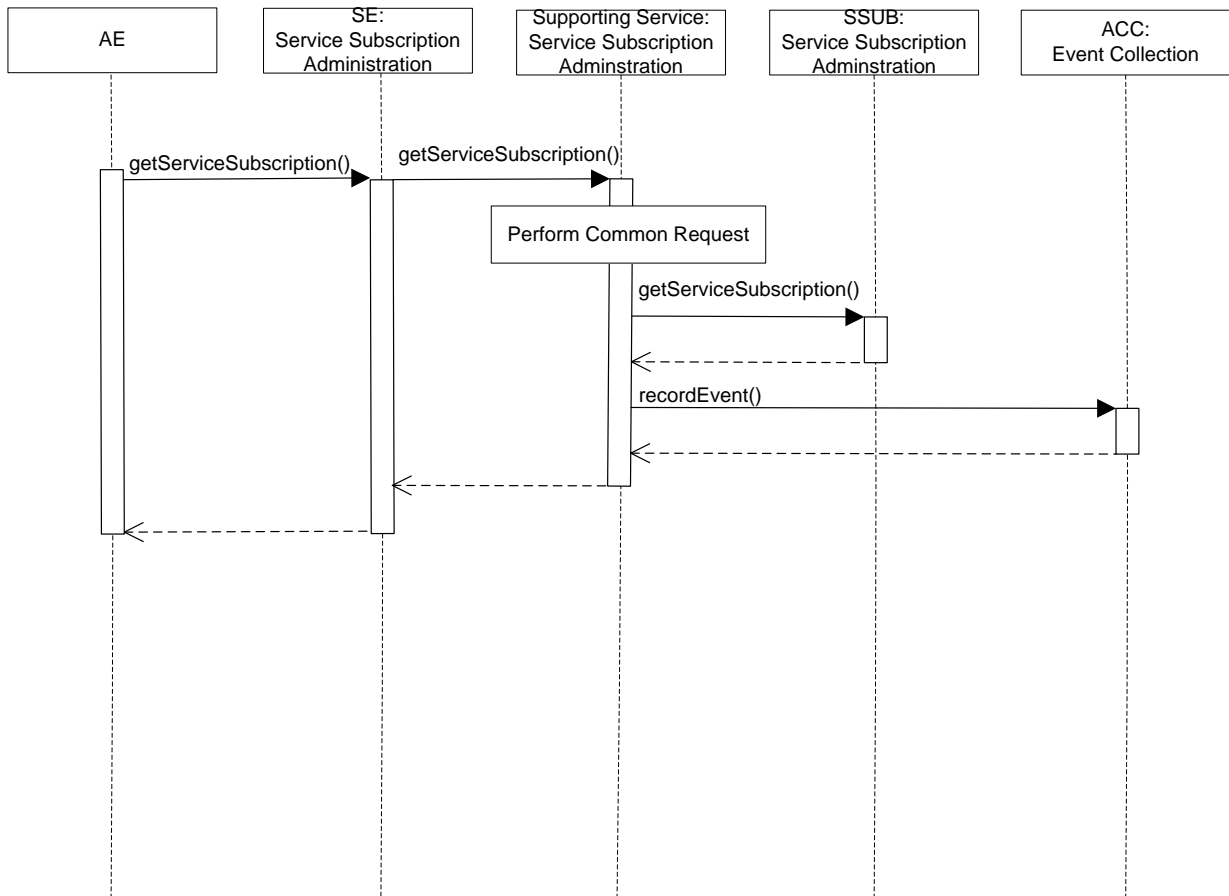
Figure C.2.2.1.4-1: getServiceSubscription Diagram

C.2.2.1.5   Post-Conditions

Not Applicable.

C.2.2.1.6   Exceptions

No unique exceptions for this service capability.

Consumed services may throw exceptions which are forwarded by this service capability.

C.2.2.1.7   Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 300 ms.

C.2.2.2   addNodeToServiceSubscription

C.2.2.2.1   Description

This service capability adds a M2M Node to a M2M Service Subscription.

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C.2.2.2.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

C.2.2.2.3 Signature - addNodeToServiceSubscription

Table C.2.2.2.3-1: Service Subscription Administration - addDeviceToServiceSubscription capability

Parameter name	Direction	Optional	Description
Mca Common request input parameters	-	-	See table A.2.2-1.
externalIds	IN	YES	A List of URNs that represent the external identifiers associated with this M2M Node.
applicationRuleIds	IN	YES	A list of Application Rules associated with this Node.
nodeId	OUT	NO	The unique M2M Node identifer for this entity.
responseType	OUT	YES	Unique response types for this service. M2M Service Subscription does not exist.
applicationRuleIds	IN	YES	• A list of Application Rules associated with this Node.

C.2.2.2.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Perform the common request authorization.

2) Add the M2M Nodes to the M2M Service Subscription.

3) Account for the event.
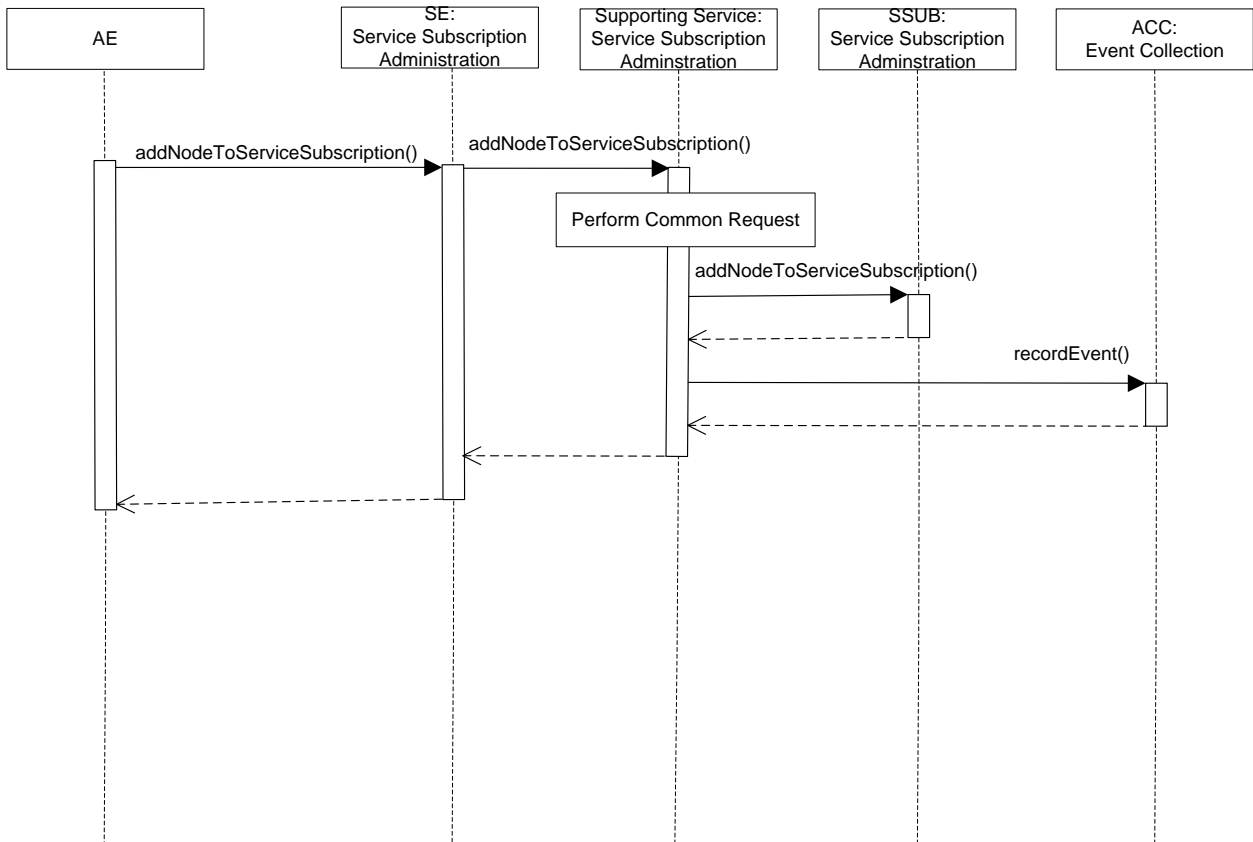
Figure C.2.2.2.4-1: addNodeToServiceSubscription Diagram

C.2.2.2.5   Post-Conditions

The M2M Node is added to the M2M Service Subscription returning the oneM2M System.

C.2.2.2.6   Exceptions

No unique exceptions for this service capability.

Consumed services may throw exceptions which are forwarded by this service capability.

C.2.2.2.7   Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 300 ms.

C.2.2.3   deleteNodesFromServiceSubscription

C.2.2.3.1   Description

This service capability deletes M2M Nodes from a M2M Service Subscription.

C.2.2.3.2   Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

### C.2.2.3.3   Signature - deleteNodesFromServiceSubscription

**Table C.2.2.3.3-1: Service Subscription Administration -
deleteNodesFromServiceSubscription capability**

Parameter name	Direction	Optional	Description
Common request input parameters	-	-	See table A.2.2-1.
nodeIds	IN	NO	List of M2M Node identifiers to be deleted from the M2M Service Subscription.
responseType	OUT	YES	Unique response types for this service: • M2M Service Subscription does not exist. • M2M Node does not exist for this M2M Service Subscription.

C.2.2.3.4   Service Interactions

The interactions of service capabilities required for this service capability:

1)   Perform the common request authorization.

2)   Delete the M2M Nodes from the M2M Service Subscription.

3)   Account for the event.
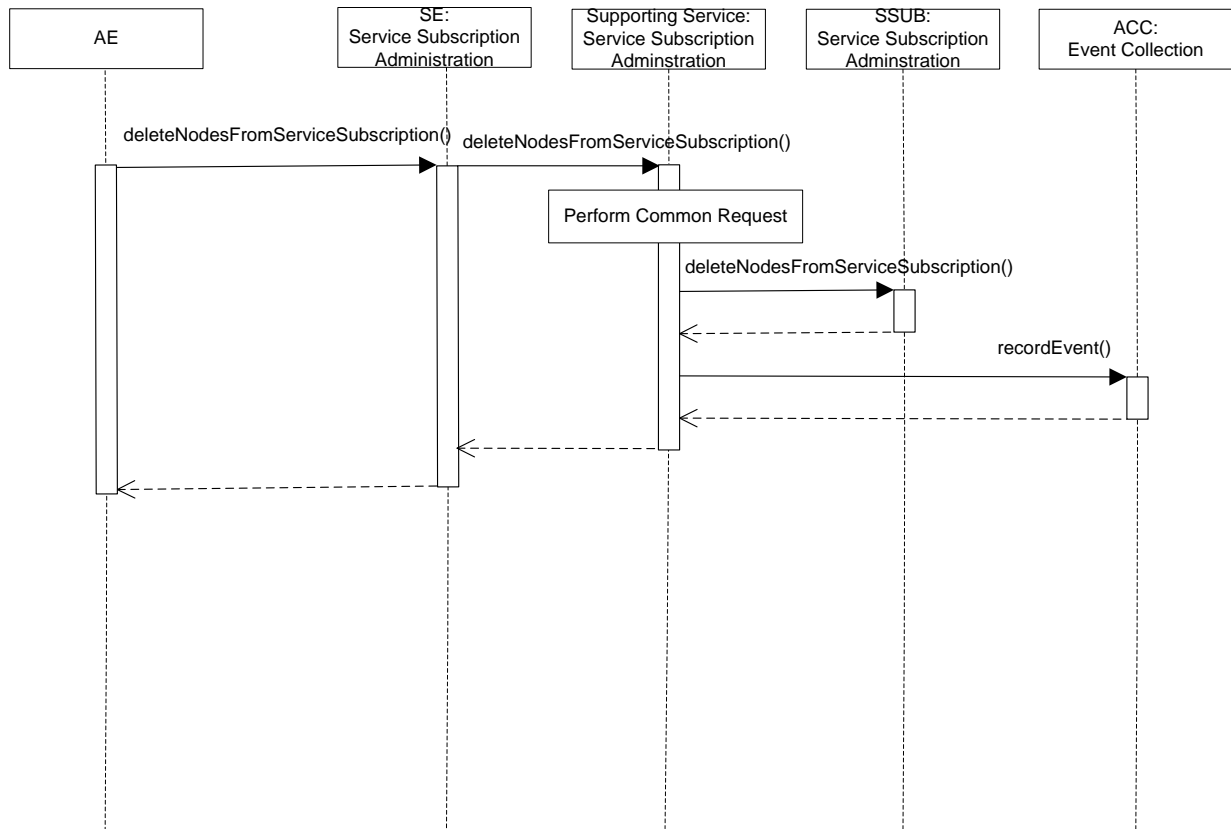
Figure C.2.2.3.4-1: deleteNodesFromServiceSubscription Diagram

C.2.2.3.5 Post-Conditions

The M2M Nodes are deleted from the M2M Service Subscription.

C.2.2.3.6 Exceptions

No unique exceptions for this service capability.

Consumed services may throw exceptions which are forwarded by this service capability.

C.2.2.3.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 300 ms.

C.2.2.4 getNodesForServiceSubscription

C.2.2.4.1 Description

This service capability retrieves the M2M Nodes for a M2M Service Subscription.

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C.2.2.4.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

C.2.2.4.3 Signature - getNodesForServiceSubscription

Table C.2.2.4.3-1: Service Subscription Administration - getNodesForServiceSubscription capability

Parameter name	Direction	Optional	Description
Common request input parameters	-	-	See table A.2.2-1.
filterCriteria	IN	NO	See table 6.9.2.4-1.
nodes	OUT	NO	The resulting M2M Node entities in table 6.9.2.3-1.
responseType	OUT	YES	Unique response types for this service: • None.

C.2.2.4.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Perform the common request authorization.

2) Retrieve the M2M Nodes with a filter condition.

3) Account for the event.
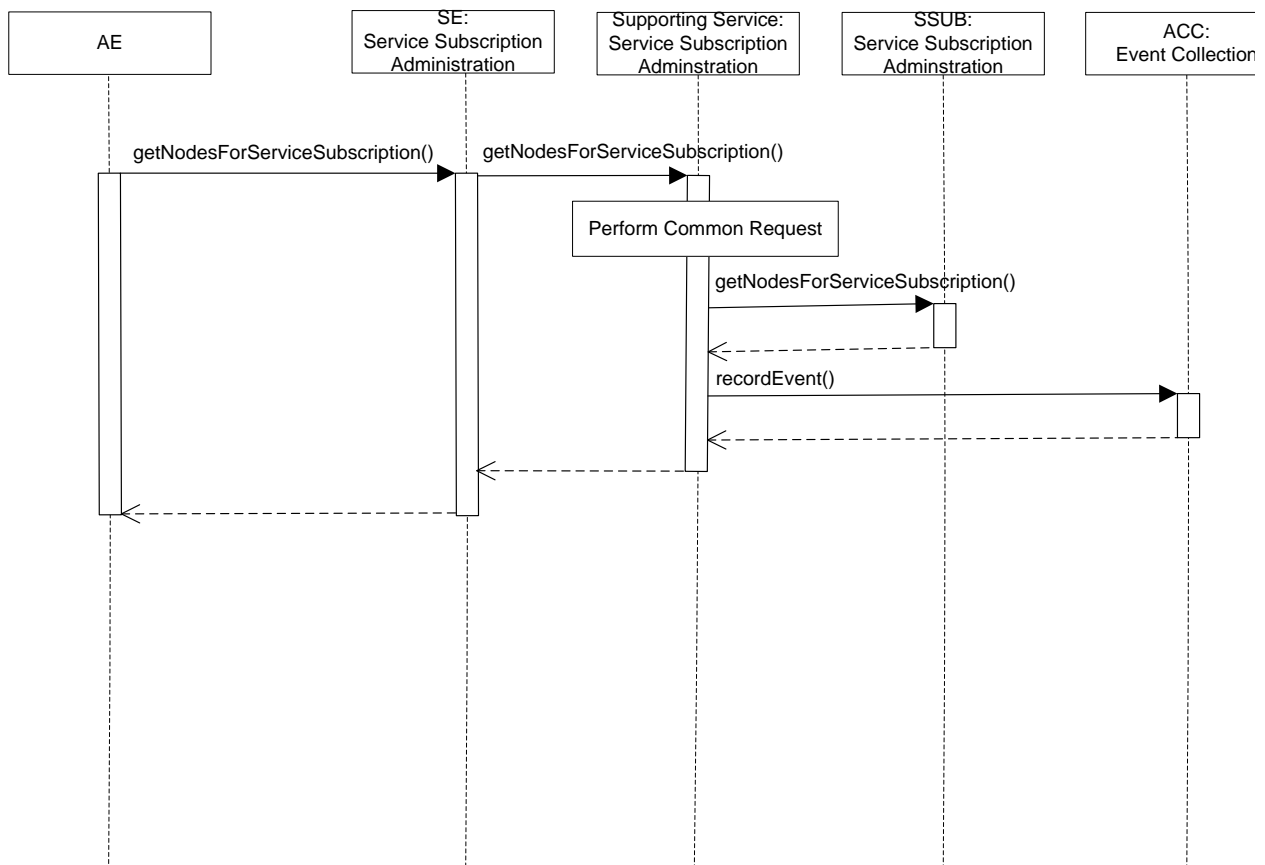
Figure C.2.2.4.4-1: getNodesForServiceSubscription Diagram

C.2.2.4.5 Post-Conditions

Not Applicable.

C.2.2.4.6 Exceptions

No unique exceptions for this service capability.

Consumed services may throw exceptions which are forwarded by this service capability.

C.2.2.4.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 300 ms.

C.2.2.5 createApplicationRule

C.2.2.5.1 Description

This service capability provides the ability to create a M2M Application Rule to be associated with one or more M2M Nodes.

C.2.2.5.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

C.2.2.5.3 Signature - createApplicationRule

Table C.2.2.5.3-1: Service Subscription Administration - createApplciationRule capability

Parameter name	Direction	Optional	Description
Common request input parameters	-	-	See table A.2.2-1.
credentialIds	IN	YES	List of credential identifiers for which this Application Rule is applicable, i.e. for registration requests coming into the M2M System via a Security Association Endpoint (SEA) [i.3], that was authenticated using credentials that match with any of these credential identifiers, the current Application Rule applies.
allowedApplicationIds	IN	YES	List of M2M Application Identifiers (App-ID) that shall be considered to be allowed for AE registration requests received via Security Association Endpoint (SEA) [i.3].
allowedAEIds	IN	YES	List of M2M Application Entity Identifiers (AE-ID) that shall be considered to be allowed for AE registration requests.
applicationRuleId	OUT	NO	The unique Application Rule identifier in the context of the M2M Service Subscription.
responseType	OUT	YES	Unique response types for this service: • None.

