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Protocol specification
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Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

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where:

- x the first digit:
 - 1 presented to TSG for information;
 - 2 presented to TSG for approval;
 - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

In the present document, modal verbs have the following meanings:

- shall** indicates a mandatory requirement to do something
- shall not** indicates an interdiction (prohibition) to do something

The constructions "shall" and "shall not" are confined to the context of normative provisions, and do not appear in Technical Reports.

The constructions "must" and "must not" are not used as substitutes for "shall" and "shall not". Their use is avoided insofar as possible, and they are not used in a normative context except in a direct citation from an external, referenced, non-3GPP document, or so as to maintain continuity of style when extending or modifying the provisions of such a referenced document.

- should** indicates a recommendation to do something
- should not** indicates a recommendation not to do something
- may** indicates permission to do something
- need not** indicates permission not to do something

The construction "may not" is ambiguous and is not used in normative elements. The unambiguous constructions "might not" or "shall not" are used instead, depending upon the meaning intended.

- can** indicates that something is possible
- cannot** indicates that something is impossible

The constructions "can" and "cannot" are not substitutes for "may" and "need not".

- will** indicates that something is certain or expected to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document
- will not** indicates that something is certain or expected not to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document
- might** indicates a likelihood that something will happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

might not indicates a likelihood that something will not happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

In addition:

is (or any other verb in the indicative mood) indicates a statement of fact

is not (or any other negative verb in the indicative mood) indicates a statement of fact

The constructions "is" and "is not" do not indicate requirements.

1 Scope

The present document specifies the protocol aspects for the group management capability of SEAL to support vertical applications (e.g. V2X) over the 3GPP system.

The present document is applicable to the User Equipment (UE) supporting the group management client functionality as described in 3GPP TS 23.434 [2], to the application server supporting the group management server functionality as described in 3GPP TS 23.434 [2] and to the application server supporting the vertical application server (VAL server) functionality as defined in specific vertical application service (VAL service) specification.

NOTE: The specification of the VAL server for a specific VAL service is out of scope for present document.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 23.434: "Service Enabler Architecture Layer for Verticals (SEAL); Functional architecture and information flows;".
- [3] IETF RFC 4825: "The Extensible Markup Language (XML) Configuration Access Protocol (XCAP)".
- [4] OMA OMA-TS-XDM_Group-V1_1_1-20170124-A: "Group XDM Specification".
- [5] 3GPP TS 24.547: "Identity management - Service Enabler Architecture Layer for Verticals (SEAL); Protocol specification;".
- [6] IETF RFC 6750: "The OAuth 2.0 Authorization Framework: Bearer Token Usage".
- [7] OMA OMA-SUP-XSD_poc_listService-V1_0: "PoC - List Service", version 1.0.
- [8] OMA OMA-SUP-XSD_xdm_extensions-V1_0: "XML Schema Definition: XDM Extensions", version 1.0.
- [9] OMA OMA-SUP-XSD_xdm2_1_extensions-V1_0: "XML Schema Definition: XDM 2.1 – Extensions", version 1.0.
- [10] IETF RFC 7159: "The JavaScript Object Notation (JSON) Data Interchange Format".
- [11] 3GPP TS 24.229: "IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3".
- [12] IETF RFC 5875: "An Extensible Markup Language (XML) Configuration Access Protocol (XCAP) Diff Event Package".
- [13] IETF RFC 6050 (November 2010): "A Session Initiation Protocol (SIP) Extension for the Identification of Services".
- [14] IETF RFC 6665 (July 2012): "SIP-Specific Event Notification".

3 Definitions of terms and abbreviations

3.1 Terms

For the purposes of the present document, the terms given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

SEAL group management client: An entity that provides the client side functionalities corresponding to the SEAL group management service.

SEAL group management server: An entity that provides the server side functionalities corresponding to the SEAL group management service.

