General Service Subscription Management Architecture

Candidate Version 1.0 – 25 Jun 2009

Open Mobile Alliance

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1. Scope (Informative)

The General Service Subscription Management (GSSM) enabler provides subscription management, subscription profile access and subscription validation, which can be used by other resources (e.g. OMA service enablers).

This document provides the architecture for the GSSM enabler. The role of the GSSM enabler is to specify how authorized principals are accessing and/or managing the service subscription (e.g. subscribing to a service, unsubscribing from a service, change of subscription (parameters), subscription suspension/resumption/renewal) and accessing subscription profile, and to specify how subscription validation requests are defined and processed.

The scope of the GSSM architecture document is to define the architecture for the GSSM enabler based on the requirements as described in the GSSM Requirements Document [GSSM-RD]. The scope of this Architecture Document does not include the interface between GSSM enabler and other enabler/resources (such as BSS/OSS).

GSSM interfaces can be re-used to also expose additional subscription related information (e.g. about the subscriber).

2. References

2.1 Normative References

[GSSM-RD]	"OMA General Service Subscription Management Requirements", Open Mobile Alliance™, OMA-RD-GSSM-V1_0, URL:http://www.openmobilealliance.org/
[OMA-DICT]	"Dictionary for OMA Specifications", Version 2.7, Open Mobile Alliance™, OMA-ORG-Dictionary-V2_7, URL:http://www.openmobilealliance.org/
[PEEM-AD]	"Policy Evaluation, Enforcement and Management Architecture", Open Mobile Alliance, OMA-AD_Policy_Evaluation_Enforcement_Management-V1_0, URL:http://www.openmobilealliance.org/
[RFC2119]	"Key words for use in RFCs to Indicate Requirement Levels", S. Bradner, March 1997, URL:http://www.ietf.org/rfc/rfc2119.txt

2.2 Informative References

[OMA SEC_CF]	" Security Common Functions", Version 1.0, Open Mobile Alliance™, OMA-ERP-SEC_CF-V1_0-A, URL:http://www.openmobilealliance.org/

3. Terminology and Conventions

3.1 Conventions

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [**Error! Reference source not found.**].

All sections and appendixes, except "Scope" and "Introduction", are normative, unless they are explicitly indicated to be informative.

3.2 Definitions

Principal	See [OMA-DICT]
Resource	See [OMA-DICT]
Service	See [OMA-DICT]
Service Provider	See [OMA-DICT]
Subscriber	See [OMA-DICT]
Subscription	See [OMA-DICT]
Subscription Data Owner	Any system, entity or process that owns the subscription data associated to a subscriber and may be responsible for business or operational processes resulting from changes or request for change of the data. BSS (Business Support Systems) is an example of subscription data owner for subscriber subscription data,
Subscription Profile	The set of information required for describing a service subscription, e.g. the subscriber identity, subscribed service, service preferences and/or service usage constraints.
Subscription Validation	Subscription validation is the process of checking for the existence of a subscription and evaluating that the service delivery request is within the limits defined by the Subscription Profile prior to service delivery.
User	See [OMA-DICT]
Validation Criteria	Set of policies the Subscription Validation is based on

3.3 Abbreviations

AD	Architecture Document
BSS	Business Support System
GSSM	General Service Subscription Management
ID	Identifier
IPSec	Internet Protocol Security
OMA	Open Mobile Alliance
OSS	Operation Support System
TLS	Transport Layer Security

4. Introduction (Informative)

The GSSM enabler allows an authorized principal to setup, terminate, change, query subscriptions by actions such as subscribing and unsubscribing to services, registering authorized user(s) for using the service, and setting subscription preferences and/or service usage constraints for associated users(s). The main objective of this enabler is to specify a set of common functions for all of the service subscriptions within the service provider's domain and thus avoids the unnecessary complexity of a silo approach to subscription management.

The purpose of this document is to define the functional components and interfaces for GSSM Architecture.

GSSM interfaces can be re-used to also access expose additional subscription related information (e.g. about the subscriber).

4.1 Version 1.0

This architecture document covers all requirements of GSSM 1.0 [GSSM-RD]. The document aims to cover the following areas:

- Service subscription handling

- Service subscription validation

- Service subscription notification and confirmation

5. Architectural Model

GSSM Architecture specifies four interfaces. With respect to the interactions between GSSM and other requestors/resources, GSSM provides subscription management and subscription validation function. GSSM architecture diagram, GSSM components, interfaces will be described in the following sections.

5.1   Dependencies

For Service Subscription Validation, the GSSM Enabler depends on PEEM [PEEM-AD] for its callable interface (a.k.a. PEM-1) and management interface (a.k.a. PEM-2), both of which are specified by PEEM [PEEM-AD]. The GSSM Enabler specifications will define how to apply the PEM-1 and PEM-2 interfaces to achieve subscription validation.