C.2.2.5.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Perform the common request authorization.

2) Create the Application Rule.

3) Account for the event.
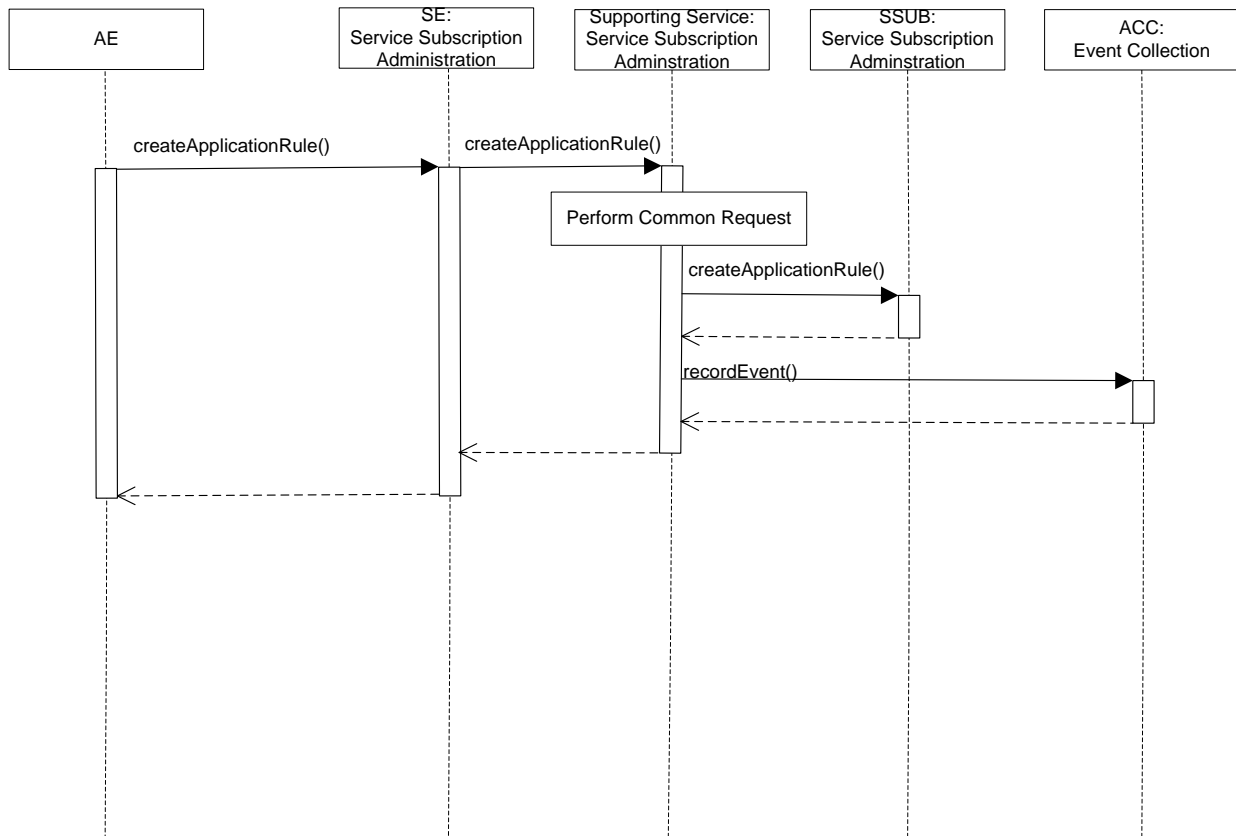
Figure C.2.2.5.4-1: createApplicationRule Diagram

C.2.2.5.5 Post-Conditions

The Application Rule is created.

C.2.2.5.6 Exceptions

No unique exceptions for this service capability.

Consumed services may throw exceptions which are forwarded by this service capability.

C.2.2.5.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 300 ms.

C.2.2.6 deleteApplicationRules

C.2.2.6.1 Description

This service capability provides the ability to delete Application Rules and any references to the Application Rule made by M2M Nodes to the Application Rules.

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C.2.2.6.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

C.2.2.6.3 Signature - deleteApplicationRules

Table C.2.2.6.2-1: Service Subscription Administration - deleteApplicationRules capability

Parameter name	Direction	Optional	Description
Common request input parameters	-	-	See table A.2.2-1.
applicationRuleIds	IN	NO	A list of Application Rule identifiers.
responseType	OUT	YES	Unique response types for this service: • Application Rule does not exist.

C.2.2.6.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Perform the common request authorization.

2) Delete the Application Rules.

3) Account for the event.
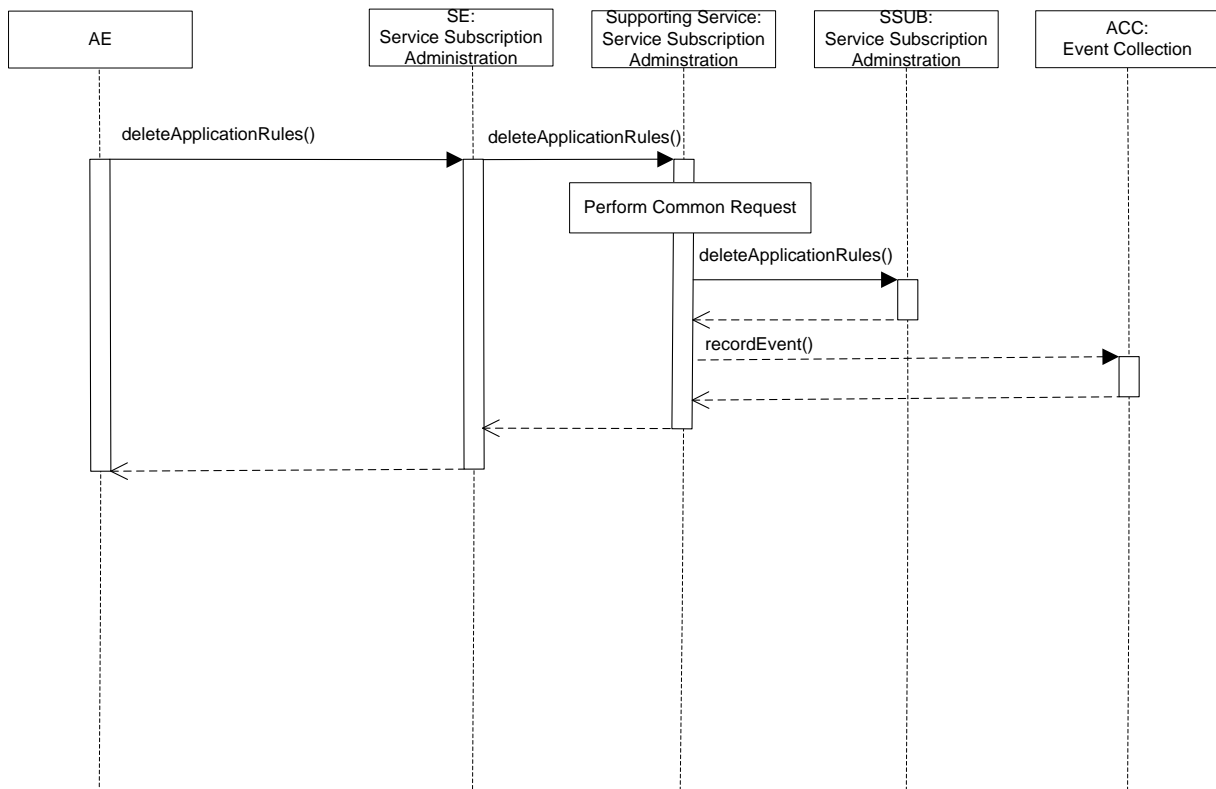
Figure C.2.2.6.4-1: deleteApplicationRules Diagram

C.2.2.6.5 Post-Conditions

Application Rules and any references to the Application Rule made by M2M Nodes to the Application Rules are deleted.

C.2.2.6.6 Exceptions

No unique exceptions for this service capability.

Consumed services may throw exceptions which are forwarded by this service capability.

C.2. 2.6.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 300 ms.

C.2.2.7 getApplicationRules

C.2.2.7.1 Description

This service capability provides the ability to retrieve the Application Rules.

C.2.2.7.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

C.2.2.7.3 Signature - getApplicationRules

**Table C.2.2.7.3-1: Service Subscription Administration - getApplicationRulescapability**

Parameter name	Direction	Optional	Description
Common request input parameters	-	-	See table A.2.2-1.
filterCriteria	IN	NO	See table 6.9.2.6-1.
applicationRules	OUT	NO	The resulting M2M Node entities in table 6.9.2.5-1.
responseType	OUT	YES	Unique response types for this service: • None.

C.2.2.7.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Perform the common request authorization.

2) Retrieve the M2M Applications of the M2M Service Subscription.

3) Account for the event.

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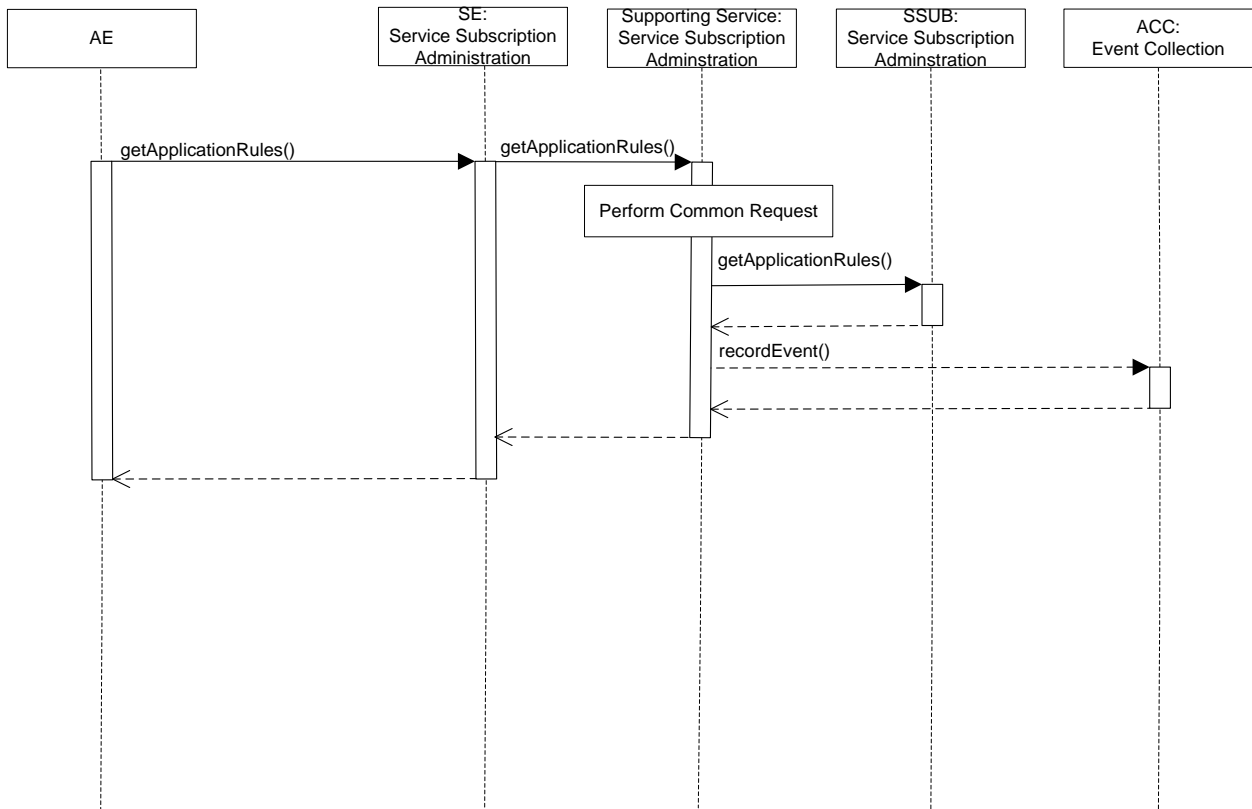
Figure C.2.2.7.4-1: getApplicationRules Diagram

C.2.2.7.5   Post-Conditions

Not Applicable.

C.2.2.7.6   Exceptions

No unique exceptions for this service capability.

Consumed services may throw exceptions which are forwarded by this service capability.

C.2.2.7.7   Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 300 ms.

C.2.2.8   updateApplicationRule

C.2.2.8.1   Description

This service capability provides the ability to update an Application Rule.

C.2.2.8.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

C.2.2.8.3 Signature - updateApplicationRule

Table C.2.2.8.3-1: Service Subscription Administration - updateApplicationForDevice capability

Parameter name	Direction	Optional	Description
Mca Common request input parameters	-	-	See table A.2.2-1.
applicationRuleId	IN	NO	The unique Application Rule identifier in the context of the M2M Service Subscription.
credentialIds	IN	YES	List of credential identifiers for which this Application Rule is applicable, i.e. for registration requests coming into the M2M System via a Security Association Endpoint (SEA) [i.3], that was authenticated using credentials that match with any of these credential identifiers, the current Application Rule applies. When present this list will overlay the list of credential identifiers.
allowedApplicationIds	IN	YES	List of M2M Application Identifiers (App-ID) that shall be considered to be allowed for AE registration requests received via Security Association Endpoint (SEA) [i.3]. When present this list will overlay the list of allowed App-IDs.
responseType	OUT	YES	Unique response types for this service: • Application Rule does not exist.

C.2.2.8.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Perform the common request authorization.

2) Update the Application Rule..

3) Account for the event.
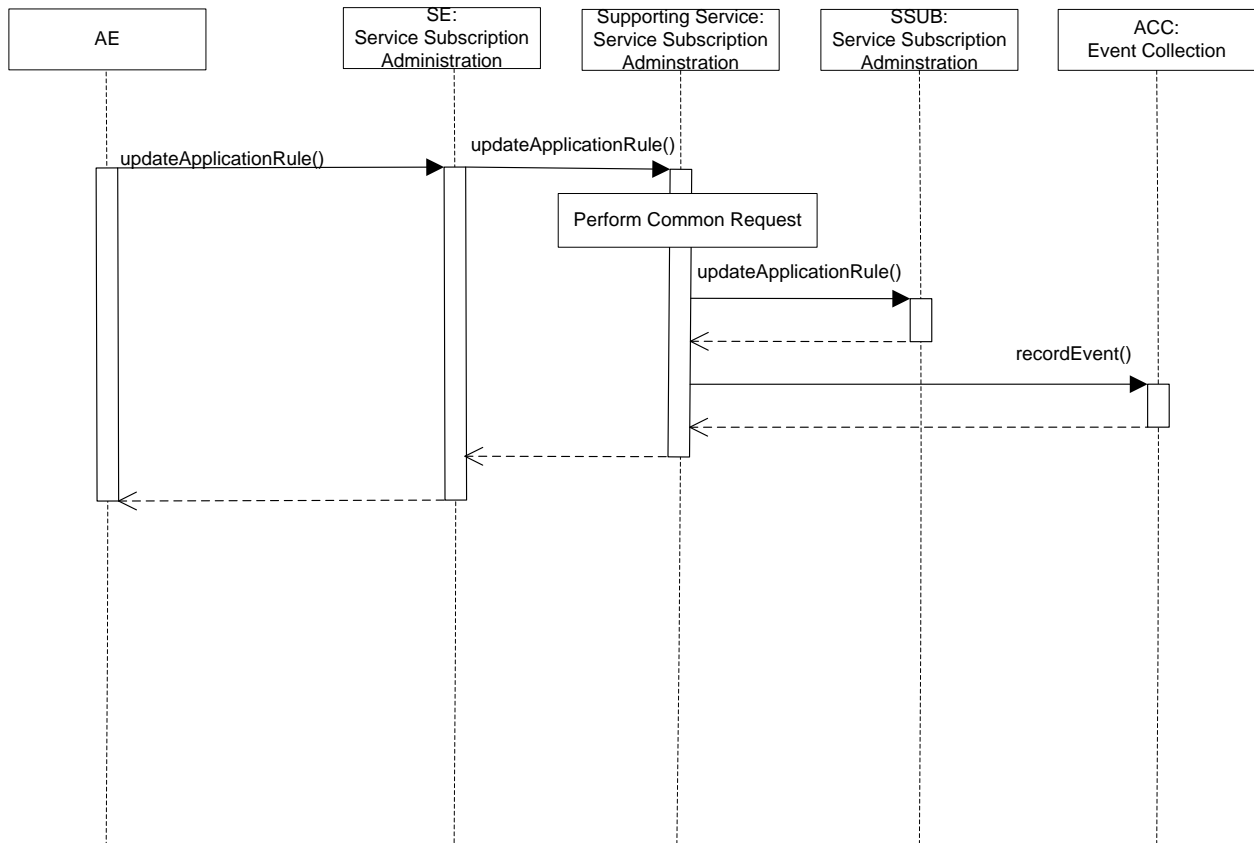
Figure C.2.2.8.4-1: updateApplicationRule Diagram

C.2.2.8.5 Post-Conditions

The Application Rule is updated.

C.2.2.8.6 Exceptions

No unique exceptions for this service capability.

Consumed services may throw exceptions which are forwarded by this service capability.

C.2.2.8.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 300 ms.

C.2.2.9 updateNodeForServiceSubscription

C.2.2.9.1 Description

This service capability provides the ability to update the Application Rules and External Identifiers to be associated to a Node within the context of a M2M Service Subscription.

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C.2.2.9.2   Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

C.2.2.9.3   Signature - updateNodeForServiceSubscription

**Table C.2.2.9.3-1: Service Subscription Administration -
updateNodeForServiceSubscription capability**

Parameter name	Direction	Optional	Description
Mca Common request input parameters	-	-	See table A.2.2-1.
nodeId	IN	NO	The unique M2M Node identifier in the context of the M2M Service Subscription.
applicationRuleIds	IN	YES	A list of Application Rule Identifier. When present this list will overlay the list of Applications associated with the Node.
externalIds	IN	YES	List of URNs that represent the external identifiers associated with this device. When present this list will overlay the list of external identifiers associated with the Node.
responseType	OUT	YES	Unique response types for this service: • M2M Service Subscription does not exist. • M2M Node does not exist for the M2M Service Subscription.