For the purposes of the present document, the following terms and definitions given in 3GPP TS 23.434 [2] apply:

SEAL client
SEAL server
SEAL service
VAL group
VAL group member
VAL server
VAL service
VAL user
Vertical
Vertical application

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

MIME	Multipurpose Internet Mail Extensions
SEAL	Service Enabler Architecture Layer for verticals
SGM-C	SEAL Group Management Client
SGM-S	SEAL Group Management Server

4 General description

Group management is a SEAL service that provides the group management related capabilities to one or more vertical applications. The present document enables a SEAL group management client (SGM-C) and a VAL server to manage group documents in a SEAL group management server (SGM-S).

5 Functional entities

5.1 SEAL group management client (SGM-C)

The SGM-C is a functional entity that acts as the application client for management of groups. To be compliant with the procedures in the present document, a SGM-C:

- shall support the role of XCAP client as specified in IETF RFC 4825 [3];
- shall support the role of XDMC as specified in OMA OMA-TS-XDM_Group-V1_1_1 [4];
- shall support the procedure in clause 6.2.2;
- shall support the procedure in clause 6.2.3;

- shall support the procedure in clause 6.2.4;
- shall support the procedure in clause 6.2.5;
- shall support the procedure in clause 6.2.6;
- shall support the procedure in clause 6.2.7; and
- shall support the procedure in clause 6.2.8.

5.2 SEAL group management server (SGM-S)

The SGM-S functional entity provides for management of groups supported within the vertical application layer. To be compliant with the procedures in the present document, a SGM-S:

- shall support the role of XCAP server as specified in IETF RFC 4825 [3];
- shall support the role of Group XDMS as specified in OMA OMA-TS-XDM_Group-V1_1_1 [4];
- shall support the procedure in clause 6.2.2;
- shall support the procedure in clause 6.2.3;
- shall support the procedure in clause 6.2.4;
- shall support the procedure in clause 6.2.5;
- shall support the procedure in clause 6.2.6;
- shall support the procedure in clause 6.2.7; and
- shall support the procedure in clause 6.2.8.

6 Group management procedures

6.1 General

6.2 On-network procedures

6.2.1 General

6.2.1.1 Authenticated identity in HTTP request

Upon receiving an HTTP request, the SGM-S shall authenticate the identity of the sender of the HTTP request as specified in 3GPP TS 24.547 [5], and if authentication is successful, the SGM-S shall use the identity of the sender of the HTTP request as an authenticated identity.

6.2.2 Group creation procedure

6.2.2.1 Client procedure

Upon receiving a request from the VAL user to create a group document, the SGM-C shall create an XML document as specified in clause 7 and shall send the XML document to the SGM-S according to procedures specified in IETF RFC 4825 [3] "*Create or Replace a Document*". In the HTTP PUT request, the SGM-C:

- a) shall set the Request URI to a XCAP URI identifying an XML document to be created. In the Request-URI:
 - 1) the "XCAP Root" is set to the URI of the SGM-S;

- 2) the "auid" is set to specific VAL service identity; and
- 3) the document selector is set to a document URI pointing to a group document addressed by a group ID;
- b) shall include an Authorization header field with the "Bearer" authentication scheme set to an access token of the "bearer" token type as specified in IETF RFC 6750 [6];
- c) shall include a Content-Type header field set to "application/vnd.3gpp.seal-group-doc+xml"; and
- d) shall include an application/vnd.3gpp.seal-group-doc+xml MIME body and in the <seal-group-doc> root element:
 - 1) shall set "uri" attribute to the VAL group identity to be created;
 - 2) may include <display-name> element containing a human readable name of the VAL group;
 - 3) if the VAL user has requested to include administrator users, shall include <administrators> element of a <list-service> element with list of administrator users.
 - 4) if the list of users available who are required to give user consent to be member for the group, shall include such list of users into the <explicit-member-list> element of a <list-service> element;
 - 5) if the list of users available who are members of the group, shall include such list of users into the <list> element of a <list-service> element;
 - 6) shall include <common> element of a <list-service> element. The <common> element:
 - i) may include <seal-subject> element indicating the title or description for the group;
 - ii) shall include <category> element indicating the category of the group; and
 - iii) shall include <val-services> element indicating list of supported services by the group; and
 - 7) shall include <val-specific-config> element of a <list-service>. The <val-specific-config> element:
 - i) may include <group-priority> element to the priority as specified by VAL user.