5.2   Architectural Diagram
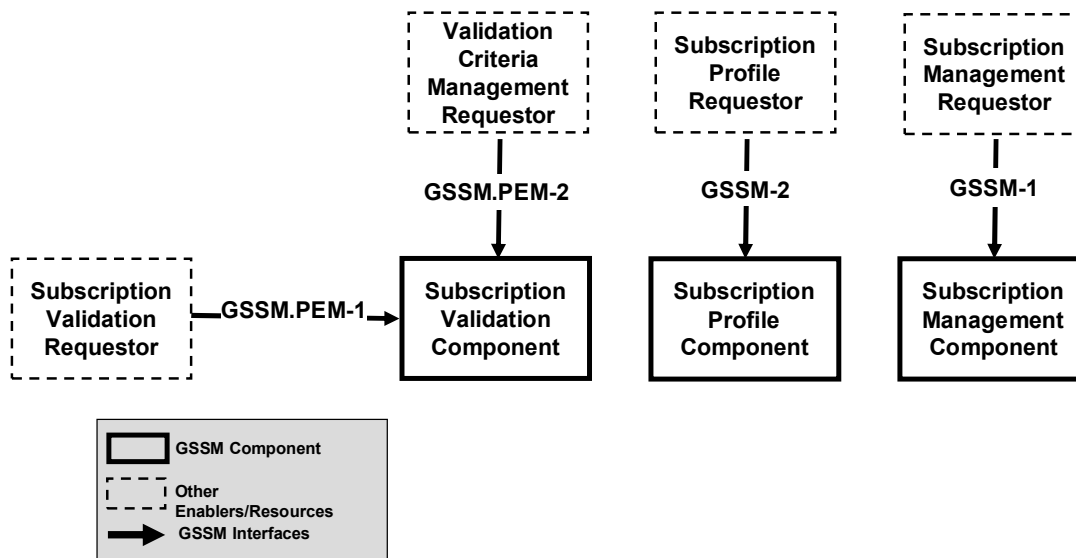
Figure 1 GSSM Enabler Architecture

Error! Reference source not found. illustrates the GSSM architecture. The GSSM functional components include:

•   Subscription Validation Component: Provides subscription validation function (to check if the service subscription is valid) to the Subscription Validation Requestor via GSSM.PEM-1; Provides validation criteria management function to the Validation Criteria Management Requestor via GSSM.PEM-2;

•   Subscription Profile Component: Provides data access functions (i.e. only read) for subscription profile data via GSSM-2 to Subscription Profile Requestor; an example of Subscription Profile Requestor is the Subscription Validation Component;

•   Subscription Management Component: Performs subscription management operations (e.g. subscribing to a service, unsubscribing from a service, change an existing subscription) received via GSSM-1 interface.

GSSM interfaces include:

- GSSM-1 (Subscription Management Interface): Interface that provides subscription management functions (e.g. subscribing to a service, un-subscribing a service, changing an existing subscription, etc.) to the Subscription Management Requestor;

- GSSM.PEM-1 (Subscription Validation Interface): Interface that provides the subscription validation function for the Subscription Validation Requestor;

- GSSM.PEM-2(Subscription Validation Criteria Management Interface): Interface that provides the Validation Criteria management for the Validation Criteria Management Requestor;

- GSSM-2: Interface for Subscription Profile data access, (i.e. read).

5.3   Functional Components and Interfaces

5.3.1   GSSM-1 Interface

GSSM-1 is subscription management interface that provides subscription management functions to the Subscription Management Requestor. Using GSSM-1, the Subscription Management Requestor sends a subscription management request to the Subscription Management Component. The response is returned through GSSM-1 from the Subscription Management Component to the Subscription Management Requestor.

The GSSM-1 interface allows manipulation of subscription data (e.g. subscription status) in ways that are data-type independent. This characteristic of the interface allows it to be re-used to expose additional related information (e.g. about the subscriber). Specific bindings may be supported by the interfaces. Data type specific manipulations are achieved by separately agreeing on the schema of the manipulated data. GSSM release 1.0 does not specify data schemas. Subsequent releases of GSSM or other OMA enabler may specify such schemas.

- The subscription management request message (e.g. Subscribing to a service, unsubscribing from a service, change of subscription (parameters), subscription suspension/resumption/renewal.) may include:

  o   Identity of the Subscription Management Requestor.

  o   Identity of the subscriber

  o   Identity of user(s) of the service subscription

  o   Identifier/descriptor of the service

  o   Subscription specific parameters, e.g. service delivery time, preferred service delivery method(s).

  o   Subscription activation time

  o   Subscription expiry time/subscription duration

- The subscription management response message may include:

  o   Result indicating if the request was successfully processed or error code if the request failed.

5.3.2   GSSM.PEM-1 Interface

The GSSM subscription validation interface is derived from PEM-1 [PEEM-AD]. It is used to perform subscription validation in the callable usage pattern. Using GSSM.PEM-1 interface, the Subscription Validation Requestor sends a subscription validation request to Subscription Validation Component corresponding to a specific service (delivery) request, and receives validation responses from the Subscription Validation Component which indicates whether the corresponding service (delivery) request is valid.