C.2.2.9.4   Service Interactions

The interactions of service capabilities required for this service capability:

1)   Perform the common request authorization.

2)   Update the M2M Node information for the M2M Service Subscription.

3)   Account for the event.
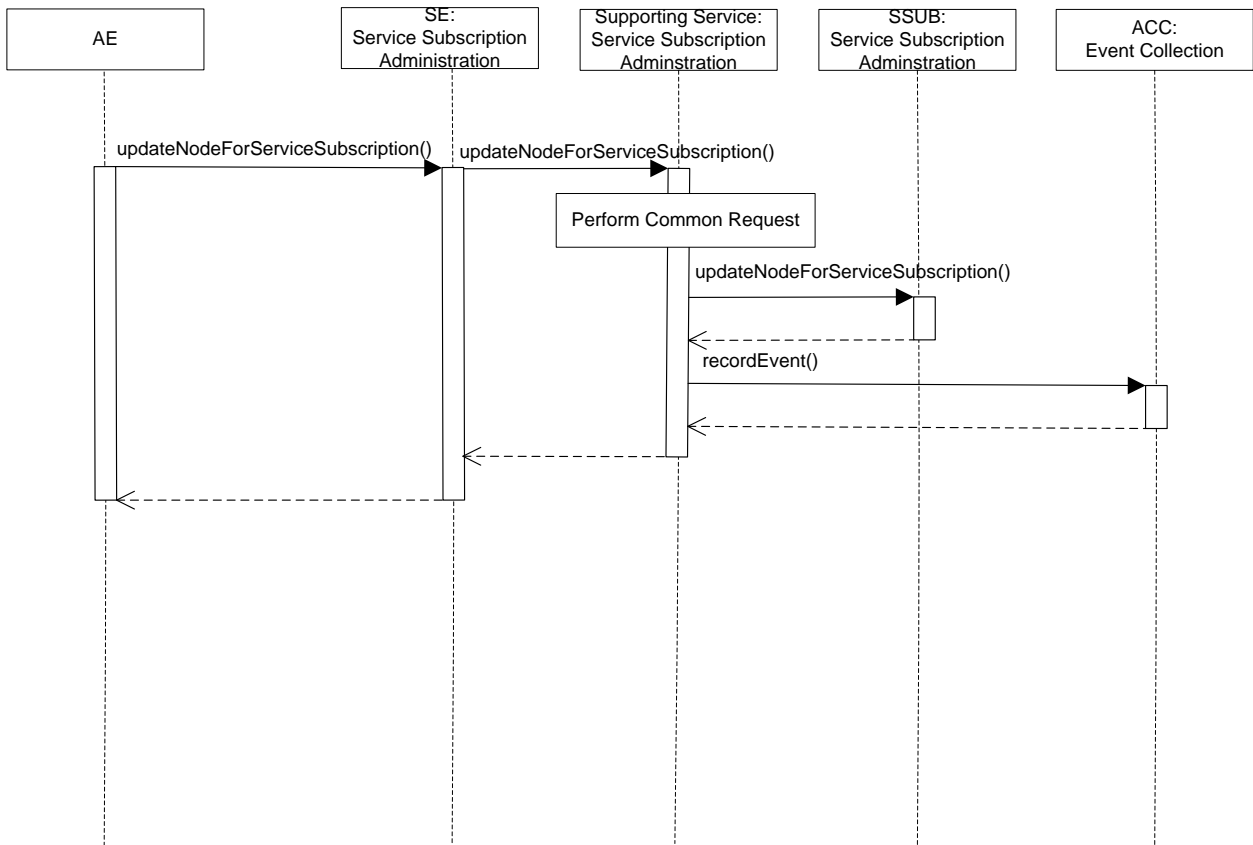
Figure C.2.2.9.4-1: updateNodeForServiceSubscription Diagram

C.2.2.9.5   Post-Conditions

The M2M Node for the M2M Service Subscription is updated.

C.2.2.9.6   Exceptions

No unique exceptions for this service capability.

Consumed services may throw exceptions which are forwarded by this service capability.

C.2.2.9.7   Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 300 ms.

Annex D (informative): Device Management Services

D.1 Overview

This annex illustrates the usage of the services for requests to manage device from AEs across the Mca Reference Point.

D.2 Supporting Services

D.2.1 Overview

This service provides the capability to manage device using the request-response or request-asynchronous report message patterns where AEs:

- Request to manage device using device specific service capabilities or more complex service capabilities that the Support Service will orchestrate into the individual service capabilities according to their business process.

- Request to obtain management operation execution results or status using the reporting capability. Reports can be generated or batched by the report policy.

D.2.2 Service Capabilities

D.2.2.1 downloadFirmware

D.2.2.1.1 Description

This service capability provides the ability to execute a downloadFirmware request from an AE.

D.2.2.1.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the M2M Service Capability and device exist.

D.2.2.1.3 Signature - downloadFirmware

Table D.2.2.1.3-1: Device Management Service -downloadFirmware capability

Parameter name	Direction	Optional	Description
Common request input attributes	-	-	See table A.2.2-1.
firmwareInfo	IN	NO	The device firmware information. Type FirmwareInfo, see clause 6.6.2.2.5.
deviceId	IN	YES	The unique device identifier in the context of the M2M Service Subscription.
reportPolicy	IN	YES	The policy used to report the state of the operation to the originating AE. See clause 6.6.2.2.1.
responseType	OUT	YES	Unique response types for this service (see note).
NOTE: Consumed services also provide response types.			

D.2.2.1.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Perform the Common Request Services for requests across the Mca Reference Point.

2) Retrieves the Management Adapter to be used for the device and M2M Service Subscription.

3) Issues the request to the Management Adapter to download the firmware.

4)   Records the event.
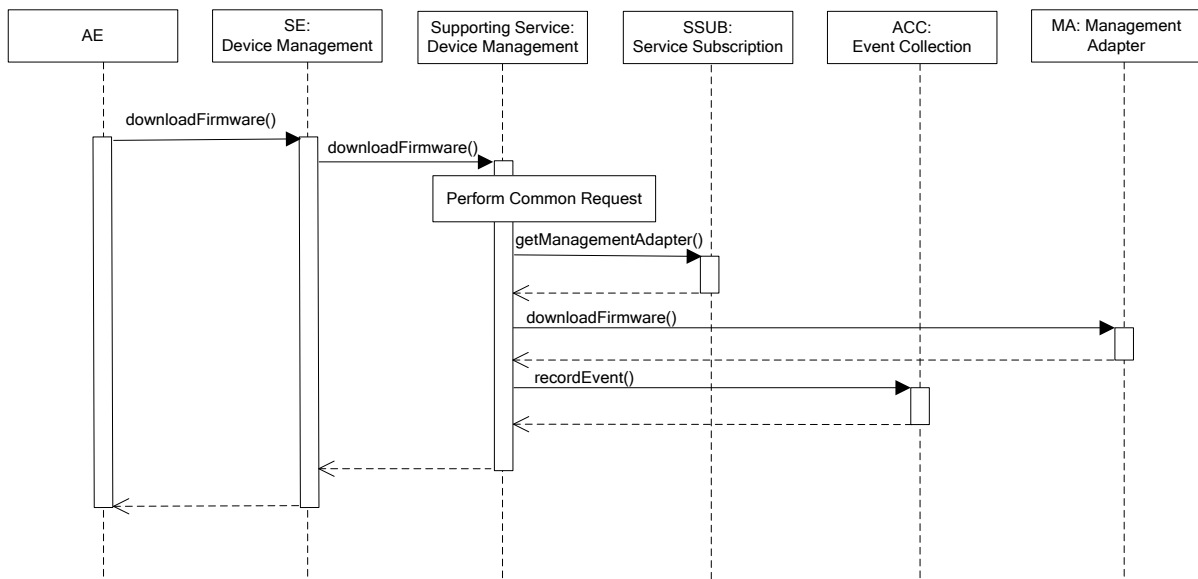
Figure D.2.2.1.4-1: downloadFirmware Diagram

D.2.2.1.5   Post-Conditions

The Management Adapter has submitted a request to the Management Server to download firmware.

The event has been recorded.

D.2.2.1.6   Exceptions

Not Applicable.

D.2.2.1.7   Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 300 ms.

D.2.2.2   installFirmware

D.2.2.2.1   Description

This service capability provides the ability to execute a installFirmware request from an AE.

D.2.2.2.2   Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the M2M Service Capability and device exist.

D.2.2.2.3   Signature - installFirmware

Table D.2.2.2.3-1: Device Management Service -installFirmware capability

Parameter name	Direction	Optional	Description
Common request input attributes	-	-	See table A.2.2-1.
firmwareInfo	IN	NO	The device firmware information. Type FirmwareInfo, see clause 6.6.2.2.5.
deviceId	IN	YES	The unique device identifier in the context of the M2M M2M Service Subscription.
reportPolicy	IN	YES	The policy used to report the state of the operation to the originating AE.
responseType	OUT	YES	Unique response types for this service (see note).
NOTE: Consumed services also provide response types.			

D.2.2.2.4   Service Interactions

The interactions of service capabilities required for this service capability:

1)   Perform the Common Request Services for requests across the Mca Reference Point.

2)   Retrieves the Management Adapter to be used for the device and M2M Service Subscription.

3)   Issues the request to the Management Adapter to install the firmware.

4)   Records the event.
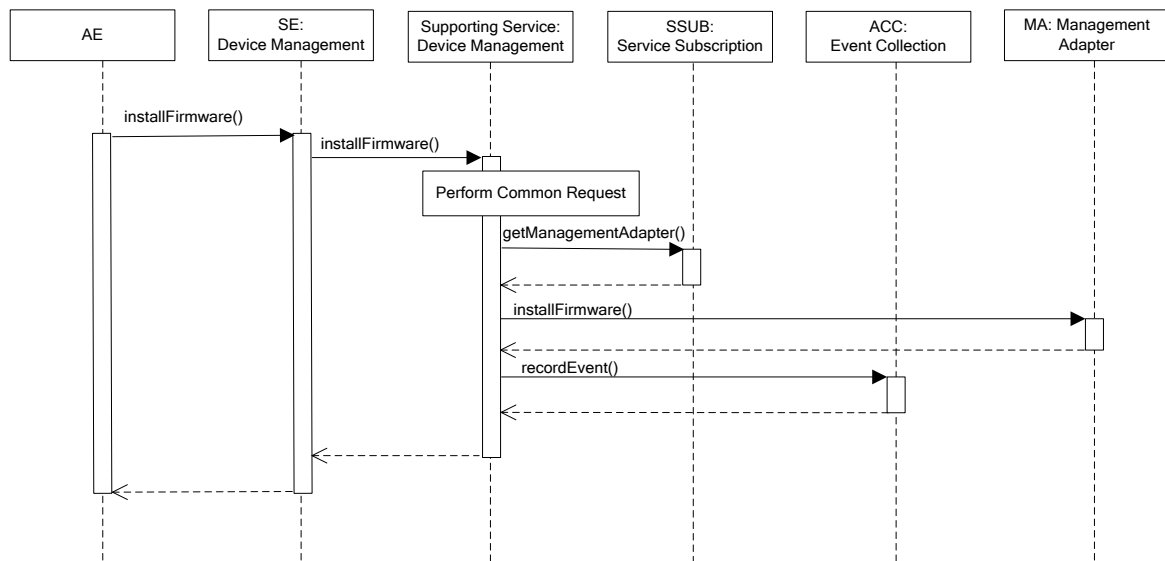
Figure D.2.2.2.4-1: installFirmware Diagram

D.2.2.2.5   Post-Conditions

The Management Adapter has submitted a request to the Management Server to install firmware.

The event has been recorded.

D.2.2.2.6   Exceptions

No unique exceptions for this service capability.

Consumed services may throw exceptions which are forwarded by this service capability.

D.2.2.2.7   Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 300 ms.

D.2.2.3   getFirmwareInformation

D.2.2.3.1   Description

This service capability provides the ability to execute a getFirmwareInformation request from an AE.

D.2.2.3.2   Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the M2M Service Capability and device exist.

D.2.2.3.3   Signature - getFirmwareInformation

Table D.2.2.3.3-1: Device Management Service - getFirmwareInformation capability

| Parameter name	Direction	Optional	Description
Common request input attributes	-	-	See table A.2.2-1.
deviceId	IN	YES	The unique device identifier in the context of the M2M M2M Service Subscription.
firmwareInfo	OUT	YES	The device firmware information. Type FirmwareInfo, see clause 6.6.2.2.5.
responseType	OUT	YES	Unique response types for this service (see note).
NOTE: Consumed services also provide response types.			

D.2.2.3.4   Service Interactions

The interactions of service capabilities required for this service capability:

1)   Perform the Common Request Services for requests across the Mca Reference Point.

2)   Retrieves the Management Adapter to be used for the device and M2M Service Subscription.

3)   Issues the request to the Management Adapter to get the firmware information.
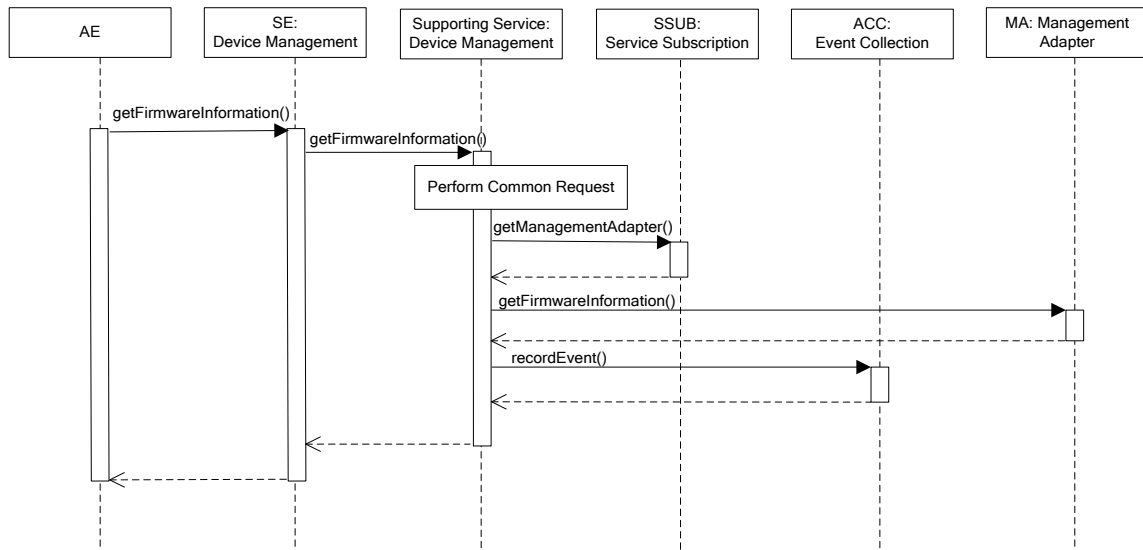
4)   Records the event.

Figure D.2.2.3.4-1: getFirmwareInformation Diagram

D.2.2.3.5 Post-Conditions

The Management Adapter has submitted a request to the Management Server to get firmware information.

The event is recorded.

D.2.2.3.6 Exceptions

No unique exceptions for this service capability.

Consumed services may throw exceptions which are forwarded by this service capability.

D.2.2.3.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 300 ms.

D.2.2.4 getFirmwareExecStatus

D.2.2.4.1 Description

This service capability provides the ability to retrieve the execution status or result of a requested firmware operation.

D.2.2.4.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the M2M Service Capability and previously submitted firmware request exist.

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D.2.2.4.3 Signature - getFirmwareExecStatus

Table D.2.2.4.3-1: Device Management Service - getFirmwareExecStatus capability

Parameter name	Direction	Optional	Description
Common request input attributes	-	-	See table A.2.2-1.
operationRequestId	IN	NO	The M2M Request Identifier of previously submitted firmware request (M2M-Request-ID).
deviceId	IN	YES	The unique device identifier in the context of the M2M M2M Service Subscription.
firmwareReport	OUT	YES	The firmware management operation execution result or status. Type FirmwareReport, see clause 6.6.2.2.3.
responseType	OUT	YES	Unique response types for this service (see note): The previously submitted firmware request does not exist.
NOTE: Consumed services also provide response types.			

D.2.2.4.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Perform the Common Request Services for requests across the Mca Reference Point.

2) Retrieves the Management Adapter to be used for the device and M2M Service Subscription.

3) Issues the request to the Management Adapter to retrieve the firmware operations execution status or result.

4) Records the event.
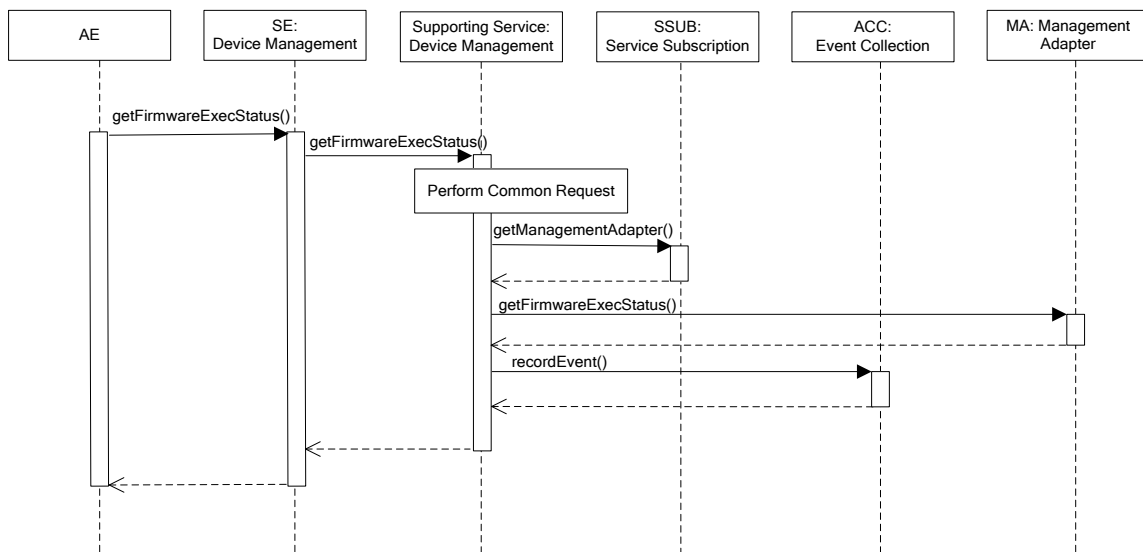
Figure D.2.2.4.4-1: getFirmwareExecStatus Diagram

D.2.2.4.5 Post-Conditions

The Management Adapter has submitted a request to the Management Server to get firmware operation execution status or result.