6.2.2.2 Server procedure

Upon reception of an HTTP PUT request where the Request-URI of the HTTP PUT request identifies an XML document as specified in clause 7, the SGM-S:

- a) shall determine the identity of the sender of the received HTTP PUT request as specified in clause 6.2.1.1, and:
 - 1) if the identity of the sender of the received HTTP PUT request is not authorized to initiate group creation, shall respond with a HTTP 403 (Forbidden) response to the HTTP PUT request and skip rest of the steps;
- b) if value of the group URI received in HTTP PUT request does not conform to local policy, shall respond with an HTTP 409 (Conflict) response to the HTTP PUT request. The <uniqueness-failure> error element shall identify the error condition. The SGM-S shall include at least one <alt-value> element in the <uniqueness-failure> error element, whereby each <alt-value> element contains a Group ID acceptable for the SGM-S. The SGM-S shall skip rest of the steps; and
- c) shall support receiving an XML document according to procedures specified in IETF RFC 4825 [3] "*PUT Handling*" where the Request-URI of the HTTP PUT request identifies an XML document.

6.2.3 Group information query procedure

6.2.3.1 Client procedure

Upon receiving a request from the VAL user to retrieve an element of a group document, the SGM-C shall send an HTTP GET request to the SGM-S according to procedures specified in IETF RFC 4825 [3] "*Fetch an Element*". In HTTP GET request, the SGM-C:

- a) shall set the Request-URI to a XCAP URI identifying an element within an XML document to be queried. In the Request-URI:
 - 1) the "XCAP Root" is set to the URI of the SGM-S;
 - 2) the "auid" is set to specific VAL service identity;
 - 3) the document selector is set to a document URI pointing to a group document addressed by a group ID which contains the element to be queried; and
 - 4) the node selector is set to a node URI identifying the element to be queried; and
- b) shall include an Authorization header field with the "Bearer" authentication scheme set to an access token of the "bearer" token type as specified in IETF RFC 6750 [6].

6.2.3.2 Server procedure

Upon reception of an HTTP GET request where the Request-URI of the HTTP GET request identifies an element of a XML document as specified in clause 7, the SGM-S:

- a) shall determine the identity of the sender of the received HTTP GET request as specified in clause 6.2.1.1, and:
 - 1) if the identity of the sender of the received HTTP GET request is not authorized to query group information, shall respond with a HTTP 403 (Forbidden) response to the HTTP GET request and skip rest of the steps;
- b) shall support handling an HTTP GET request from a SGM-C according to procedures specified in IETF RFC 4825 [3] "*GET Handling*".

6.2.4 Group membership procedure

6.2.4.1 Client procedure

Upon receiving a request from the VAL user to update group membership element of a group document, a SGM-C shall send an HTTP PUT request to the SGM-S according to procedures specified in IETF RFC 4825 [3] "*Create or Replace an Element*". In HTTP PUT request, the SGM-C:

- a) shall set the Request-URI to a XCAP URI identifying an element within an XML document to be updated. In the Request-URI:
 - 1) the "XCAP Root" is set to the URI of the SGM-S;
 - 2) the "auid" is set to specific VAL service identity;
 - 3) the document selector is set to a document URI pointing to a group document addressed by a group ID which contains the element to be updated; and
 - 4) the node selector is set to a node URI identifying the element to be updated; and
- b) shall include an Authorization header field with the "Bearer" authentication scheme set to an access token of the "bearer" token type as specified in IETF RFC 6750 [6].

NOTE: The VAL client can use the procedure specified in this clause to update all possible elements which can be updated.