- The subscription validation request message may include

    o   Identity of the Subscription Validation Requestor

    o   Identity of the principal requesting the service.

    o   The service requested

    o   Subscription specific parameters, e.g. which channel user wants to watch, user preferred service delivery method(s).

•   Output parameters in the subscription validation response may include:

    o   Result indicating if the subscription to the service allows service to be delivered to the principal that requested it or an error code if the service subscription does not allow the service to be delivered to the principal. This error code must describe why the service delivery is not granted.

If needed, GSSM specific input and/or output parameter may be added to extend the PEM-1 interface.

5.3.3   GSSM.PEM-2 Interface

This interface allows Validation Criteria Management Requestor to manage Validation Criteria, i.e. create, read, delete and modify Validation Criteria. The Validation Criteria Management Requestor will be able to create validation criteria based on any combination of conditions and actions. The interface is derived from PEM-2 [PEEM-AD].

5.3.4   GSSM-2 Interface

The GSSM-2 interface allows manipulation of subscription data (e.g. subscription status) in ways that are data-type independent. This characteristic of the interface allows it to be re-used to expose additional related information (e.g. about the subscriber). Specific bindings may be supported by the interfaces. Data type specific manipulations are achieved by separately agreeing on the schema of the manipulated data. GSSM release 1.0 does not specify data schemas. Subsequent releases of GSSM or other OMA enabler may specify such schemas.

GSSM-2 is the data access interface for subscription profile based on a template/schema. Using the GSSM-2 interface, the Subscription Profile Requestor sends a request with the profile data template/schema or the pre-defined template/schema ID to the Subscription Profile Component for acquiring the corresponding subscription profile relating to the principal in the input request and receives the required subscription profile data from the Subscription Profile Component.

•   The subscription acquiring request message may include:
    o   The profile data template/schema or the pre-defined template/schema ID that may be used to optionally replace an active aggregation data schema

    o   The identity of the principal

    o   The service requested

•   Output parameters in the subscription acquiring response may include:
    o   The identity of subscriber

    o   The identity of the user(s) of the service

    o   The identifier/descriptor of the service

    o   The subscription profile [that may include, for example]:

            ▪   Subscription specific parameters, e.g. service delivery time, preferred service delivery method(s).

            ▪   Subscription activation time

            ▪   Subscription expiry time/subscription duration

            ▪   Subscription status, i.e. suspending, available

5.3.5   Subscription Validation Component

The Subscription Validation Component provides the subscription validation function to the Subscription Validation Requestor. The Subscription Validation Component has the following features:

- Processes the subscription validation function by:
  - o acquiring related data (e.g. queries and retrieves from related resources the necessary information to validate a subscription)

  - o validating the subscription based on validation criteria

- The Subscription Validation Component returns the result of its subscription validation processing to the Subscription Validation Requester indicating whether the subscription is valid. An error code is returned in case the request failed).

5.3.6   Subscription Profile Component

The Subscription Profile Component provides the Subscription Profile access function to the Subscription Profile Requestor. The Subscription Profile Component has the following features:

- Performs the subscription profile access function by aggregating (viewing, mapping and retrieving) the subscription profile data from one or multiple subscription data owner, e.g. through I2 interface(s), as defined a schema which is pre-defined or passed with the request

- The Subscription Profile Component returns the result of its subscription profile processing to the Subscription Profile Requestor.

5.3.7   Subscription Management Component

Subscription Management Component provides subscription management function to Subscription Management Requestor. Subscription Management Component has the following features:

- Performing the subscription management function (e.g. by delegating subscription data operation and the resulting process to the subscription data owner),

- (optionally) confirming the subscription change with the service provider or authorised principal before completing the operation,

- (optionally) notifying the principal and related resources with the subscription change(new subscription, modification, unsubscription)

- Returning the result of its Subscription Management processing to the Subscription Management Requestor indicating whether the subscription is successful, being processed or failed.

5.4   Security Considerations

The GSSM enabler needs to ensure that only authorized principals can perform subscription management and subscription validation activities. Interaction with the GSSM Enabler implementation may be within the same domain or across domain boundaries. For both cases appropriate security measures should be considered, such as security mechanisms defined in [OMA SEC_CF], IPsec, TLS and web service security.

Note that different domains may imply: different administrative domains, different security domains and/or the need to traverse insecure networks between the domains.

Subscription validation criteria are managed (i.e., create, delete, modify, view validation criteria) through the management interface. Various management actors such as network operator and end-user are supported and appropriate associated security measures need to be applied. It should be possible to authenticate and authorize requestors, (e.g., an end-user, or other principals authorised by service provider or third party) and provide data integrity and data confidentiality for the management interface exchanges for both the intra-domain and the inter-domain case.

To implement subscription management and subscription validation, GSSM enabler may delegate to (i.e. make a request to) other enablers/resources. These other (delegated to) resources may or may not reside in different security or administrative domains and appropriate security measures should be considered for each case.