Record the event.

D.2.2.4.6 Exceptions

No unique exceptions for this service capability.

Consumed services may throw exceptions which are forwarded by this service capability.

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D.2.2.4.7   Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 300 ms.

D.2.2.5 deviceManagementReport

D.2.2.5.1   Description

This service capability provides the ability to report an AE about the status or result of management operations for previously submitted operation requests.

D.2.2.5.2   Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the M2M Service Capability and previously submitted management requests exist.

D.2.2.5.3   Signature -deviceManagementReport

Table D.2.2.5.3-1: Device Management Service -deviceManagementReport capability

Parameter name	Direction	Optional	Description
Common request input attributes	-	-	See table A.2.2-1.
isLastReport	IN	NO	Boolean, whether it is the last report.
sequenceNumber	IN	NO	The report sequence number.
firmwareReportList	IN	NO	Array of firmwareReport. Type FirmwareReport, see clause 6.6.2.2.3.
troubleshootingReportList	IN	YES	Array of troubleshootingReport. Type TroubleshootingReport, see clause 6.6.2.2.20.
softwareReportList	IN	YES	Array of softwareReport. Type SoftwareReport, see clause 6.6.2.2.27.
responseType	OUT	YES	Unique response types for this service (see note).
NOTE: Consumed services also provide response types.			

D.2.2.5.4   Service Interactions

The interactions of service capabilities required for this service capability:

1)   Perform the Common Request Services for requests across the Mca Reference Point.
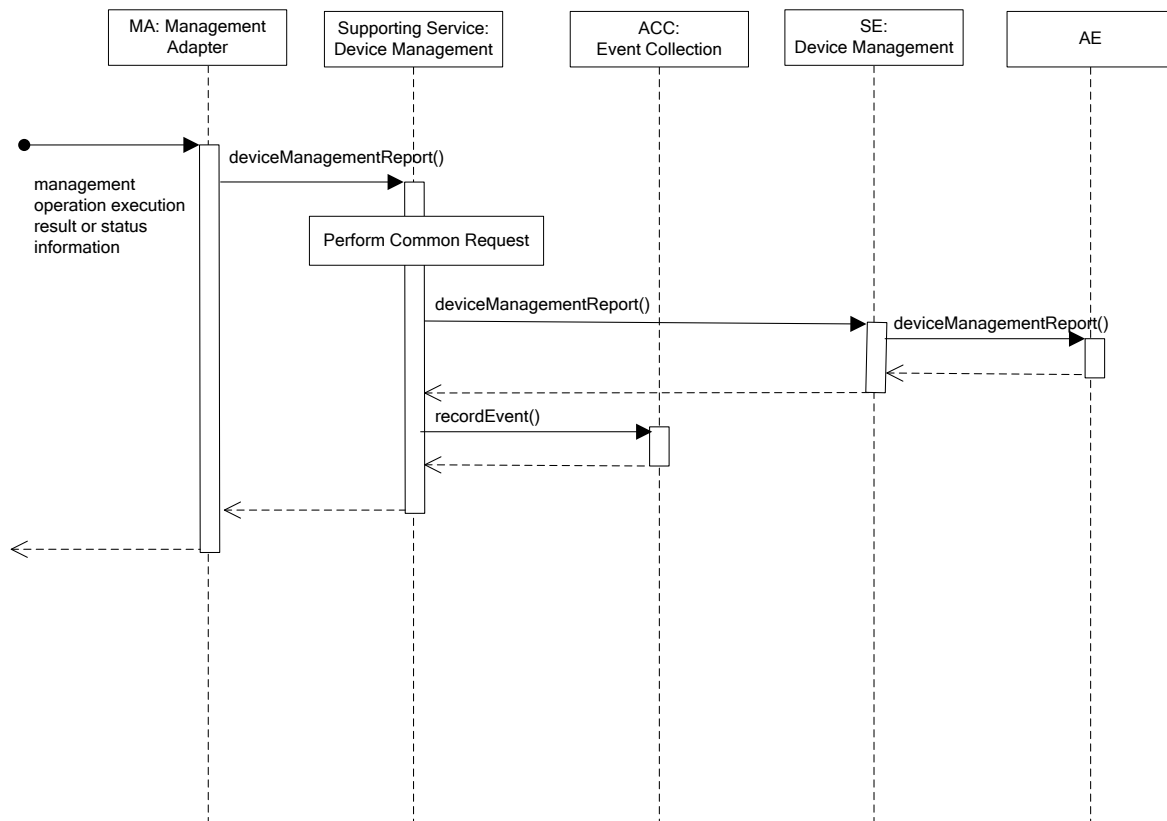
2)   Record the event.

Figure D.2.2.5.4-1: deviceManagementReport Diagram

D.2.2.5.5   Post-Conditions

The AE has received a report of management operation execution status or result.

The event is recorded.

D.2.2.5.6   Exceptions

No unique exceptions for this service capability.

Consumed services may throw exceptions which are forwarded by this service capability.

D.2.2.5.7   Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 300 ms.

D.2.2.6   upgradeFirmware

D.2.2.6.1   Description

This service capability permits AEs to upgrade the firmware on individual device, multiple devices or a group of devices. In addition the upgrade of the firmware is permitted based on a schedule for each of the operations.

D.2.2.6.2   Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between Management Adapter, the M2M Service Capability and devices or device group exist.

D.2.2.6.3 Signature - upgradeFirmware

Table D.2.2.6.3-1: Device Management Service -upgradeFirmware capability

Parameter name	Direction	Optional	Description
Common request input attributes	-	-	See table A.2.2-1.
orchestrationRuleList	IN	NO	List of OrchestrationRule. Type OrchestrationRule, see clause 6.6.2.2.4.
reportPolicy	IN	YES	The policy used to report the state of the operation to the originating AE. See clause 6.6.2.2.1.
responseType	OUT	YES	Unique response types for this service (see note).
NOTE: Consumed services also provide response types.			

D.2.2.6.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Perform the Common Request Services for requests across the Mca Reference Point.

2) Retrieves the Management Adapter to be used for the device and M2M Service Subscription.

3) Issues a series of operations to the Management Adapter to upgrade the firmware on a the devices in the orchestration rule list. Each entry in the orchestration rule list contains the operation, the devices and schedule for the operation.

4) Records the event.

Figure D.2.2.6.4-1: upgradeFirmware Diagram

D.2.2.6.5 Post-Conditions

The Management Adapter has submitted a set of requests to the Management Server to upgrade the firmware.

The event is recorded.

D.2.2.6.6 Exceptions

The reachability schedule of the device does not match the schedule of the orchestration rule.

D.2.2.6.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 300 ms.

D.2.2.7 getDeviceInformation

D.2.2.7.1 Description

This service capability provides the ability for an AE to retrieve the information about a device across the Mca Reference Point.

D.2.2.7.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Parment Adapter, the M2M Service Capability and device exist.

D.2.2.7.3 Signature - getDeviceInformation

Table D.2.2.7.3-1: Device Management Service -getDeviceInformation capability

Parameter name	Direction	Optional	Description
Common request input attributes	-	-	See table A.2.2-1.
deviceId	IN	NO	The unique device identifier in the context of the M2M M2M Service Subscription.
deviceInfo	OUT	NO	The device information. Type DeviceInfo, see clause 6.6.2.2.7.
memory	OUT	YES	The memory information. Type Memory, see clause 6.6.2.2.8.
battery	OUT	YES	The battery information. Type Battery, see clause 6.6.2.2.9.
lockStatus	OUT	YES	The device lock status. Enum LockStatus, see clause 6.6.2.2.13.
responseType	OUT	YES	Unique response types for this service (see note).
NOTE: Consumed services also provide response types.			

D.2.2.7.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Perform the Common Request Services for requests across the Mca Reference Point.

2) Retrieves the Management Adapter to be used for the device and M2M Service Subscription.

3) Issues the request to the Management Adapter to get device information.
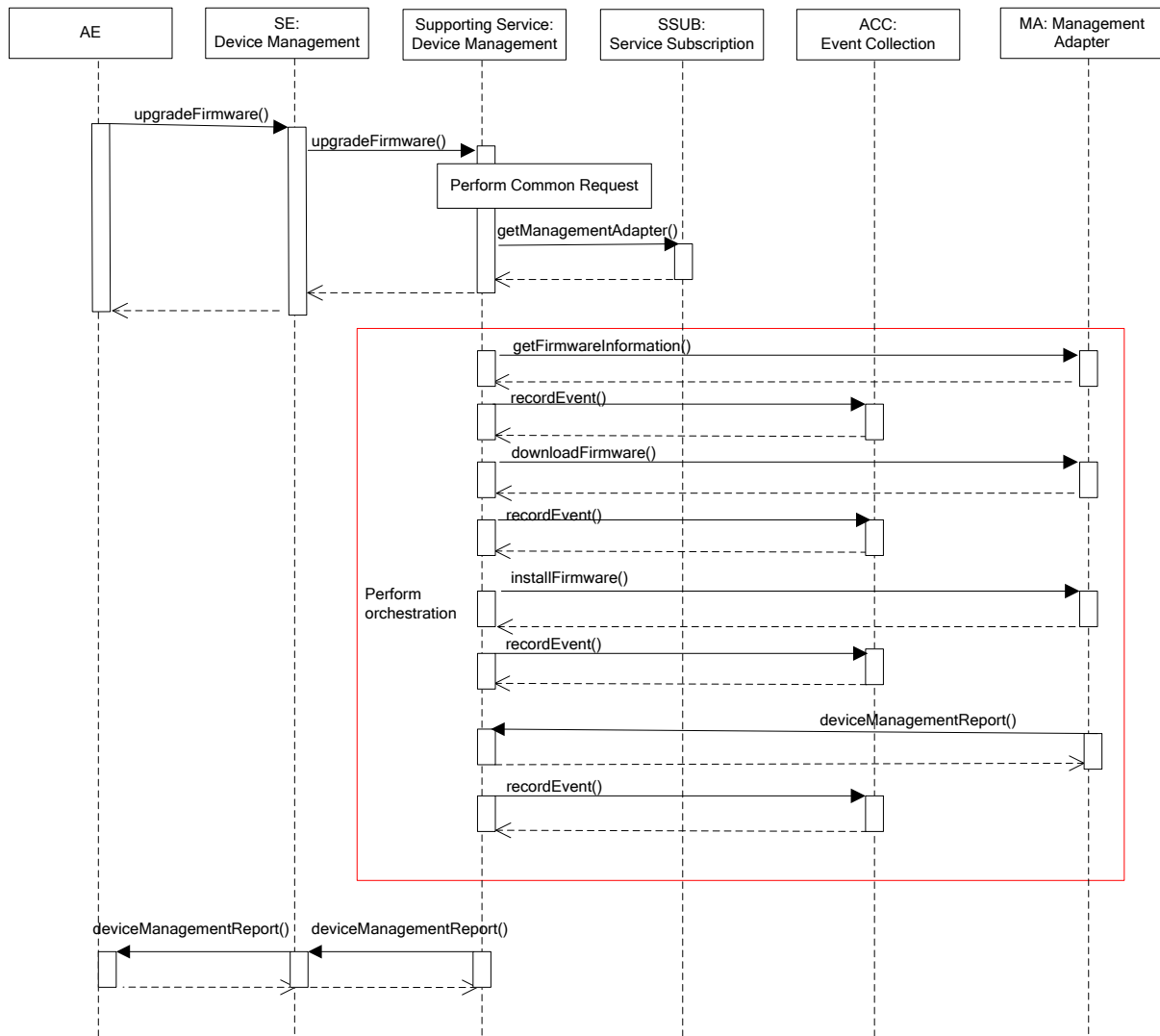
4) Records the event.
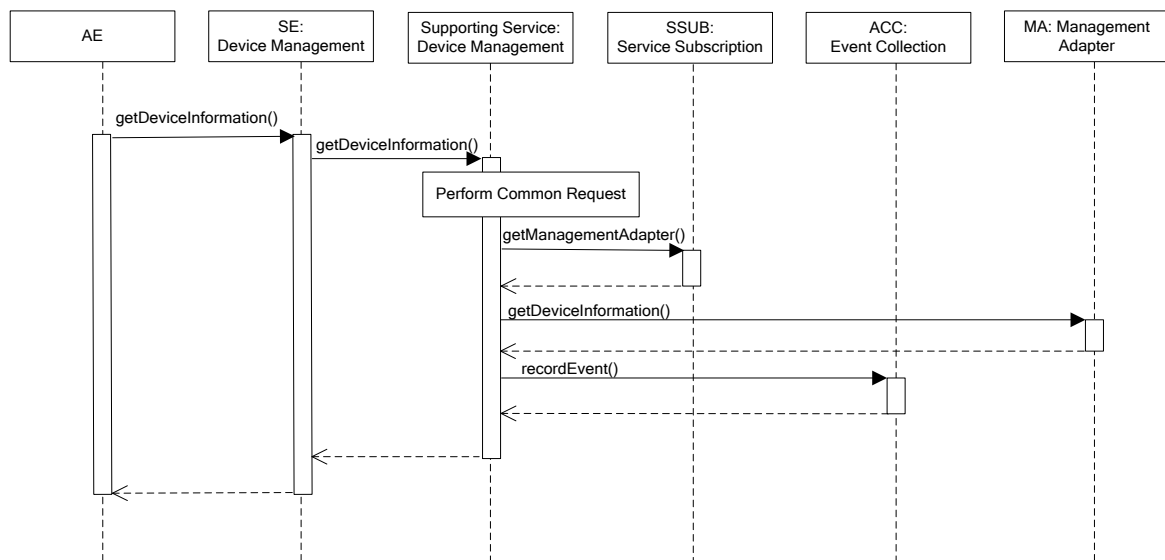
Figure D.2.2.7.4-1: getDeviceInformation Diagram

D.2.2.7.5 Post-Conditions

The Management Adapter has submitted a request to the Management Server to get device information.

Based on the capabilities supported by the device, the memory, battery and lock status information may or may not be returned.

The event has been recorded.

D.2.2.7.6 Exceptions

Not Applicable.

D.2.2.7.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 300 ms.

D.2.2.8 getDeviceCapabilities

D.2.2.8.1 Description

This service capability provides the ability to execute a getDeviceCapabilities request from an AE.

D.2.2.8.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the M2M Service Capability and device exist.

D.2.2.8.3 Signature - getDeviceCapabilities

Table D.2.2.8.3-1: Device Management Service -getDeviceCapabilities capability

Parameter name	Direction	Optional	Description
Common request input attributes	-	-	See table A.2.2-1.
deviceId	IN	NO	The unique device identifier in the context of the M2M M2M Service Subscription.
deviceCapabilities	OUT	YES	Array of deviceCapability. Type DeviceCapability, see clause 6.6.2.2.10.
responseType	OUT	YES	Unique response types for this service (see note).
NOTE: Consumed services also provide response types.			

D.2.2.8.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Perform the Common Request Services for requests across the Mca Reference Point.

2) Retrieves the Management Adapter to be used for the device and M2M Service Subscription.

3) Issues the request to the Management Adapter to get device capabilities.

4) Records the event.

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Figure D.2.2.8.4-1: getDeviceCapabilities Diagram

D.2.2.8.5   Post-Conditions

The Management Adapter has submitted a request to the Management Server to get device capabilities.

The event has been recorded.

D.2.2.8.6   Exceptions

No unique exceptions for this service capability.

Consumed services may throw exceptions which are forwarded by this service capability.

D.2.2.8.7   Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 300 ms.

D.2.2.9   enableDeviceCapability

D.2.2.9.1   Description

This service capability provides the ability to execute a enableDeviceCapability request from an AE.

D.2.2.9.2   Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the M2M Service Capability and device exist.

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D.2.2.9.3 Signature - enableDeviceCapability

Table D.2.2.9.3-1: Device Management Service -enableDeviceCapability capability

Parameter name	Direction	Optional	Description
Common request input attributes	-	-	See table A.2.2-1.
deviceId	IN	NO	The unique device identifier in the context of the M2M M2M Service Subscription.
name	IN	NO	The name of the capability. Enum DeviceCapabilityName, see clause 6.6.2.2.12.
state	OUT	NO	Indicates if the capability is enabled or disabled.
responseType	OUT	YES	Unique response types for this service (see note).
NOTE: Consumed services also provide response types.			

D.2.2.9.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Perform the Common Request Services for requests across the Mca Reference Point.

2) Retrieves the Management Adapter to be used for the device and M2M Service Subscription.

3) Issues the request to the Management Adapter to enable device capability.
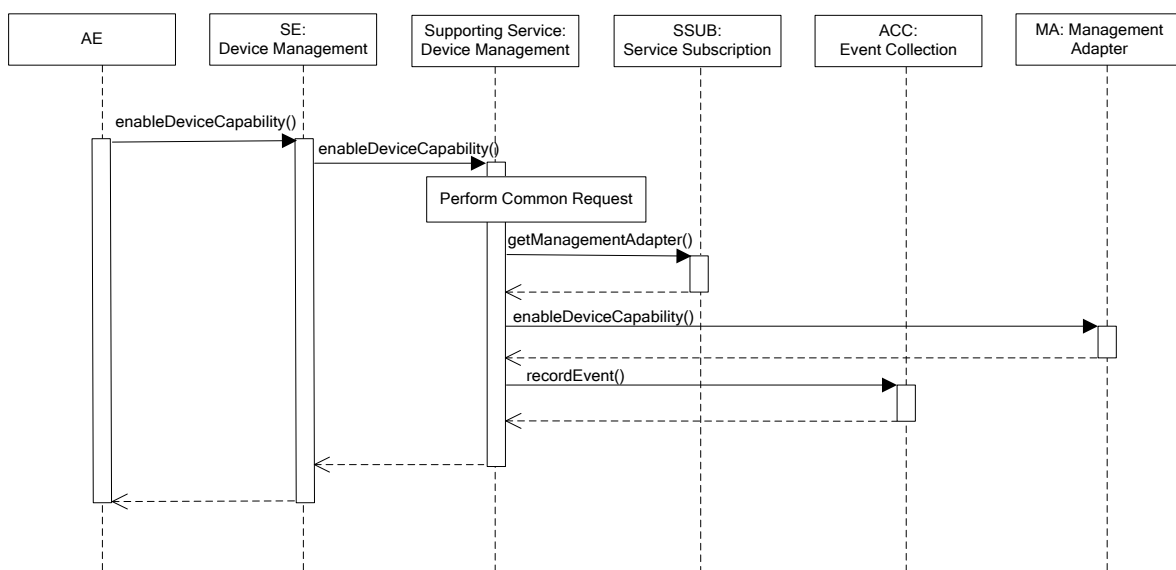
4) Records the event.