6.2.4.2 Server procedure

Upon reception of an HTTP PUT request where the Request-URI of the HTTP PUT request identifies an element of a XML document as specified in clause 7, the SGM-S:

- a) shall determine the identity of the sender of the received HTTP PUT request as specified in clause 6.2.1.1, and:
 - 1) if the identity of the sender of the received HTTP PUT request is not authorized to update group information, shall respond with a HTTP 403 (Forbidden) response to the HTTP PUT request and skip rest of the steps;

- b) shall support handling an HTTP PUT request from a SGM-C according to procedures specified in IETF RFC 4825 [3] "*PUT Handling*".

6.2.5 Group configuration management procedure

6.2.5.1 Update group configuration

6.2.5.1.1 Client procedure

Upon receiving a request from the VAL user to update a group document, the SGM-C shall create an XML document as specified in clause 7 and shall send the XML document to the SGM-S according to procedures specified in IETF RFC 4825 [3] "*Create or Replace a Document*". In the HTTP PUT request, the SGM-C:

- a) shall set the Request URI to a XCAP URI identifying an XML document to be updated. In the Request-URI:
 - 1) the "XCAP Root" is set to the URI of the SGM-S;
 - 2) the "aud" is set to specific VAL service identity; and
 - 3) the document selector is set to a document URI pointing to a group document addressed by a group ID;
- b) shall include an Authorization header field with the "Bearer" authentication scheme set to an access token of the "bearer" token type as specified in IETF RFC 6750 [6];
- c) shall include a Content-Type header field set to "application/vnd.3gpp.seal-group-doc+xml"; and
- d) shall include an application/vnd.3gpp.seal-group-doc+xml MIME body and in the <seal-group-doc> root element:
 - 1) shall set "uri" attribute to the VAL group identity to be created;
 - 2) may include <display-name> element containing a human readable name of the VAL group;
 - 3) if the VAL user has requested to include administrator users, shall include <administrators> element of a <list-service> element with list of administrator users.
 - 4) if the list of users available who are required to give user consent to be member for the group, shall include such list of users into the <explicit-member-list> element of a <list-service> element;
 - 5) if the list of users available who are members of the group, shall include such list of users into the <list> element of a <list-service> element;
 - 6) shall include <common> element of a <list-service> element. The <common> element:
 - i) may include <seal-subject> element indicating the title or description for the group;
 - ii) shall include <category> element indicating the category of the group; and
 - iii) shall include <val-services> element indicating list of supported services by the group; and
 - 7) shall include <val-specific-config> element of a <list-service>. The <val-specific-config> element:
 - i) may include <group-priority> element to the priority as specified by VAL user

6.2.5.1.2 Server procedure

Upon reception of an HTTP PUT request where the Request-URI of the HTTP PUT request identifies an XML document as specified in clause 7, the SGM-S:

- a) shall determine the identity of the sender of the received HTTP PUT request as specified in clause 6.2.1.1, and:
 - 1) if the identity of the sender of the received HTTP PUT request is not authorized to update the group document, shall respond with a HTTP 403 (Forbidden) response to the HTTP PUT request and skip rest of the steps;

- b) shall support receiving an XML document as specified in application usage of the specific vertical application according to procedures specified in IETF RFC 4825 [3] "*PUT Handling*".

6.2.5.2 Retrieve group document

6.2.5.2.1 Client procedure

Upon receiving a request from the VAL user to retrieve a group document, the SGM-C shall send an HTTP GET request to the SGM-S according to procedures specified in IETF RFC 4825 [3] "*Fetch a Document*". In HTTP GET request, the SGM-C:

- a) shall set the Request-URI to a XCAP URI identifying an XML document to be retrieved. In the Request-URI:
 - 1) the "XCAP Root" is set to the URI of the SGM-S;
 - 2) the "auid" is set to specific VAL service identity; and
 - 3) the document selector is set to a document URI pointing to a group document addressed by a group ID; and
- b) shall include an Authorization header field with the "Bearer" authentication scheme set to an access token of the "bearer" token type as specified in IETF RFC 6750 [6].