Appendix A.   Change History   (Informative)

A.1   Approved Version History

Reference	Date	Description
n/a	n/a	No prior version –or- No previous version within OMA

A.2   Draft/Candidate Version 1.0 History

Document Identifier	Date	Sections	Description
Draft Version OMA-ARC-AD_General Service Subscription Management-V1_0	26 Jun 2007		Initial draft of baseline AD; OMA-ARC-GSSM-2007-0003-INP_GSSM_Baseline AD for review
Draft Versions: OMA-AD-GSSM-V1_0	01 Oct 2007		Editorial fixes: - Filename corrected - Cover page with correct name - History box
	24 Oct 2007	5.2 5.3.1 5.3.2 5.4.1 5.4.2 5.4.3	See: OMA-ARC-GSSM-2007-0001R05-INP_GSSM_Architecture_Proposal.doc OMA-ARC-GSSM-2007-0008R02-INP_GSSM_1_interface_description.doc OMA-ARC-GSSM-2007-0009R02-INP_GSSM_2_interface_description.doc OMA-ARC-GSSM-2007-0004R02-INP_Subscription_Management_Flow_New_Subscription.doc OMA-ARC-GSSM-2007-0005-INP_Subscription_Validation_Flow.doc OMA-ARC-GSSM-2007-0007R01-INP_flow_service_un_subscription.doc
	14 Dec 2007	 5.3.4 5.3.3 5.4.3	Editorial fixes (styles) See: OMA-ARC-GSSM-2007-0010R02-INP_Subscription_Validation_Component_description OMA-ARC-GSSM-2007-0011R01-INP_GSSM_3_Interface_description OMA-ARC-GSSM-2007-0014R02-INP_Subscription_Modification_Flow
	05 Mar 2008	5.2 5.3.1; 5.3.2 5.2 5.2 3.2; 5.4.1; 5.4.3; 5.4.4 5.4.2 5.4.4 5.3.5 5.3.5 5.3.6	See: OMA-ARC-GSSM-2008-0003-INP_Clean_GSSM_AD_architecture_notes OMA-ARC-GSSM-2008-0006R01-CR_Interface_Description OMA-ARC-GSSM-2008-0007-CR_Note1_Related_Diagram OMA-ARC-GSSM-2008-0011-INP_Comments_GSSM_0007 OMA-ARC-GSSM-2008-0018R01-INP_Introduce_data_Owner_Controller OMA-ARC-GSSM-2008-0019-INP_Group_Subscription OMA-ARC-GSSM-2008-0020-INP_Group_Validation OMA-ARC-GSSM-2008-0022R03-CR_Profile_Management_Component OMA-ARC-GSSM-2008-0022R04-CR_Profile_Management_Component OMA-ARC-GSSM-2008-0024R01-CR_Subscription_Management_Component_description OMA-ARC-GSSM-2008-0025-CR_Architecture_Diagram OMA-ARC-GSSM-2008-0029-CR_Fixing_GSSM_3_Interface
	14 Apr 2008-	5.2 5.2 5.3.3 5.4.3 5.4.4 1 2.1; 2.2 3.2; 3.3	See: OMA-ARC-GSSM-2008-0027-CR_Fixing_Architecture_Diagram OMA-ARC-GSSM-2008-0028-CR_Architecture_Diagram_Description OMA-ARC-GSSM-2008-0029-CR_Fixing_GSSM_3_Interface OMA-ARC-GSSM-2008-0030R01-CR_Fixing_Validation_Flow OMA-ARC-GSSM-2008-0031R01-CR_Fixing_Group_Subscription_Validation_Flow OMA-ARC-GSSM-2008-0034-INP__Scope OMA-ARC-GSSM-2008-0035R01-INP_References OMA-ARC-GSSM-2008-0035R01-INP_References OMA-ARC-GSSM-2008-0036R01-INP_Terminology_and_Conventions