Figure D.2.2.9.4-1: enableDeviceCapability Diagram

D.2.2.9.5 Post-Conditions

The Management Adapter has submitted a request to the Management Server to enable device capability.

The event is recorded.

D.2.2.9.6 Exceptions

No unique exceptions for this service capability.

Consumed services may throw exceptions which are forwarded by this service capability.

D.2.2.9.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 300 ms.

D.2.2.10 disableDeviceCapability

D.2.2.10.1 Description

This service capability provides the ability to execute a disableDeviceCapability request from an AE.

D.2.2.10.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the M2M Service Capability and device exist.
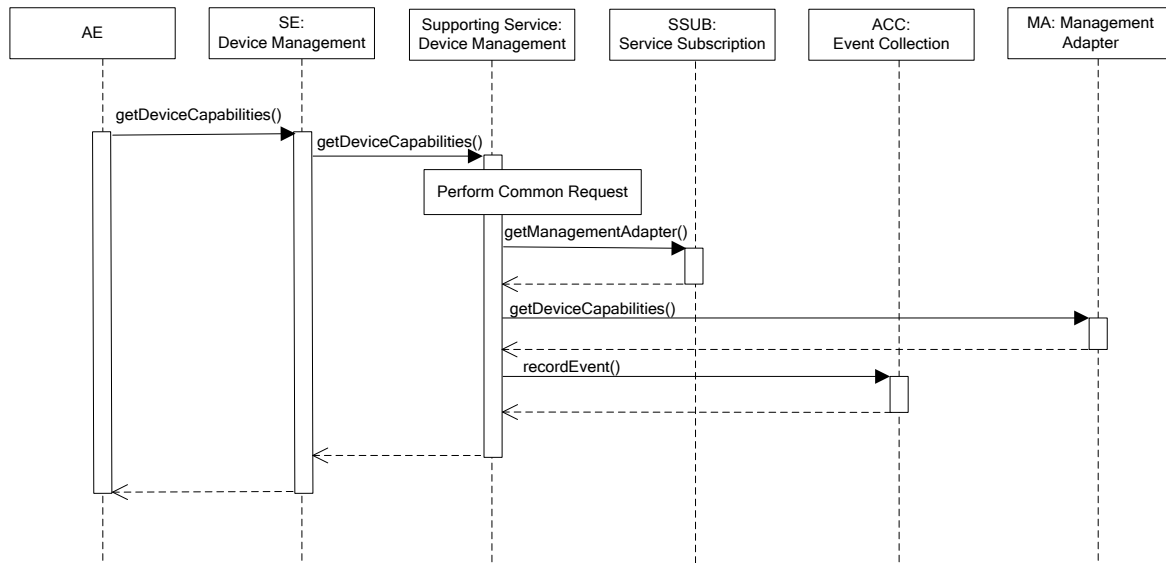
D.2.2.10.3 Signature - disableDeviceCapability

Table D.2.2.10.3-1: Device Management Service - disableDeviceCapability capability

Parameter name	Direction	Optional	Description
Common request input attributes	-	-	See table A.2.2-1.
deviceId	IN	NO	The unique device identifier in the context of the M2M M2M Service Subscription.
name	IN	NO	The name of the capability. Enum DeviceCapabilityName, see clause 6.6.2.2.12.
state	OUT	NO	Indicates if the capability is enabled or disabled.
responseType	OUT	YES	Unique response types for this service (see note).
NOTE: Consumed services also provide response types.			

D.2.2.10.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Perform the Common Request Services for requests across the Mca Reference Point.

2) Retrieves the Management Adapter to be used for the device and M2M Service Subscription.

3) Issues the request to the Management Adapter to disable device capability.
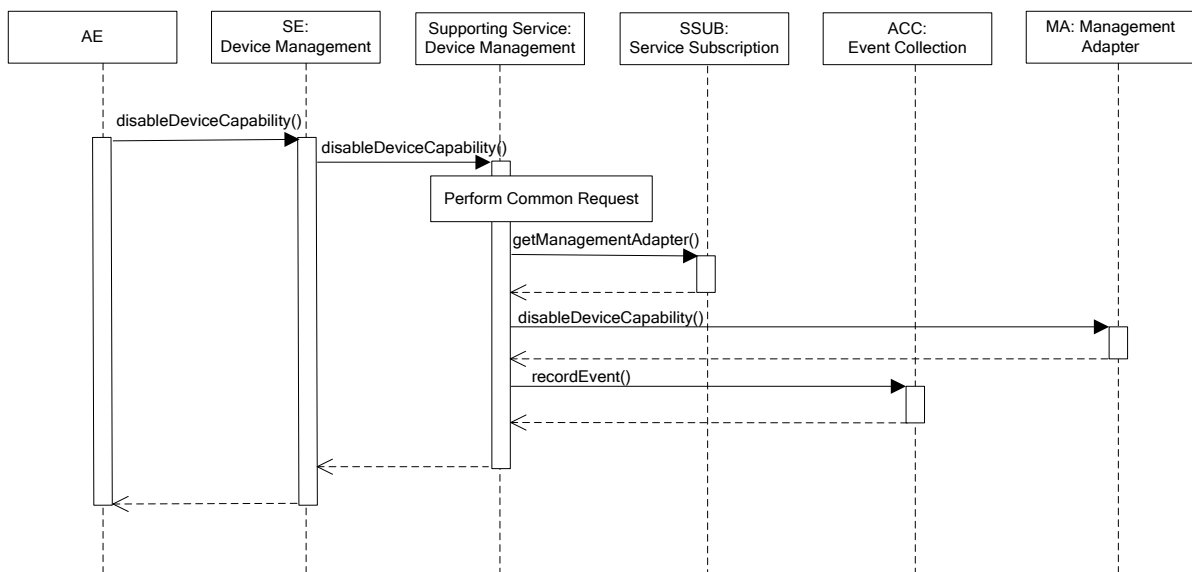
4) Records the event.

Figure D.2.2.10.4-1: disableDeviceCapability Diagram

D.2.2.10.5   Post-Conditions

The Management Adapter has submitted a request to the Management Server to disable device capability.

Record the event.

D.2.2.10.6   Exceptions

No unique exceptions for this service capability.

Consumed services may throw exceptions which are forwarded by this service capability.

D.2.2.10.7   Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 300 ms.

D.2.2.11 getAreaNetworks

D.2.2.11.1   Description

This service capability provides the ability to execute a getAreaNetworks request from an AE.

D.2.2.11.2   Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the M2M Service Capability and area network exist.

D.2.2.11.3   Signature - getAreaNetworks

Table D.2.2.11.3-1: Device Management Service - getAreaNetworks capability

Parameter name	Direction	Optional	Description
Common request input attributes	-	-	See table A.2.2-1.
areaNwks	OUT	YES	Array of area network. Type AreaNwkInfo, see clause 6.6.2.2.13.
responseType	OUT	YES	Unique response types for this service (see note).
NOTE: Consumed services also provide response types.			

D.2.2.11.4   Service Interactions

The interactions of service capabilities required for this service capability:

1) Perform the Common Request Services for requests across the Mca Reference Point.

2) Retrieves the Management Adapter to be used for the device and M2M Service Subscription.

3) Issues the request to the Management Adapter to get area networks information.

4) Records the event.

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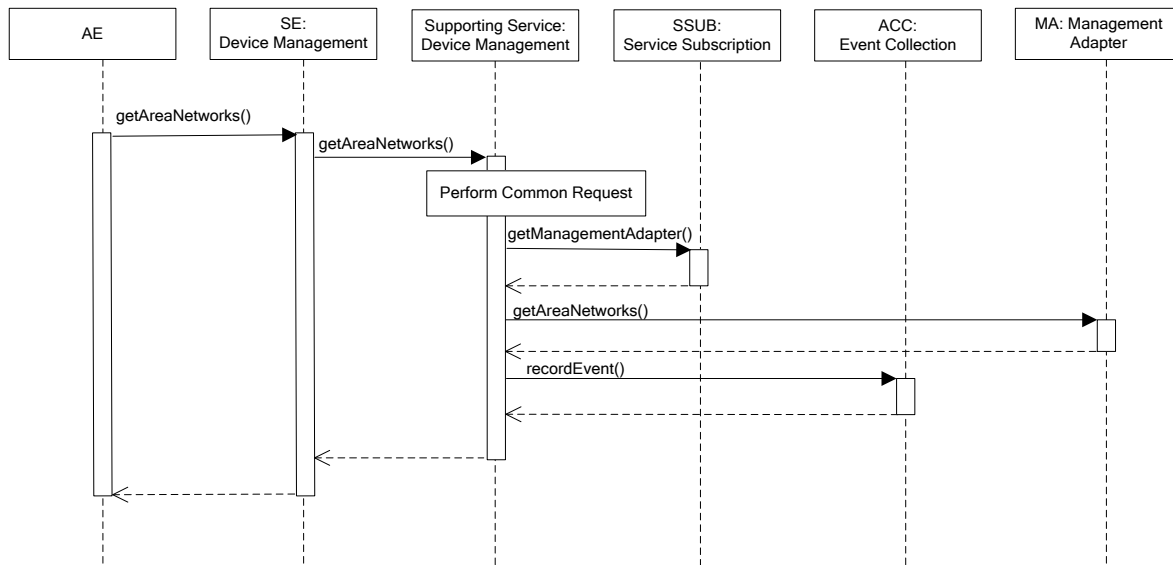
Figure D.2.2.11.4-1: getAreaNetworks Diagram

D.2.2.11.5   Post-Conditions

The Management Adapter has submitted a request to the Management Server to get area networks information.

The event has been recorded.

D.2.2.11.6   Exceptions

Not Applicable.

D.2.2.11.7   Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 300 ms.

D.2.2.12 updateDeviceForAreaNetwork

D.2.2.12.1   Description

This service capability provides the ability to execute a updateDeviceForAreaNetwork request from an AE.

D.2.2.12.2   Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the M2M Service Capability, the device and area network exist.

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D.2.2.12.3   Signature -updateDeviceForAreaNetwork

Table D.2.2.12.3-1: Device Management Service - updateDeviceForAreaNetwork capability

Parameter name	Direction	Optional	Description
Common request input attributes	-	-	See table A.2.2-1.
areaNwkId	IN	NO	The unique area network identifier.
deviceId	IN	NO	The unique device identifier in the context of the M2M M2M Service Subscription.
areaNwkDeviceInfo	IN	YES	The existing areaNwkDeviceInfo are replaced with the information in this parameter. Type AreaNwkDeviceInfo, see clause 6.6.2.2.15.
lastModifiedTime	OUT	NO	The modified time.
responseType	OUT	YES	Unique response types for this service (see note).
NOTE: Consumed services also provide response types.			

D.2.2.12.4   Service Interactions

The interactions of service capabilities required for this service capability:

1)   Perform the Common Request Services for requests across the Mca Reference Point.

2)   Retrieves the Management Adapter to be used for the device and M2M Service Subscription.

3)   Issues the request to the Management Adapter to update device information for area network.

4)   Records the event.
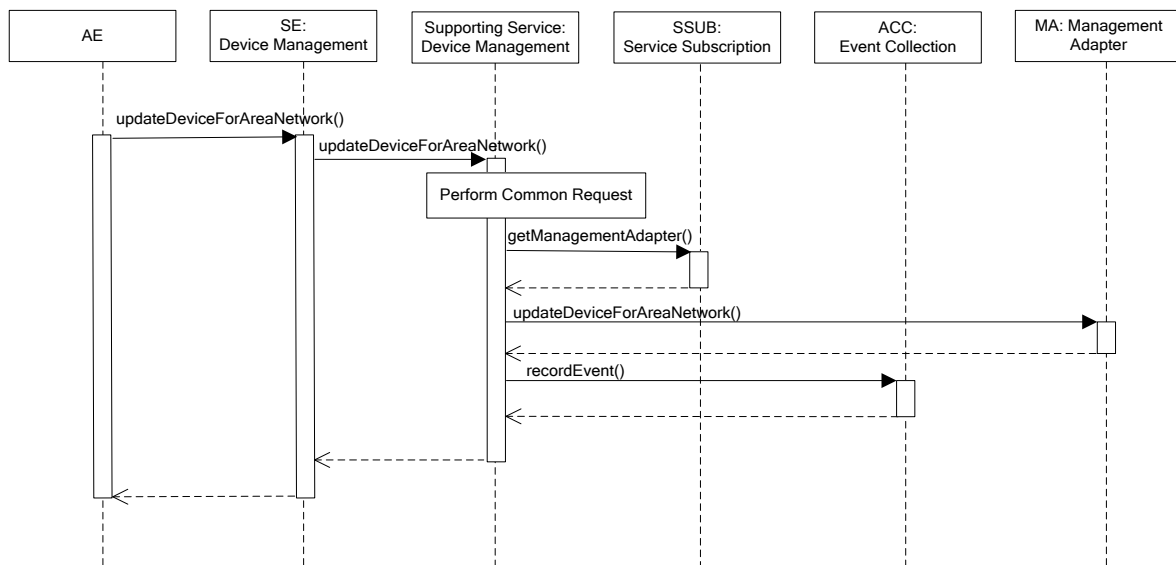
Figure D.2.2.12.4-1: updateDeviceForAreaNetwork Diagram

D.2.2.12.5   Post-Conditions

The Management Adapter has submitted a request to the Management Server to update device information for area network.

The event is recorded.

D.2.2.12.6   Exceptions

No unique exceptions for this service capability.

Consumed services may throw exceptions which are forwarded by this service capability.

D.2.2.12.7   Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 300 ms.

D.2.2.13 rebootDevice

D.2.2.13.1   Description

This service capability provides the ability to execute a rebootDevice request from an AE.

D.2.2.13.2   Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the M2M Service Capability and device exist.

D.2.2.13.3   Signature - rebootDevice

Table D.2.2.13.3-1: Device Management Service - rebootDevice capability

Parameter name	Direction	Optional	Description
Common request input attributes	-	-	See table A.2.2-1.
deviceId	IN	NO	The unique device identifier in the context of the M2M M2M Service Subscription.
reportPolicy	IN	YES	The policy used to report the state of the operation to the originating AE. See clause 6.6.2.2.1.
responseType	OUT	YES	Unique response types for this service (see note).
NOTE: Consumed services also provide response types.			

D.2.2.13.4   Service Interactions

The interactions of service capabilities required for this service capability:

1) Perform the Common Request Services for requests across the Mca Reference Point.

2) Retrieves the Management Adapter to be used for the device and M2M Service Subscription.

3) Issues the request to the Management Adapter to reboot device.

4) Records the event.
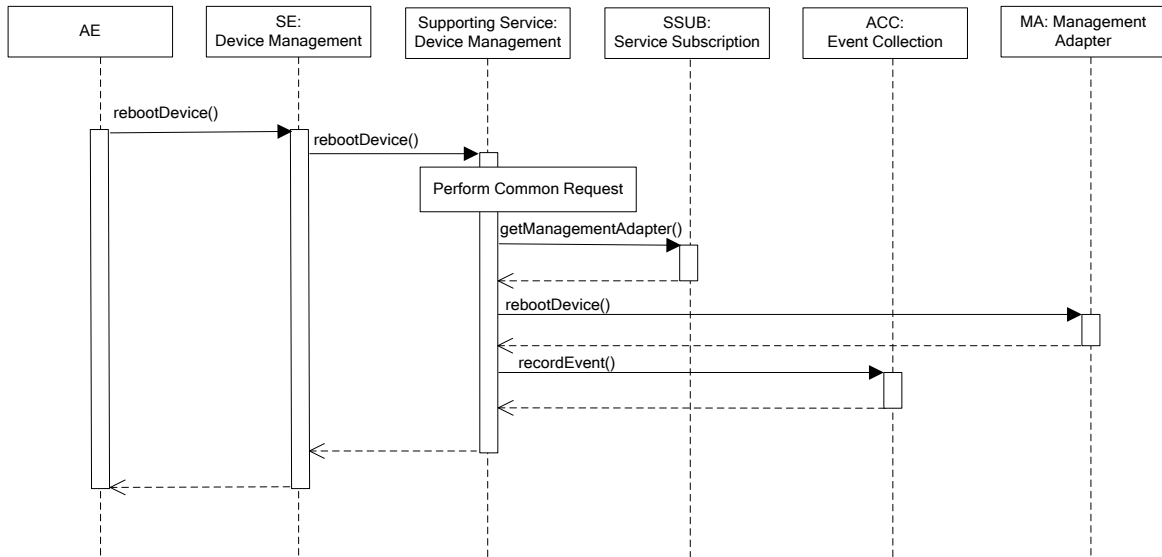
Figure D.2.2.13.4-1: rebootDevice Interaction Diagram

D.2.2.13.5   Post-Conditions

The Management Adapter has submitted a request to the Management Server to reboot device.

The event has been recorded.

D.2.2.13.6   Exceptions

Not Applicable.

D.2.2.13.7   Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 300 ms.

D.2.2.14 resetDevice

D.2.2.14.1   Description

This service capability provides the ability to execute a resetDevice request from an AE.

D.2.2.14.2   Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the M2M Service Capability and device exist.

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D.2.2.14.3　Signature -resetDevice

Table D.2.2.14.3-1: Device Management Service -resetDevice capability

Parameter name	Direction	Optional	Description
Common request input attributes	-	-	See table A.2.2-1.
deviceId	IN	NO	The unique device identifier in the context of the M2M M2M Service Subscription.
reportPolicy	IN	YES	The policy used to report the state of the operation to the originating AE. See clause 6.6.2.2.1.
responseType	OUT	YES	Unique response types for this service (see note).
NOTE:　　Consumed services also provide response types.			

D.2.2.14.4　Service Interactions

The interactions of service capabilities required for this service capability:

1) Perform the Common Request Services for requests across the Mca Reference Point.

2) Retrieves the Management Adapter to be used for the device and M2M Service Subscription.

3) Issues the request to the Management Adapter to reset device.