6.2.5.2.2 Server procedure

Upon reception of an HTTP GET request where the Request-URI of the HTTP GET request identifies an XML document as specified in clause 7, the SGM-S:

- a) shall determine the identity of the sender of the received HTTP GET request as specified in clause 6.2.1.1, and:
 - 1) if the identity of the sender of the received HTTP GET request is not authorized to retrieve the group document, shall respond with a HTTP 403 (Forbidden) response to the HTTP GET request and skip rest of the steps;
- b) shall support receiving an XML document as specified in application usage of the specific vertical application according to procedures specified in IETF RFC 4825 [3] "*GET Handling*".

6.2.6 Location-based group creation procedure

6.2.6.1 Client procedure

Upon receiving a request from the VAL user to create a location based group, the SGM-C shall follow the procedure as defined in clause 6.2.2.1 with following clarifications.

The SGM-C:

- a) shall set <category> child element of <common> element of a <list-service> element to the value "location-based" as defined in clause 7;
- b) shall set the location of tracking area in the <geographical-area> child element of <common> element of a <list-service> element;

6.2.6.2 Server procedure

Upon receiving HTTP PUT request with <category> child element of <common> element of a <list-service> element set to the value "location-based", the SGM-S shall follow the procedure as defined in clause 6.2.2.2 with following clarifications. The SGM-S:

- 1) shall obtain the list of users based on location as specified in clause 6.2.x of 3GPP TS 24.545 [11] and update the list of users in group document.

6.2.7 Group announcement and join procedure

6.2.7.1 General

Upon successful creation of the group as specified in clause 6.2.2, the SGM-S follow the procedure specified in clause 6.2.7.3 to notify group announcement to group members and to handle group registration request from SGM-C. The SGM-C shall follow the procedure specified in clause 6.2.7.2 to handle received group announcement notification and to request group registration.

6.2.7.2 Client procedure

6.2.7.2.1 Receiving group announcement notification

Upon receiving an HTTP POST request over a call back URI which was given to SGM-S at time of group events subscription, the SGM-C:

- a) shall match subscription identity received in the "Identity" parameter of the HTTP POST request with the locally stored identity of the subscription. If subscription identity is not valid, then
 - 1) send an HTTP 406 (Not Acceptable) response and skip rest of the steps;
- b) shall send an HTTP 200 (OK); and
- c) if "Event" parameter is set to SUBSCRIBE_GROUP_ANNOUNCEMENT (0x01) as specified in clause B.2, shall notify the VAL user about announcement of group with group-ID and subject. If the notification contains "IsJoinReq" parameter with value set to "true", the SGM-C shall ask VAL user to join the group. The SGM-C may also decide to store the group announcement based on user's request.

6.2.7.2.2 Sending group registration request

Upon receiving request from VAL user to join the group, the SGM-C:

- a) shall generate an HTTP POST request. In the HTTP POST request:
 - 1) shall set the Request URI to the value "/group-registration";
 - 2) shall include the Host header with public user identity of SGM-S;
 - 3) shall include an Authorization header field with the "Bearer" authentication scheme set to an access token of the "bearer" token type as specified in IETF RFC 6750 [6]; and
 - 4) shall include in the HTTP request entity-body the "group-ID" parameter set to the group URI received in group announcement notification; and
- b) shall send an HTTP POST request to SGM-S.

Upon receiving an HTTP 200 (OK), the SGM-C shall notify the VAL user about successful group registration. Based on VAL user's request, if group events subscription is not already created, then the SGM-C shall create the group events subscription as specified in clause 6.2.8.1.1 for the event SUBSCRIBE_GROUP_MODIFICATION (0x02) as defined in clause A.1.2. If group events subscription already exists then the SGM-C shall modify the subscription as specified in the clause 6.2.8.1.2.