Document Identifier	Date	Sections	Description
	23 Apr 2008	5.2 5.4.1;5.4.2 5.4.6 5.4.5 5.4.3 4; 4.1 5.3.3 5.3.5	See: OMA-ARC-GSSM-2008-0040R01-CR_OPT3_Architecture_Diagram_Update OMA-ARC-GSSM-2008-0042R01-CR_Fixing_subscription_management_flows OMA-ARC-GSSM-2008-0043R01-CR_Fixing_subscription_modification_flow OMA-ARC-GSSM-2008-0044-CR_Fixing_subscription_validation_flows OMA-ARC-GSSM-2008-0045R01-INP_AD_Introduction OMA-ARC-GSSM-2008-0046R01-CR_Fixing_GSSM_3_interface OMA-ARC-GSSM-2008-0047R01-CR_Subscription_Profile_Component
	03 Jun 2008	5.4.2	OMA-ARC-GSSM-2008-0052-CR_Fixing_group_subscription
	11 Jul 2008	5.3.4 5.2 3.2;4;5.2;5.3.5 5.3.6;5.4.1;5.4.2 5.4.3;5.4.4	OMA-ARC-GSSM-2008-0056-CR_Fixing_subscription_Validation_Component OMA-ARC-GSSM-2008-0057R01-INP_Validation_Criteria_Management_Interface OMA-ARC-2008-0078R04-INP_GSSM_AD_Informal_Review_Comments
	17 Jul 2008	5.2	See: OMA-ARC-2008-0078R04-INP_GSSM_AD_Informal_Review_Comments
	12 Sep 2008	5.2 5.3.2 5.4.3; 5.4.4 5.3.3 5.2	See: OMA-ARC-GSSM-2008-0060R01-CR_Architectural_Diagram.doc OMA-ARC-GSSM-2008-0061R01-CR_PEM_1_Interface.doc OMA-ARC-GSSM-2008-0062R02-CR_Validation_Flow.doc OMA-ARC-GSSM-2008-0062R02-CR_Validation_Flow.doc OMA-ARC-GSSM-2008-0064-CR_Fixing_Architecture_Diagram.doc
	15 Oct 2008	5. 5.1 2.1 4.2	See: OMA-ARC-GSSM-2008-0066R01-INP_Architectural_Model_Introduction.doc OMA-ARC-GSSM-2008-0067R01-INP_Dependencies.doc OMA-ARC-GSSM-2008-0068R02-CR_Fixing_Normative_References.doc OMA-ARC-GSSM-2008-0069R01-INP_Security_Considerations.doc
	16 Oct 2008	all	Editorial clean-up
	24 Feb 2009	5.2 5.3.2 5.3.3 5.4.5	See: OMA-ARC-GSSM-2009-0001-INP_Change_interface_names_in_AD OMA-ARC-GSSM-2009-0007-CR_Change_flow_of_subscription_modification
	08 Apr 2009	All	Editorial changes: Updated as per editorial comments of ADRR except for 2009 template

	09 Apr 2009	All	Editorial changes:
			  implemented 2009 template as per issue A001 of ADRR
			  styles fixed
			  Cross-references fixed
			  History Box fixed

	10 Apr 2009	5.3.1 5.3.4	Implemented agreed change: OMA-ARC-GSSM-2009-0008-CR_fix_Subscriber_profile_issues
	12 May 2009	All	Updated as per agreed comments resolution of ADRR
	08 Jun 2009	4 4.1	Implemented agreed change: OMA-ARC-GSSM-2009-0010-CR_AD_Section_4_1 Editorial updates: footer and history box fixed
	15 Jun 2009	5.2	Implemented agreed change: OMA-ARC-GSSM-2009-0023-CR_AD_diagram_bugfix
Candidate Version: OMA-AD-GSSM-V1_0	25 Jun 2009	All	Status changed to Candidate by TP: OMA-TP-2009-0221R01-INP_GSSM_AD_for_Candidate_approval

Appendix B.   Flows   (informative)

B.1   Flow of Subscription Management – New Service Subscription
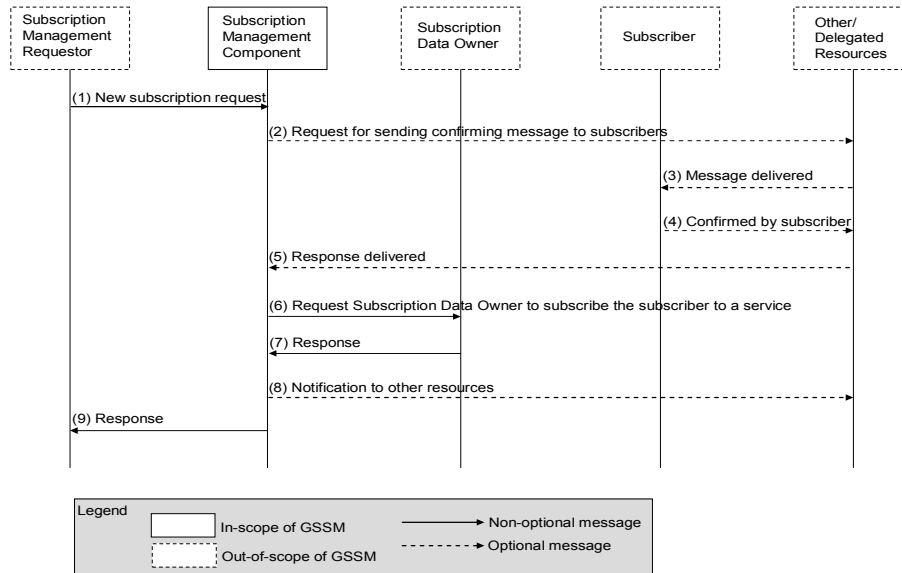

Figure 2 Flow of New Subscription process

Description:

1)   The Subscription Management Requestor uses GSSM-1 interfaces to send a request for a new subscription to the GSSM Subscription Management Component;

2)   Upon receipt of the request, the Subscription Management Component may, based on information which is out of scope, request other/delegated resources to send a message to the subscriber confirming the subscription (by delegating to the corresponding message enabler);

3)   The confirming message is delivered to the subscriber;

4)   The confirmation response is received from subscribers

5)   The delegated message enabler forwards the response to the Subscription Management Component;

6)   Then the Subscription Management Component delegates the operation to the Subscription Data Owner (e.g. BSS or even OSS) by sending the request for the new service subscription to the Subscription Data Owner.