4) Records the event.
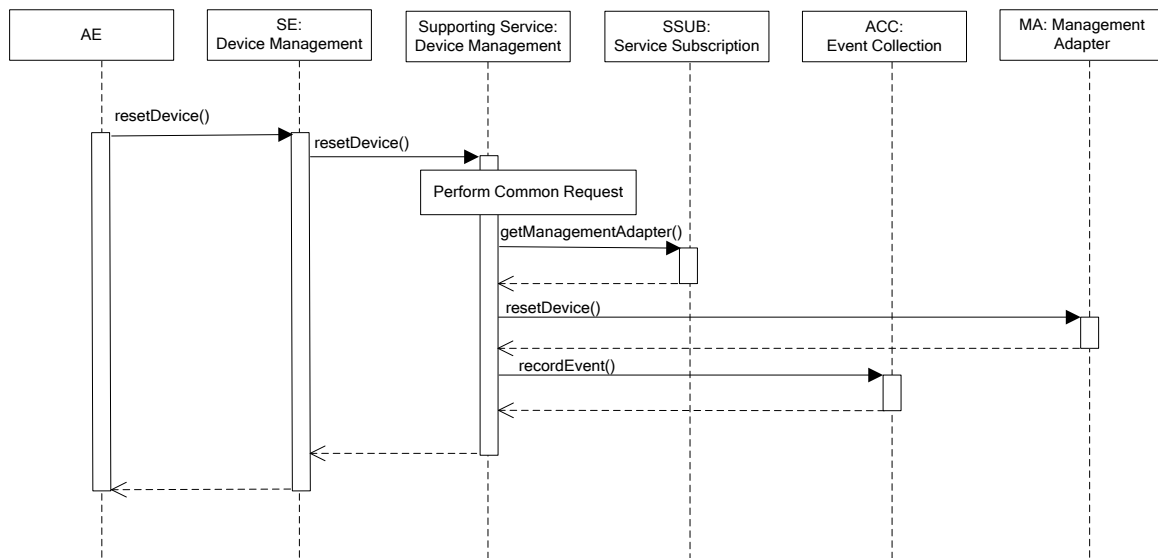
Figure D.2.2.14.4-1: resetDevice Interaction Diagram

D.2.2.14.5　Post-Conditions

The Management Adapter has submitted a request to the Management Server to reset device.

The event has been recorded.

D.2.2.14.6　Exceptions

No unique exceptions for this service capability.

Consumed services may throw exceptions which are forwarded by this service capability.

D.2.2.14.7　Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 300 ms.

D.2.2.15 uploadDeviceLog

D.2.2.15.1   Description

This service capability provides the ability to execute a uploadDeviceLog request from an AE.

D.2.2.15.2   Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the M2M Service Capability and device exist.

D.2.2.15.3   Signature -uploadDeviceLog

Table D.2.2.15.3-1: Device Management Service -uploadDeviceLog capability

Parameter name	Direction	Optional	Description
Common request input attributes	-	-	See table A.2.2-1.
deviceId	IN	NO	The unique device identifier in the context of the M2M M2M Service Subscription.
logInfo	IN	NO	The log information. Type LogInfo, see clause 6.6.2.2.19.
reportPolicy	IN	YES	The policy used to report the state of the operation to the originating AE. See clause 6.6.2.2.1.
logURL	OUT	YES	The URL from which the log can be uploaded.
responseType	OUT	YES	Unique response types for this service (see note).
NOTE: Consumed services also provide response types.			

D.2.2.15.4   Service Interactions

The interactions of service capabilities required for this service capability:

1) Perform the Common Request Services for requests across the Mca Reference Point.

2) Retrieves the Management Adapter to be used for the device and M2M Service Subscription.

3) Issues the request to the Management Adapter to upload device log.

4) Records the event.
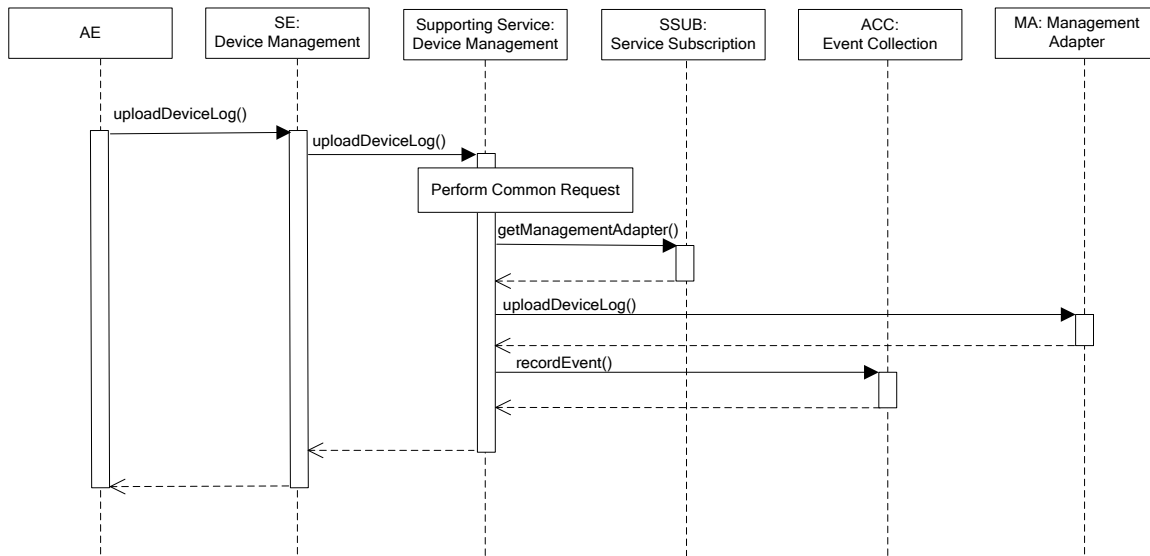
Figure D.2.2.15.4-1: uploadDeviceLog Interaction Diagram

D.2.2.15.5   Post-Conditions

The Management Adapter has submitted a request to the Management Server to upload device log.

The event is recorded.

D.2.2.15.6   Exceptions

No unique exceptions for this service capability.

Consumed services may throw exceptions which are forwarded by this service capability.

D.2.2.15.7   Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 300 ms.

D.2.2.16 getDeviceLogs

D.2.2.16.1   Description

This service capability provides the ability to execute a getDeviceLogs request from an AE.

D.2.2.16.2   Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the M2M Service Capability and device exist.

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D.2.2.16.3 Signature - getDeviceLogs

Table D.2.2.16.3-1: Device Management Service - getDeviceLogs capability

Parameter name	Direction	Optional	Description
Common request input attributes	-	-	See table A.2.2-1.
deviceId	IN	NO	The unique device identifier in the context of the M2M M2M Service Subscription.
logList	OUT	YES	Array of log. Type Log, see clause 6.6.2.2.21.
responseType	OUT	YES	Unique response types for this service (see note).
NOTE: Consumed services also provide response types.			

D.2.2.16.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Perform the Common Request Services for requests across the Mca Reference Point.

2) Retrieves the Management Adapter to be used for the device and M2M Service Subscription.

3) Issues the request to the Management Adapter to get all logs of a device.

4) Records the event.
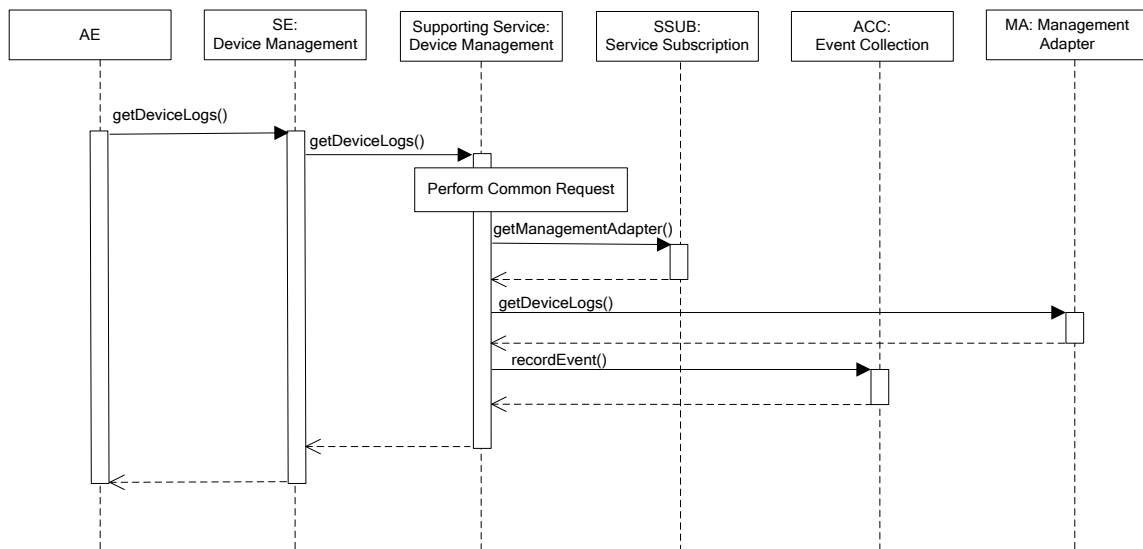
Figure D.2.2.16.4-1: getDeviceLogs Interaction Diagram

D.2.2.16.5 Post-Conditions

The Management Adapter has submitted a request to the Management Server to get all logs of a device.

The event is recorded.

D.2.2.16.6 Exceptions

No unique exceptions for this service capability.

Consumed services may throw exceptions which are forwarded by this service capability.

D.2.2.16.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 300 ms.

D.2.2.17 getDeviceLogInformation

D.2.2.17.1   Description

This service capability provides the ability to execute a getDeviceLogInformation request from an AE.

D.2.2.17.2   Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the M2M Service Capability and device exist.
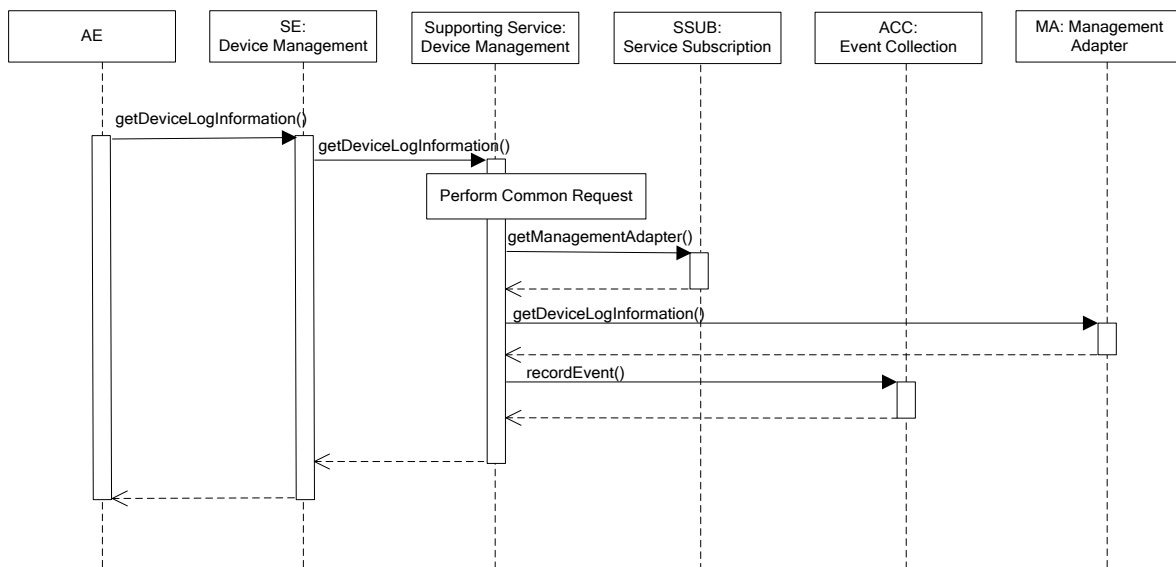
D.2.2.17.3   Signature - getDeviceLogInformation

Table D.2.2.17.3-1: Device Management Service - getDeviceLogInformation capability

Parameter name	Direction	Optional	Description
Common request input attributes	-	-	See table A.2.2-1.
deviceId	IN	NO	The unique device identifier in the context of the M2M M2M Service Subscription.
filterCriteria	IN	YES	See table 6.6.2.2.22.
logURL	IN	YES	The URL from which the log can be accessed.
log	OUT	YES	Type Log, see clause 6.6.2.2.21.
responseType	OUT	YES	Unique response types for this service (see note).
NOTE: Consumed services also provide response types.			

D.2.2.17.4   Service Interactions

The interactions of service capabilities required for this service capability:

1)   Perform the Common Request Services for requests across the Mca Reference Point.

2)   Retrieves the Management Adapter to be used for the device and M2M Service Subscription.

3)   Issues the request to the Management Adapter to get a device log information.

4)   Records the event.

Figure D.2.2.17.4-1: getDeviceLogInformation Interaction Diagram

D.2.2.17.5   Post-Conditions

The Management Adapter has submitted a request to the Management Server to get a device log information.

The event is recorded.

D.2.2.17.6   Exceptions

No unique exceptions for this service capability.

Consumed services may throw exceptions which are forwarded by this service capability.

D.2.2.17.7   Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 300 ms.

D.2.2.18 getSoftwareInformation

D.2.2.18.1   Description

This service capability provides the ability to execute a getSoftwareInformation request from an AE.

D.2.2.18.2   Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the M2M Service Capability and device exist.

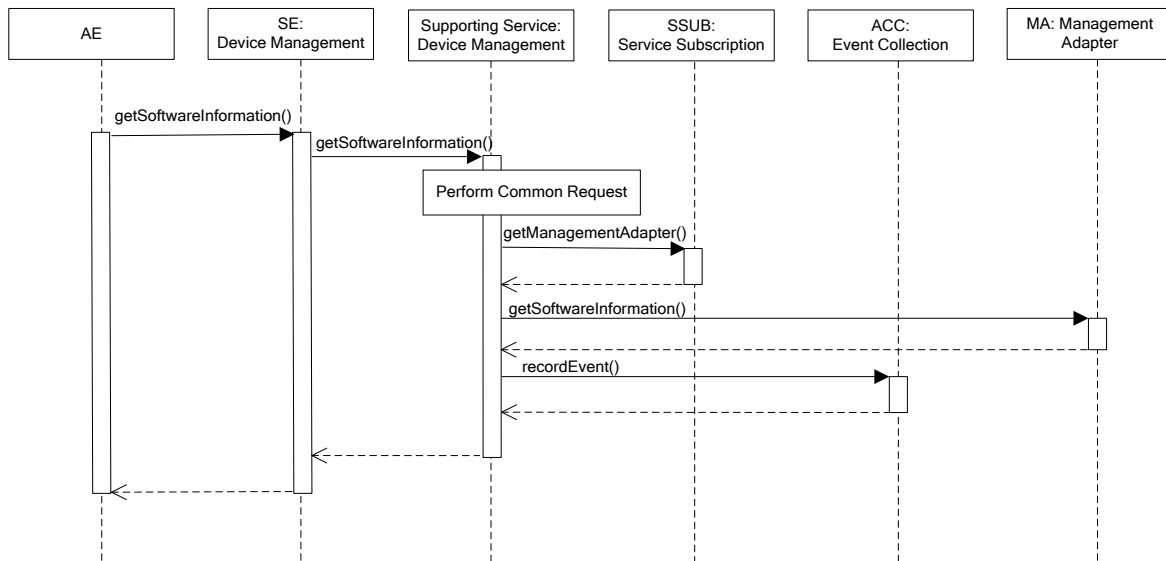### D.2.2.18.3   Signature - getSoftwareInformation

Table D.2.2.18.3-1: Device Management Service - getSoftwareInformation capability

Parameter name	Direction	Optional	Description
Common request input attributes	-	-	See table A.2.2-1.
deviceId	IN	NO	The unique device identifier in the context of the M2M M2M Service Subscription.
version	OUT	YES	The version of the software.
name	OUT	YES	The name of the software.
URL	OUT	YES	The URL from which the software package can be downloaded.
installStatus	OUT	YES	Indicates the status of the install. Enum ActionStatus, see clause 6.6.2.2.26.
activeStatus	OUT	YES	The status of active or deactivate action. Enum ActionStatus, see clause 6.6.2.2.26.
responseType	OUT	YES	Unique response types for this service (see note).
NOTE: Consumed services also provide response types.			

D.2.2.18.4   Service Interactions

The interactions of service capabilities required for this service capability:

1)   Perform the Common Request Services for requests across the Mca Reference Point.

2)   Retrieves the Management Adapter to be used for the device and M2M Service Subscription.

3)   Issues the request to the Management Adapter to get application software information.

4)   Records the event.

Figure D.2.2.18.4-1: getSoftwareInformation Interaction Diagram

D.2.2.18.5   Post-Conditions

The Management Adapter has submitted a request to the Management Server to get application software information.

The event has been recorded.

D.2.2.18.6   Exceptions

Not Applicable.

D.2.2.18.7   Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 300 ms.

D.2.2.19 downloadSoftware

D.2.2.19.1   Description

This service capability provides the ability to execute a downloadSoftware request from an AE.

D.2.2.19.2   Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the M2M Service Capability and device exist.

D.2.2.19.3 Signature - downloadSoftware

Table D.2.2.19.3-1: Device Management Service - downloadSoftware capability

Parameter name	Direction	Optional	Description
Common request input attributes	-	-	See table A.2.2-1.
deviceId	IN	NO	The unique device identifier in the context of the M2M M2M Service Subscription.
version	IN	NO	The version of the software.
name	IN	NO	The name of the software.
URL	IN	NO	The URL from which the software package can be downloaded.
reportPolicy	IN	YES	The policy used to report the state of the operation to the originating AE. See clause 6.6.2.2.1.
responseType	OUT	YES	Unique response types for this service (see note).
NOTE: Consumed services also provide response types.			

D.2.2.19.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Perform the Common Request Services for requests across the Mca Reference Point.

2) Retrieves the Management Adapter to be used for the device and M2M Service Subscription.