6.2.7.3 Server procedure

6.2.7.3.1 Sending group announcement notification

Upon successful creation of group, for each VAL user in <explicit-member-list> element of a <list-service> element of the group document, the SGM-S:

- a) shall check whether valid group events subscription exists for event SUBSCRIBE_GROUP_ANNOUNCEMENT (0x01) as defined in clause A.1.2 or not; if valid subscription does not exist then skip rest of the steps;

- b) shall generate an HTTP POST message to notify group announcement. In the HTTP POST message:
 - 1) shall set request URI to call back URI received at the time of creating subscription;
 - 2) shall set Content-Type header to "application/json"; and
 - 3) shall include an HTTP request entity-body with the parameters specified in clause B.2 serialized into a JavaScript Object Notation (JSON) structure; and
- c) shall sent the HTTP POST request towards SGM-C.

6.2.7.3.2 Receiving group registration request

Upon reception of an HTTP POST request where the Request-URI of the HTTP POST request is set to "/group-registration", the SGM-S:

- a) shall determine the identity of the sender of the received HTTP POST request as specified in clause 6.2.1.1, and:
 - 1) if the identity of the sender of the received HTTP POST request is not authorized user, shall respond with an HTTP 403 (Forbidden) response to the HTTP POST request and skip rest of the steps;
- b) shall update the members information in group document; and
- c) shall send an HTTP 200 (OK) response to SGM-C.

6.2.8 Group subscription and notification procedure

6.2.8.1 Management of group events subscription

6.2.8.1.1 SIP based procedures

6.2.8.1.1.1 General

The VAL service will use the same identity which has been authenticated by VAL service with SIP core using SIP based REGISTER message. If VAL service do not support SIP protocol, then HTTP based method needs to be used.

The SGM-C shall use mechanism provided by VAL service to add access-token in SIP messages. The SGM-S shall identify the originating VAL user ID from the access-token received from SGM-C using the mechanism defined in VAL service specification.

6.2.8.1.1.2 Create subscription

In order to subscribe to notification of changes of one or more group documents of VAL groups identified by VAL group IDs, a SGM-C shall send an initial SIP SUBSCRIBE request to the network according to the UE originating procedures specified in 3GPP TS 24.229 [11] and IETF RFC 5875 [12]. In the initial SIP SUBSCRIBE request, the SGM-C:

- a) shall set the Request-URI to the configured public service identity for performing subscription proxy function of the SGM-S;
- b) shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.seal" (coded as specified in 3GPP TS 24.229 [11]), in a P-Preferred-Service header field according to IETF RFC 6050 [13];
- c) shall include the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.seal" in the Contact header field;
- d) shall include an application/resource-lists+xml MIME body. In the application/resource-lists+xml MIME body, the SGM-C shall include one <entry> element for each group document to be subscribed to, such that the "uri" attribute of the <entry> element contains a relative path reference to XCAP URI identifying an XML document to be subscribed to;

- e) if the VAL server wants to fetch the current state only, shall set the Expires header field according to IETF RFC 6665 [14], to zero. Otherwise, shall set the Expires header field to the duration for which VAL user has requested for subscription;

Upon reception of an initial SIP SUBSCRIBE request:

- a) with the Event header field set to xcap-diff;
- b) with the Request-URI set to own public service identity for performing subscription proxy function of the SGM-S;
- c) with an application/resource-lists+xml MIME body; and
- d) with the ICSI value "urn:urn-7:3gpp-service.ims.icsi.seal" (coded as specified in 3GPP TS 24 229 [11]), in a P-Asserted-Service header field according to IETF RFC 6050 [13];

the SGM-S:

- d) shall identify the originating VAL user ID and shall use the originating VAL user ID as an authenticated identity when performing the authorization;
- b) if the authenticated identity is not authorized to subscribe to notification of changes of any resource in the application/resource-lists+xml MIME body, shall reject the request with a SIP 403 (Forbidden) response and shall not continue with rest of the steps;
- e) act as a notifier according to IETF RFC 5875 [12].