7)   Subscription Data Owner returns the response to the GSSM Subscription Management Component.

8)   The GSSM Subscription Management Component may, based on information which is out of scope,notify some other/delegated resources about the service subscription;

9)   A response for the new subscription is returned from the Subscription Management Component to the Subscription Management Requestor.
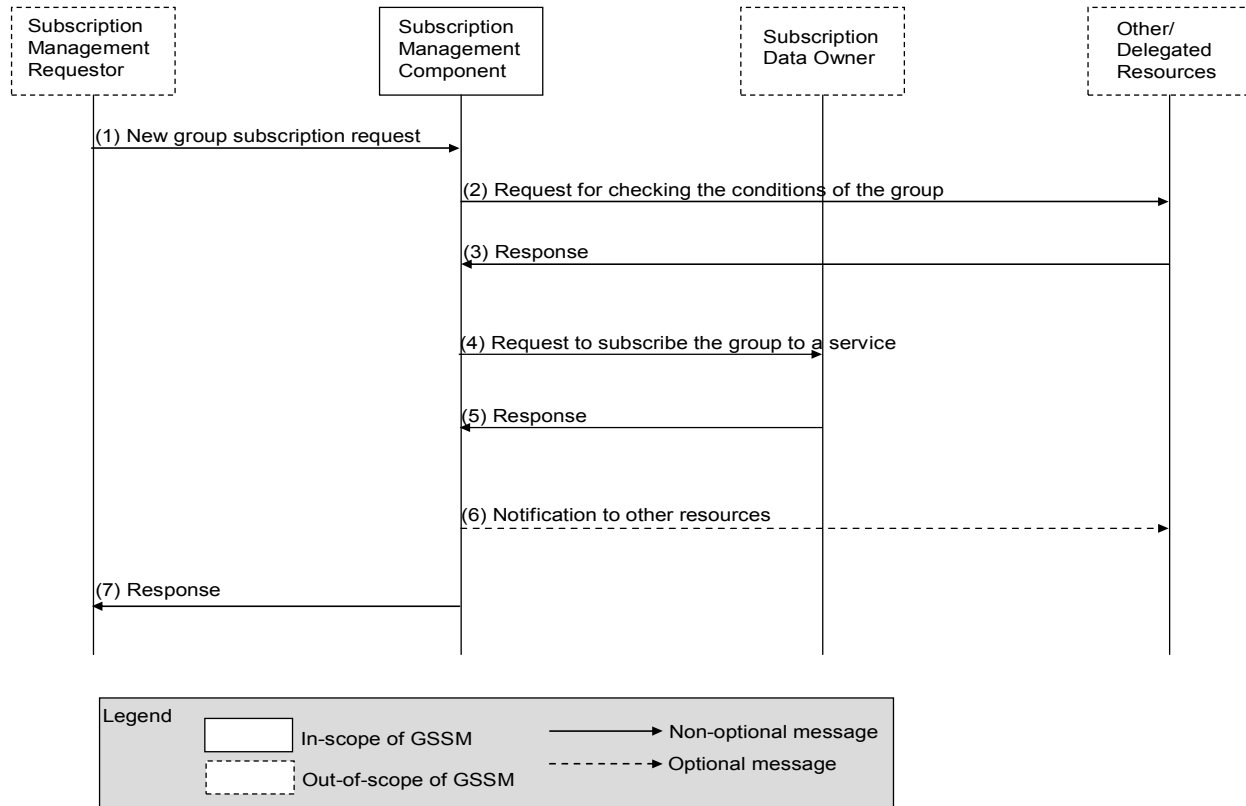
B.2 Flow of Group Subscription

Figure 3 Flow of Group Subscription

Description:

1) The Subscription Management Requestor uses GSSM-1 interfaces to send a request for a group (set of users) to subscribe a service;

2) Upon receipt of the request, the Subscription Management Component sends a message to related enablers/resources(e.g. group management component) to check the condition of whether the group is allowed to subscribe the service;

3) The related enablers/resources feedback whether the group is allowed to subscribe the service or not.

4) If the subscription is allowed, then the Subscription Management Component delegates the operation to the Subscription Data Owner by sending it the request for the group subscription.

5) Subscription Data Owner returns the response to the GSSM Subscription Management Component.

6) The GSSM Subscription Management Component and may, based on information which is out of scope, notify some other/delegated resources about the service subscription;

7) A response for the group subscription is returned from the Subscription Management Component to the Subscription Management Requestor.