3) Issues the request to the Management Adapter to download application software.
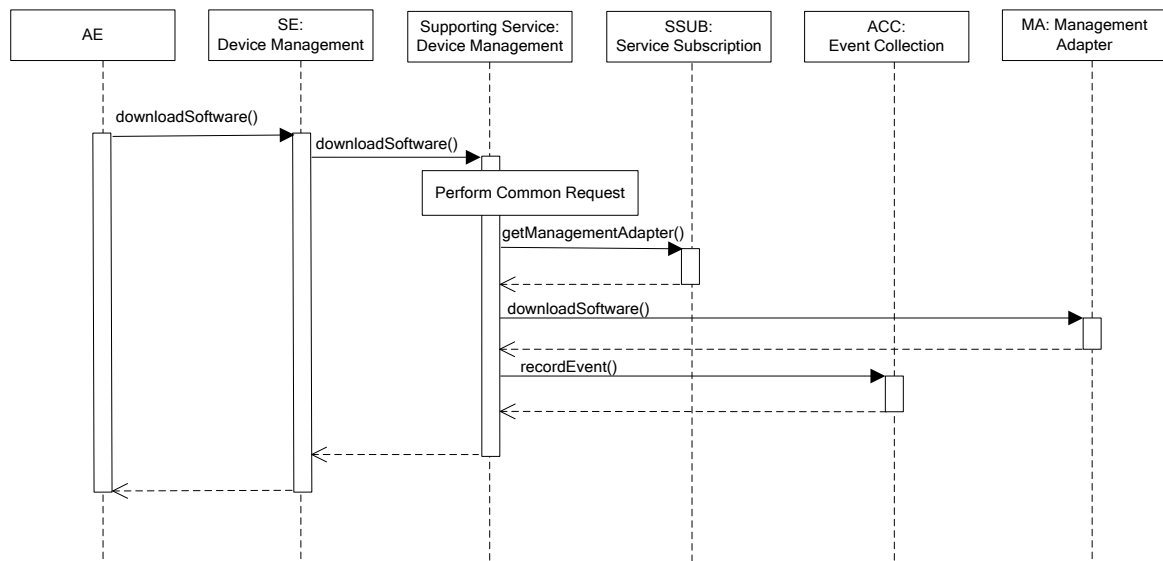
4) Records the event.

Figure D.2.2.19.4-1: downloadSoftware Interaction Diagram

D.2.2.19.5 Post-Conditions

The Management Adapter has submitted a request to the Management Server to download application software.

The event has been recorded.

D.2.2.19.6 Exceptions

No unique exceptions for this service capability.

Consumed services may throw exceptions which are forwarded by this service capability.

D.2.2.19.7   Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 300 ms.

D.2.2.20 installSoftware

D.2.2.20.1   Description

This service capability provides the ability to execute a installSoftware request from an AE.

D.2.2.20.2   Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the M2M Service Capability and device exist.

D.2.2.20.3   Signature -installSoftware

Table D.2.2.20.3-1: Device Management Service -installSoftware capability

Parameter name	Direction	Optional	Description
Common request input attributes	-	-	See table A.2.2-1.
deviceId	IN	NO	The unique device identifier in the context of the M2M M2M Service Subscription.
version	IN	NO	The version of the software.
name	IN	NO	The name of the software.
reportPolicy	IN	YES	The policy used to report the state of the operation to the originating AE. See clause 6.6.2.2.1.
responseType	OUT	YES	Unique response types for this service (see note).
NOTE: Consumed services also provide response types.			

D.2.2.20.4   Service Interactions

The interactions of service capabilities required for this service capability:

1) Perform the Common Request Services for requests across the Mca Reference Point.

2) Retrieves the Management Adapter to be used for the device and M2M Service Subscription.

3) Issues the request to the Management Adapter to install application software.
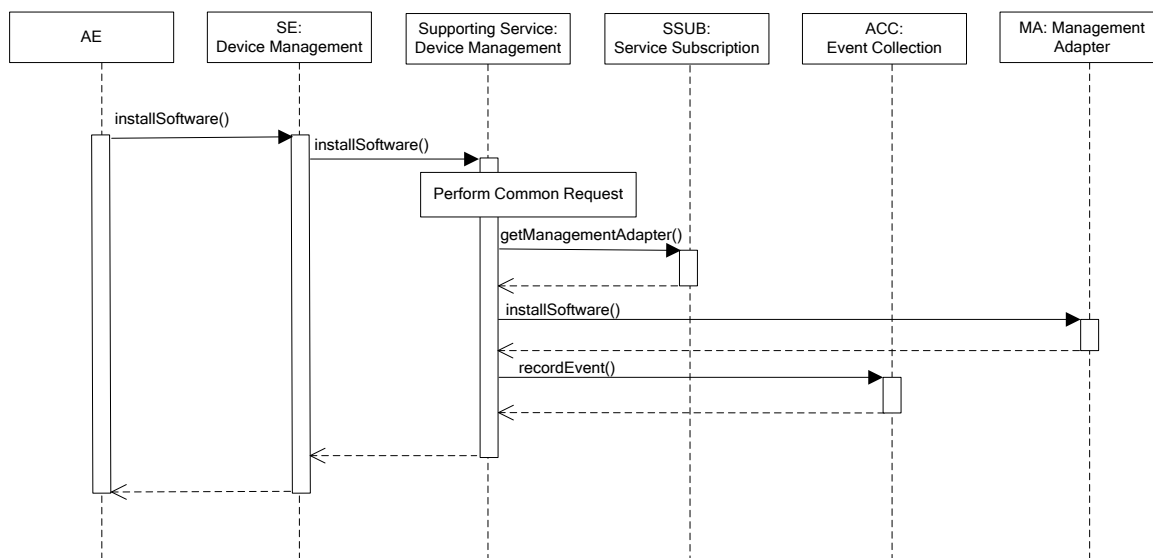
4) Records the event.

Figure D.2.2.20.4-1: installSoftware Interaction Diagram

D.2.2.20.5 Post-Conditions

The Management Adapter has submitted a request to the Management Server to install application software.

The event is recorded.

D.2.2.20.6 Exceptions

No unique exceptions for this service capability.

Consumed services may throw exceptions which are forwarded by this service capability.

D.2.2.20.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 300 ms.

D.2.2.21 activateSoftware

D.2.2.21.1 Description

This service capability provides the ability to execute an activateSoftware request from an AE.

D.2.2.21.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the M2M Service Capability and device exist.

D.2.2.21.3   Signature - activateSoftware

Table D.2.2.21.31: Device Management Service - activateSoftware capability

Parameter name	Direction	Optional	Description
Common request input attributes	-	-	See table A.2.2-1.
deviceId	IN	NO	The unique device identifier in the context of the M2M M2M Service Subscription.
version	IN	NO	The version of the software.
name	IN	NO	The name of the software.
reportPolicy	IN	YES	The policy used to report the state of the operation to the originating AE. See clause 6.6.2.2.1.
responseType	OUT	YES	Unique response types for this service (see note).
NOTE: Consumed services also provide response types.			

D.2.2.21.4   Service Interactions

The interactions of service capabilities required for this service capability:

1) Perform the Common Request Services for requests across the Mca Reference Point.

2) Retrieves the Management Adapter to be used for the device and M2M Service Subscription.

3) Issues the request to the Management Adapter to activate software previously installed.

4) Records the event.
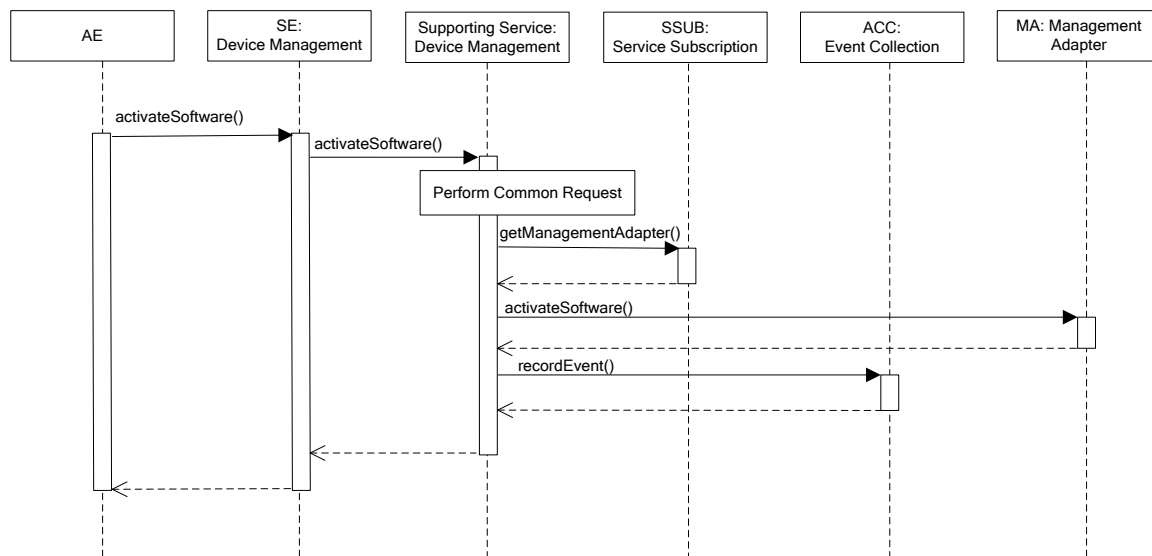
Figure D.2.2.21.4-1: activateSoftware Interaction Diagram

D.2.2.21.5   Post-Conditions

The Management Adapter has submitted a request to the Management Server to activate software previously installed.

Record the event.

D.2.2.21.6   Exceptions

No unique exceptions for this service capability.

Consumed services may throw exceptions which are forwarded by this service capability.

D.2.2.21.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 300 ms.

D.2.2.22 deactivateSoftware

D.2.2.22.1 Description

This service capability provides the ability to execute a deactivateSoftware request from an AE.

D.2.2.22.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the M2M Service Capability and device exist.
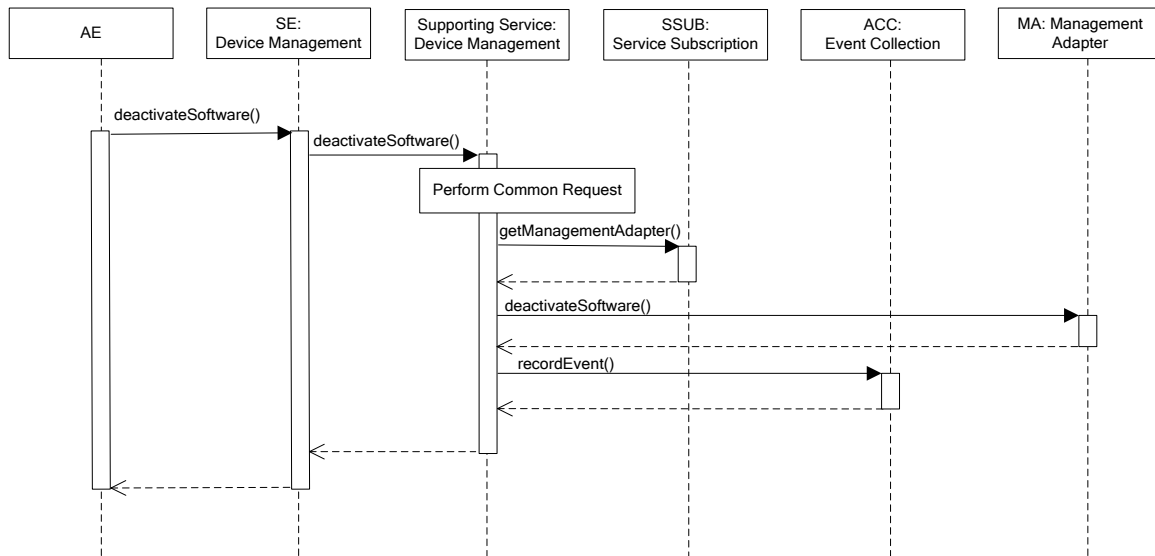
D.2.2.22.3 Signature - deactivateSoftware

Table D.2.2.22.3-1: Device Management Service - deactivateSoftware capability

Parameter name	Direction	Optional	Description
Common request input attributes	-	-	See table A.2.2-1.
deviceId	IN	NO	The unique device identifier in the context of the M2M M2M Service Subscription.
version	IN	NO	The version of the software.
name	IN	NO	The name of the software.
reportPolicy	IN	YES	The policy used to report the state of the operation to the originating AE. See clause 6.6.2.2.1.
responseType	OUT	YES	Unique response types for this service (see note).
NOTE: Consumed services also provide response types.			

D.2.2.22.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Perform the Common Request Services for requests across the Mca Reference Point.

2) Retrieves the Management Adapter to be used for the device and M2M Service Subscription.

3) Issues the request to the Management Adapter to deactivates software.

4) Records the event.

Figure D.2.2.22.4-1: deactivateSoftware Interaction Diagram

D.2.2.22.5   Post-Conditions

The Management Adapter has submitted a request to the Management Server to deactivates software.

The event is recorded.

D.2.2.22.6   Exceptions

No unique exceptions for this service capability.

Consumed services may throw exceptions which are forwarded by this service capability.

D.2.2.22.7   Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 300 ms.

D.2.2.23 removeSoftware

D.2.2.23.1   Description

This service capability provides the ability to execute a removeSoftware request from an AE.

D.2.2.23.2   Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a Management Adapter, the M2M Service Capability and device exist.

D.2.2.23.3   Signature - removeSoftware

Table D.2.2.23.3-1: Device Management Service - removeSoftware capability

Parameter name	Direction	Optional	Description
Common request input attributes	-	-	See table A.2.2-1.
deviceId	IN	NO	The unique device identifier in the context of the M2M M2M Service Subscription.
version	IN	NO	The version of the software.
name	IN	NO	The name of the software.
reportPolicy	IN	YES	The policy used to report the state of the operation to the originating AE. See clause 6.6.2.2.1.
responseType	OUT	YES	Unique response types for this service (see note).
NOTE: Consumed services also provide response types.			

D.2.2.23.4   Service Interactions

The interactions of service capabilities required for this service capability:

1)   Perform the Common Request Services for requests across the Mca Reference Point.

2)   Retrieves the Management Adapter to be used for the device and M2M Service Subscription.

3)   Issues the request to the Management Adapter to uninstall the software.

4)   Records the event.
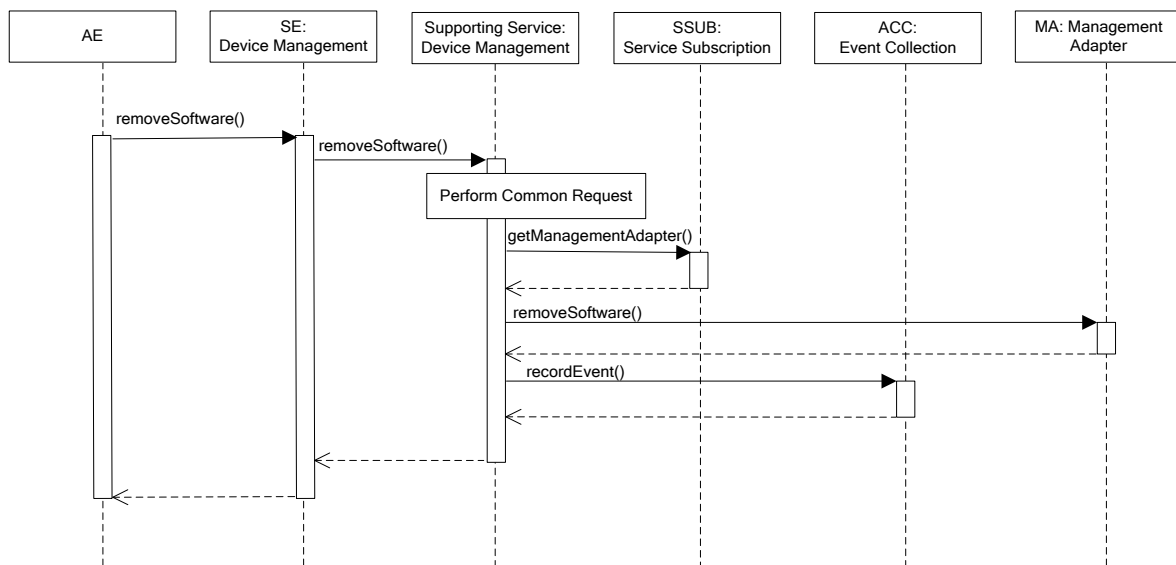
Figure D.2.2.23.4-1 removeSoftware Interaction Diagram

D.2.2.23.5   Post-Conditions

The Management Adapter has submitted a set of requests to the Management Server to uninstall the software.

The event is recorded.

D.2.2.23.6   Exceptions

No unique exceptions for this service capability.

Consumed services may throw exceptions which are forwarded by this service capability.

D.2.2.23.7 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 300 ms.

Annex E (informative): Device On-boarding Service

E.1 Overview

This annex illustrates the usage of services to onboard a device or AE when the M2M Node or AE contacts the M2M System.

The Device On-boarding supporting service is a process by which a M2M Node is provided the artifacts (e.g. configuration information, software and firmware) needed to successfully register an AE with the M2M Service Layer and invoke or receive the authorized service capabilities.

E.2 Supporting Services

E.2.1 Remote Administration

E.2.1.1 Overview

This service provides remote administration of the device and/or AE when an AE registers or registers with the M2M System. The mechanism is implemented using the first contact subscription and notification services provided/used by the Registration Service.

E.2.1.2 Service Capabilities

E.2.1.1.1 notifyRegistrationContact

E.2.1.1.1.1 Description

This service capability provides the capability to invoke a process to update the M2M Service Layer artifacts (e.g. credentials, device firmware, and application software).

E.2.1.1.1.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

A correlation between a M2M Service Subscription and the contacting entity (M2M Node, AE) exist.

The Supporting Service subscribed to receive registration events using the subscribeInitialAERegistrationEvent service capability.

E.2.1.1.1.3 Signature - notifyRegistrationContact

**Table E.2.1.1.1.3-1: Device On-boarding Service - notifyRegistrationContact capability**

Parameter name	Direction	Optional	Description
Mca Common request input parameters	-	-	See table A.2.2-1.
aeId	IN	NO	The AE-ID of the registered AE.
event	IN	NO	The event that caused the registration contact. Enumeration of: • FirstContact.

E.2.1.1.1.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Perform the Common Request Services for requests across the Mca Reference Point.

2) Determine the Application information (Device, Subscription, and Application Id) for the registering AE.

3) Determine from the Device information if the device need be updated.

4) Determine from the Application information if Applications need updated on the Device.