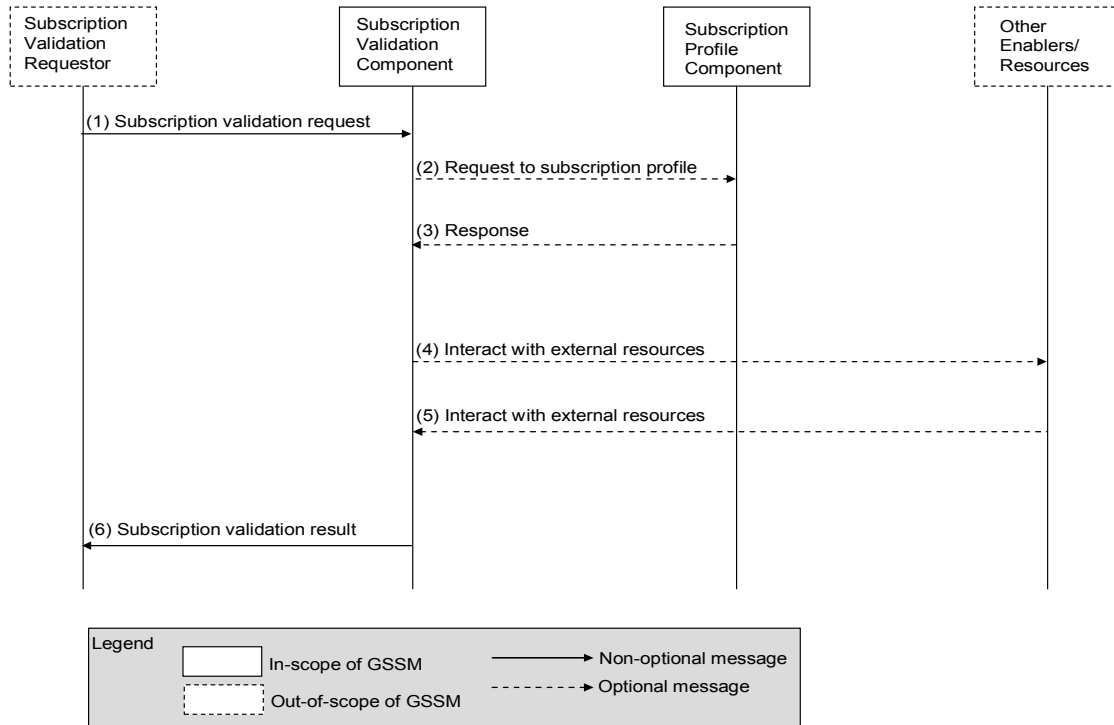# B.3   Flow of Subscription Validation

Figure 4 Flow of Subscription Validation process

Description:

1. The Subscription Validation Requestor sends a subscription validation request to GSSM Subscription Validation Component;

2. Upon reception of subscription validation request, the Subscription Validation Component may send a request to Subscription Profile Component for acquiring the corresponding subscription profile;

3. The Subscription Profile Component respond to Subscription Validation Component with the required subscription profile data;

4. The Subscription Validation Component then (if necessary) interact with supporting enablers/resource for either querying necessary information or delegating part of its validation function for performing the subscription validation function;

5. Related data/result from supporting enablers/resources returned;

6. The Subscription Validation Component processes the evaluation of whether the subscription is valid according to corresponding subscription profile data and data/results from supporting enablers/resources, and return the result to the Subscription Validation Component

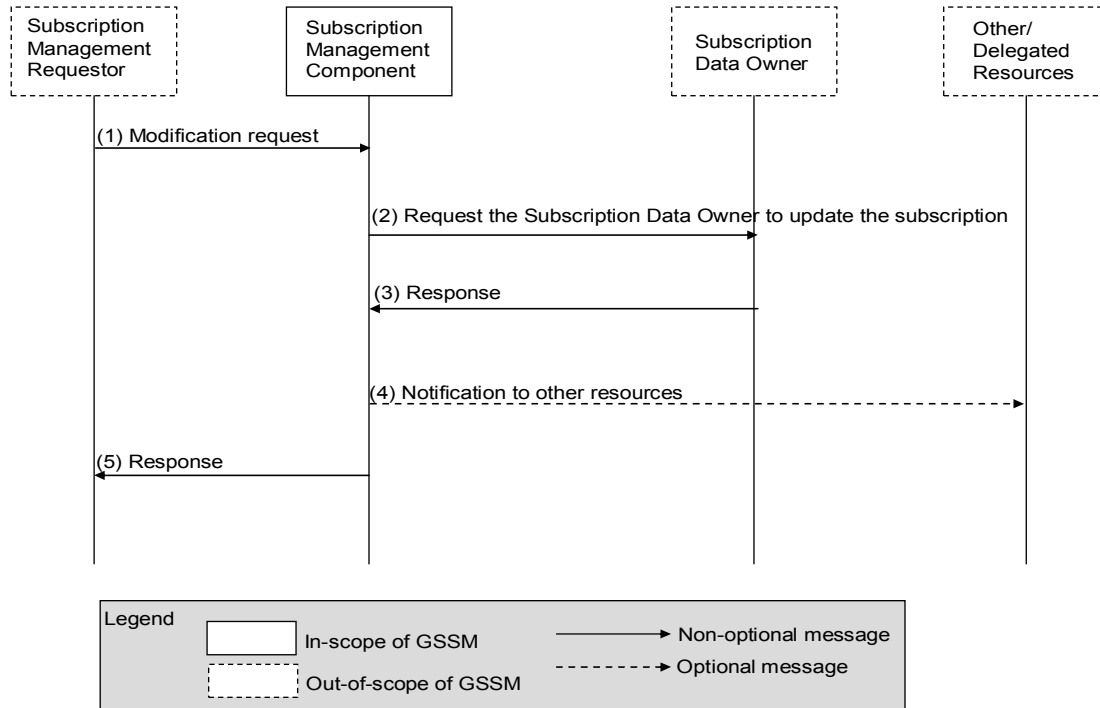# B.4   Flow of Subscription Management –Service Subscription Modification

Figure 5 Flow of Subscription Management – Service Subscription Modification

Description:

1) The Subscription Management Requestor uses GSSM-1 interfaces to send a request for a modification of service subscription to the GSSM Subscription Management Component;

2) The GSSM Subscription Management Component requests the modification of the subscription profile from the Subscription Data Owner;

3) The Subscription Data Owner returns the confirm information;

4) The GSSM Subscription Management Component and may, based on information which is out of scope notify some other/delegated resources about the service subscription changes;

5) A modification response is returned from the Subscription Management Component to the Subscription Management Requestor.

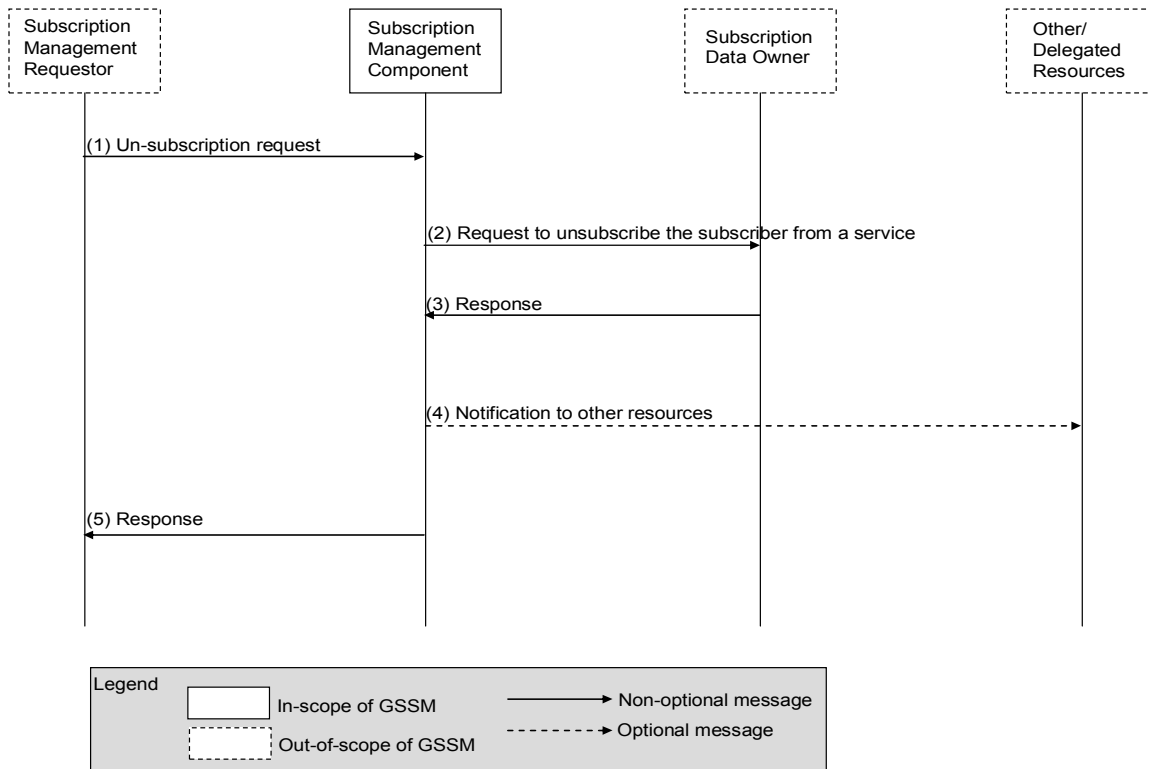# B.5 Flow of Subscription Management –Service Un-subscription

Figure 6 Flow of un-subscription process

Description:

1) The Subscription Management Requestor uses GSSM-1 interfaces to send a request for service un-subscription to the GSSM Subscription Management Component;

2) The Subscription Management Component delegates the operation to the Subscription Data Owner (e.g. BSS or even OSS) by sending the request of service un-subscription to the Subscription Data Owner.

3) The Subscription Data Owner returns the response to the GSSM Subscription Management Component (the response could include a list of whom to notify).

4) The GSSM Subscription Management Component and may, based on information which is out of scope, notify some other/delegated resources about the service un-subscription;

5) A response for un-subscription is returned from the Subscription Management Component to the Subscription Management Requestor.