5) Record the event for accounting purposes.
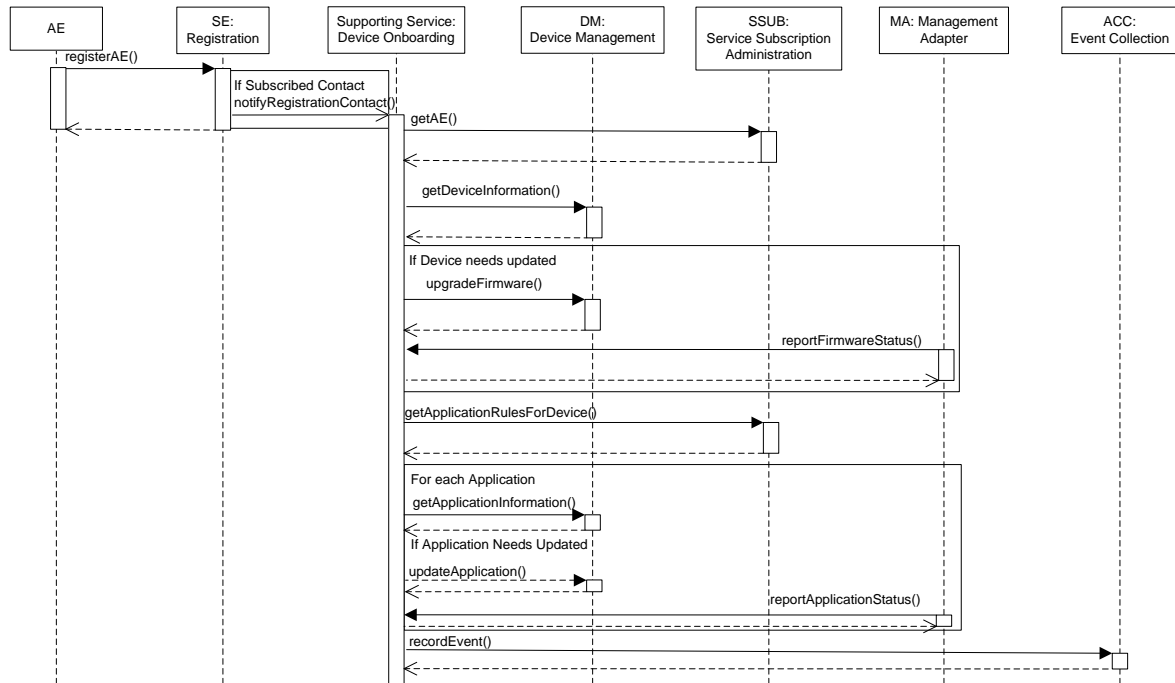
Figure E.2.1.1.1.4-1: notifyRegistrationContact Diagram

E.2.1.1.1.5   Post-Conditions

Success case: The request is permitted and the associated.

Failure case: The request is recorded as a failure.

E.2.1.1.1.6   Exceptions

No unique exceptions for this service capability.

Consumed services may throw exceptions which are recorded by this service capability.

E.2.1.1.1.7   Policies for Use

Message Exchange Patterns: In-Only.

Transaction Pattern: Creates Transaction.

Maximum Response: Not applicable for the In-Only message exchange pattern.

Annex F (informative):
Registration Services

F.1 Overview

This annex illustrates the usage of the services for requests to register AEs across the Mca Reference Point and between M2M Service Components across the Msc Reference Point.

F.2 Mca Registration Service Processing and Supporting Services

F.2.1 Overview

AEs communicate with the M2M System over the Mca Reference Point through the SE component. The SE component accepts the request from the AE and provides the request to the Supporting Service in order allow the M2M Service Provider to ensure the request is properly authorized and recorded. In addition, the M2M Service Provider is able to orchestrate other capabilities that have not been specified.

F.2.2 Service Capabilities

F.2.2.1 registerAE

F.2.2.1.1 Description

This service capability enables an AE to register with the M2M System. This service capability shall be restricted across the Mca Reference Point.

F.2.2.1.2 Pre-Conditions

The AE has not registered with the M2M System.

The Pre-Conditions for Mca Received Requests are met.

F.2.2.1.3 Signature - registerAE

Table F.2.2.1.3-1: Registration Services - registerAE capability

Parameter name	Direction	Optional	Description
Mca Common request input parameters	-	-	See table A.2.2-1.
aeId	IN	NO	The Application Entity Identifier (AE-ID) to be refreshed.
pointOfAccess	IN	YES	The point of Access of the registered AE. POA is optional only if identical to the one in the refreshed registration
expirationTime	IN	NO	The expiration time of the registration as requested by the Originator.
reachabilitySchedule	IN	YES	The contact reachability schedule information of the AE associated with the device node. The absence of this parameter implies the AE associated with the device node is always contact reachable. Type Schedule, see clause 6.9.2.7.1.
responseType	OUT	NO	Unique response types for this service: • AE successfully refreshed • Registration does not exist

F.2.2.1.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Perform the Common Request Services for requests across the Mca Reference Point.

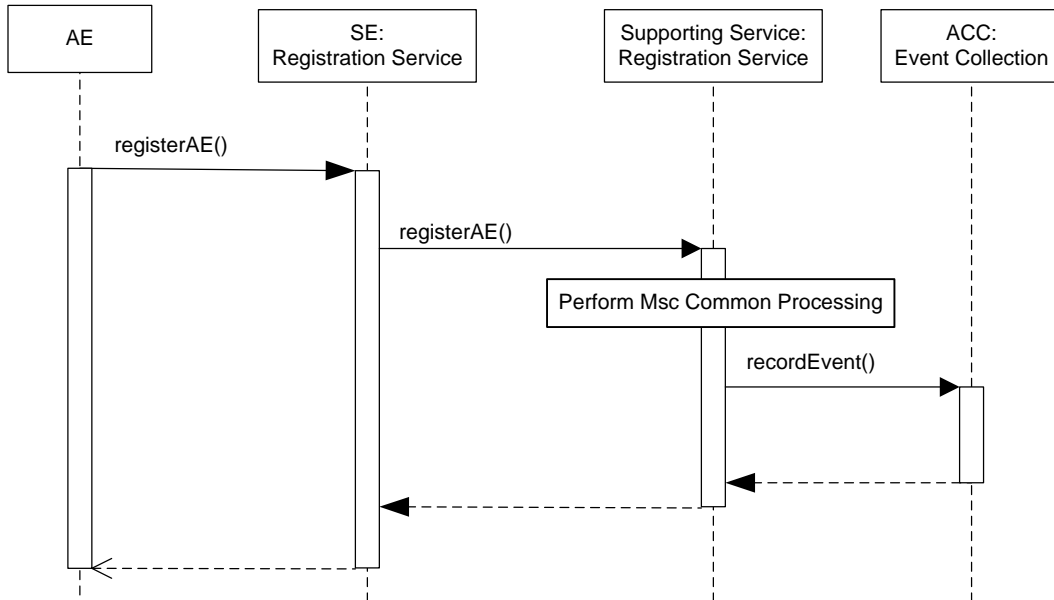2) Record the event.

Figure F.2.2.1.4-1: Registration Services - registerAE Diagram

F.2.2.1.4 Post-Conditions

Event is recorded.

F.2.2.1.5 Exceptions

No unique exceptions for this service capability.

Consumed services may throw exceptions which are forwarded by this service capability.

F.2.2.1.6 Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 250 ms.

F.2.2.2 refreshAERegistration

F.2.2.2.1 Description

This service capability enables an AE to refresh an existing registration with the M2M System

F.2.2.2.2 Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

The AE is registered and allocated an aeId by the M2M System.

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This is a draft oneM2M document and should not be relied upon; the final version, if any, will be made available by oneM2M Partners Type 1.

F.2.2.2.3 Signature - refreshAERegsitration
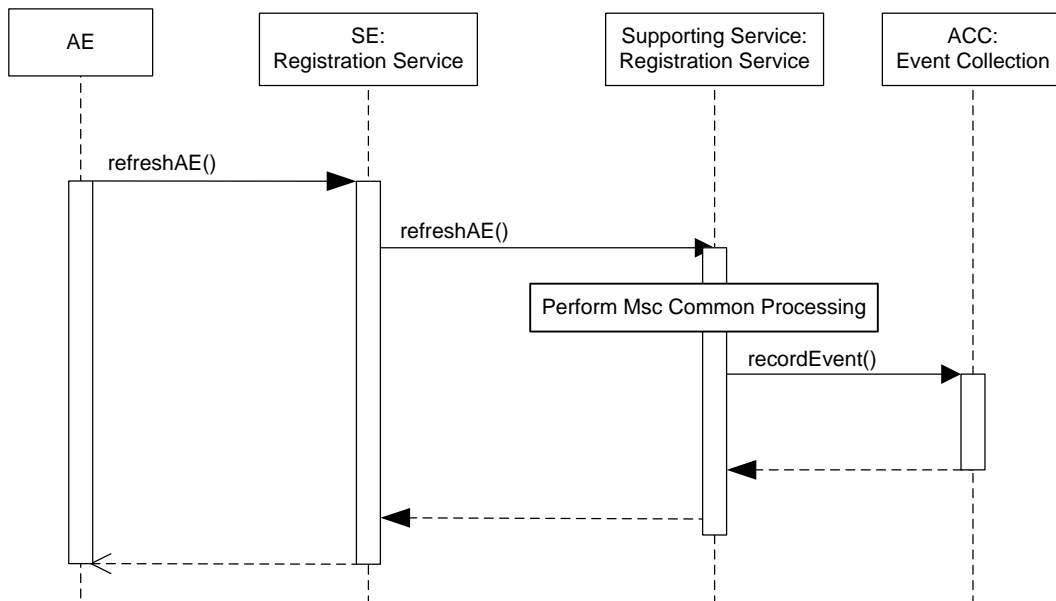
Table F.2.2.2.3-1: Registration Services - refreshAERegistration capability

Parameter name	Direction	Optional	Description
Mca Common request input parameters	-	-	See table A.2.2-1.
aeId	IN	NO	The Application Entity Identifier (AE-ID) to be refreshed.
pointOfAccess	IN	YES	The point of Access of the registered AE. POA is optional only if identical to the one in the refreshed registration.
expirationTime	IN	NO	The expiration time of the registration as requested by the Originator.
reachabilitySchedule	IN	YES	The contact reachability schedule information of the AE associated with the device node. The absence of this parameter implies the AE associated with the device node is always contact reachable. Type Schedule, see clause 6.9.2.7.1.
responseType	OUT	NO	Unique response types for this service: • AE successfully refreshed. • Registration does not exist.

F.2.2.2.4 Service Interactions

The interactions of service capabilities required for this service capability:

1) Perform the Common Request Services for requests across the Msc Reference Point.

2) Record the event.

Figure F.2.2.2.4-1: Registration Services - refreshAERegistration Diagram

F.2.2.2.5   Post-Conditions

Success case: The request is permitted.

Failure case: The request is not permitted and a response type is transmitted to the AE.

F.2.2.2.6   Exceptions

No unique exceptions for this service capability.

Consumed services may throw exceptions which are forwarded by this service capability.

F.2.2.2.7   Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 50 ms.

F.2.2.3   deregisterAE

F.2.2.3.1   Description

This service capability enables an AE to deregister from the M2M System.

F.2.2.3.2   Pre-Conditions

The Pre-Conditions for Mca Received Requests are met.

The Application Entity is registered.

### F.2.2.3.3   Signature - deregisterAE

Table F.2.2.3.3-1: RegistrationServcies - deregisterAE capability

Parameter name	Direction	Optional	Description
Mca Common request input parameters	-	-	See table A.2.2-1.
aeId	IN	NO	The Application Entity Identifier (AE-ID) to be deregistered.
responseType	OUT	NO	Unique response types for this service: • AE successfully De-registered. • Registration does not exist.

F.2.2.3.4   Service Interactions

The interactions of service capabilities required for this service capability:

1)   Perform the Common Request Services for requests across the Msc Reference Point.

2)   Record the event.
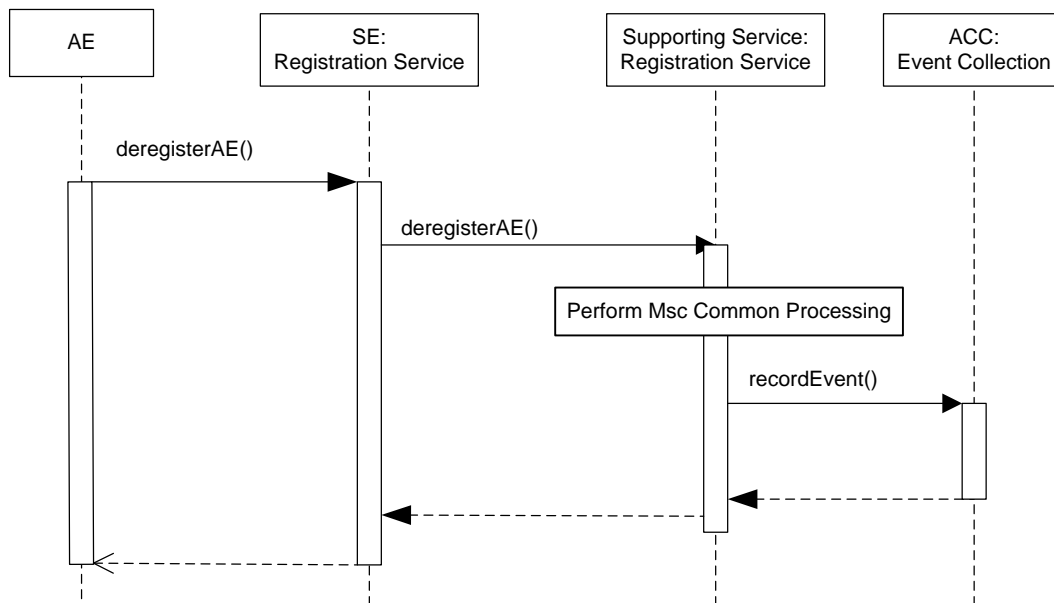
Figure F.2.2.3.4-1: Registration Services - deregisterAE Diagram

F.2.2.3.5   Post-Conditions

Success case: The request is permitted.

Failure case: The request is not permitted and a response type is transmitted back to the AE.

F.2.2.3.6   Exceptions

No unique exceptions for this service capability.

Consumed services may throw exceptions which are forwarded by this service capability.

F.2.2.3.7   Policies for Use

Message Exchange Patterns: In-Out.

Transaction Pattern: Participation allowed.

Maximum Response: 300 ms.

Annex G (informative): M2M Service Capability Template

G.1 Introduction

The M2M Service Capability template is used as a specification that defines the contract between the consumer of the service capability and the producer of the service capability. The specification contract includes documenting the provided Signature, constraints (Pre-Conditions, post-conditions, exceptions), policies and runtime expectations.

G.2 <serviceCapabilityName>

G.2.1 Description

<Document introductory description of the service capability>

The <serviceCapabilityName> reflects the operational functionality provided by the M2M Service Capability. M2M Service Capabilities are named using a construct [verb][noun][context] where the:

- **verb:** Used to indicate what will happen to the noun.

- **noun:** Is the target of the noun.

- **context:** Is optional and further defines the service capability

G.2.2 Pre-Conditions

<Document the Pre-Conditions that may only be valid to run provided some testable prior business rule check or other value to be changed is actually present and available for the service capability to act upon. Pre-Conditions are documented that are in addition to that provided by the internal resource operations and procedures.>

G.2.3 Signature

Table G.2.3-1: M2M Service Capability Signature

Parameter name	Direction	Optional	Description
Name of the parameter.	IN, OUT, IN-OUT	YES, NO	Description of the parameter in the context of the service capability.

Direction: The direction is relative to the entity that provides (implements) the M2M Service Capability. The value "IN" means that the entity expects to receive a value for the parameter from the consumer (sender) of the M2M Service Capability request. The value "Out" means that the entity will send a value for the parameter to the consumer (sender) of the M2M Service Capability request. A value of "IN-OUT" means that the entity will receive the value for the parameter from the consumer and then send a value (not necessarily the same value) for the parameter back to the consumer.

Optional: Indicates if the parameter is required in requests (Direction: IN, IN-OUT) or responses (Direction: IN-OUT, OUT). A value of YES means that the parameter is optional. A value of NO means that the parameter is mandatory.

G.2.4 Service Interactions

<Document the detail procedure for <serviceCapabilityName>. The detail procedure for the service capability is written as an Diagram in a time order and step-by-step. The Originator and what the Originator carries out (a task, function, accessing to resources or other services) are defined in each step.

G.2.5 Post-Conditions

<Document the post-conditions of the <serviceCapabilityName>. If the service capability has no defined output that can be validated except a notification of success (or failure) to set a value in the target of the service capability, a testable

post condition of the service capability is documented. Post-conditions are documented that are in addition to that provided by the internal resource operations and procedures.>

G.2.6 Exceptions

<Document the exception or error conditions that may be returned by the <serviceCapabilityName>. Exceptions are documented that are in addition to that provided by the internal resource operations and procedures.>

G.2.7 Policies for Use

Message Exchange Patterns : See clause 5.2.3.1.

Transaction Pattern:

- Creates Transaction: This service capability starts and completes a transaction.

- Participation allowed: This service capability is able to participate in a transaction without violating the ongoing transaction's properties (i.e. Atomicity, Consistency, Isolation, Durability).

- Participation not allowed: This service capability is unable to participate in a transaction.

- Maximum Response: The maximum time in milliseconds permitted to complete this service capability.

G.2.8 oneM2M Resource Interworking

<Document the related oneM2M Resources operations to <serviceCapabilityName> here. Interworking rules are defined for each Resource operation. If there is no related internal resource, this resource list can be empty (e.g. the service capability is 'sendTrigger').>

Annex H (informative):
oneM2M Service Requirements

The primary motivation of the present documentis to integrate oneM2M Service capabilities with existing M2M deployments without affecting that existing M2M solution's underlying deployment framework and protocols. For example if an existing M2M solution uses a XMPP based framework to communicate between applications in the network and devices, then M2M Service capabilities are efficiently exposed to the XMPP based framework without requiring modifications to the existing M2M solution's deployment framework or protocol. A secondary motivation for the present documentis to offer M2M Service capabilities to M2M service providers who utilize service oriented architectural frameworks.

This annex defines requirements that have not been captured in the oneM2M Requirements [1].

Table H-1

Requirement ID	Description
SCA-001	The M2M System shall be capable of integrating oneM2M service capabilities with existing M2M deployments without affecting the existing M2M solution's underlying deployment framework and protocols.
SCA-002	The M2M System shall be capable of offering oneM2M service capabilities to SOA architectural frameworks.

History

Publication history		
V2.0.0	30-Aug-2016	Release 2 - Publication