6.2.8.1.1.3 Modify subscription

In order to modify or refresh subscription, the SGM-C shall send SIP re-SUBSCRIBE request on the same dialog as the existing subscription, and with the same "Event" header. The SGM-C shall follow the steps specified in clause 6.2.8.1.1.2.1 to create SIP SUBSCRIBE request.

Upon reception of a SIP re-SUBSCRIBE request:

- a) with the Event header field set to xcap-diff; and
- b) with an application/resource-lists+xml MIME body;

the SGM-S:

- a) act as a notifier according to IETF RFC 5875 [12].

6.2.8.1.1.4 Delete subscription

In order to delete the subscription, the SGM-C shall send SIP re-SUBSCRIBE request on the same dialog as the existing subscription, and with the same "Event" header. The SGM-C shall follow the steps specified in clause 6.2.8.1.1.2.1 to create SIP SUBSCRIBE request with following clarification:

- a) shall set the Expires header field to zero.

Upon reception of a SIP re-SUBSCRIBE request:

- a) with the Event header field set to xcap-diff; and
- b) with Expires header field set to zero;

the SGM-S:

- a) act as a notifier according to IETF RFC 5875 [12].

6.2.8.1.2 HTTP based procedures

6.2.8.1.2.1 Creating subscription

Upon successful service authorization of the VAL service, the SGM-C shall create a subscription for group events by sending an HTTP POST request to the SGM-S. In the HTTP POST request, the SGM-C:

- a) shall set the Request URI to the URI of the SGM-S appended with VAL service identity and the value `"/groupEventsSubscription"`;
- b) shall include the Host header with public user identity of SGM-S;
- c) shall include an Authorization header field with the "Bearer" authentication scheme set to an access token of the "bearer" token type as specified in IETF RFC 6750 [6]; and
- c) include the parameters specified in clause A.1.2 serialized into a JavaScript Object Notation (JSON) structure as specified in IETF RFC 7159 [10].

Upon reception of an HTTP POST request from SGM-C where the Request-URI of the HTTP POST request contains `"/groupEventsSubscription"` without subscription identity, the SGM-S:

- a) shall determine the identity of the sender of the received HTTP POST request as specified in clause 6.2.1.1, and:
 - 1) if the identity of the sender of the received HTTP POST request is not authorized user, shall respond with an HTTP 403 (Forbidden) response to the HTTP POST request and skip rest of the steps;
- b) shall generate unique subscription identity and store the subscription details for the authorized user; and
- c) shall send an HTTP 200 (OK) response including parameters specified in clause A.1.3.

6.2.8.1.2.2 Modify a subscription

Upon receiving a request from VAL user to modify existing subscription identified with unique subscription identity, the SGM-C:

- a) shall generate an HTTP PUT request. In the HTTP PUT request:
 - 1) shall set the Request URI to the same Request URI used while creating subscription in clause 6.2.8.1.2.1.1 appended with subscription identity;
 - 2) shall include the Host header with public user identity of SGM-S;
 - 3) shall include an Authorization header field with the "Bearer" authentication scheme set to an access token of the "bearer" token type as specified in IETF RFC 6750 [6]; and
 - 4) include the parameters specified in clause A.1.2 serialized into a JavaScript Object Notation (JSON) structure as specified in IETF RFC 7159 [10].
- b) shall send the HTTP PUT request to the SGM-S.

Upon reception of an HTTP PUT request from SGM-C where the Request-URI of the HTTP PUT request is set to `"/groupEventsSubscription"` appended with subscription identity, the SGM-S:

- a) shall determine the identity of the sender of the received HTTP PUT request as specified in clause 6.2.1.1, and:
 - 1) if the identity of the sender of the received HTTP PUT request is not authorized user, shall respond with an HTTP 403 (Forbidden) response to the HTTP PUT request and skip rest of the steps;
- b) shall determine whether subscription for group events exists or not based on received subscription identity in request URI; and

- 1) if subscription does not exist, shall respond with an HTTP 406 (Not Acceptable) response to the HTTP PUT request and skip rest of the steps;
- c) shall update the subscription details based on received parameters from the HTTP PUT request; and
- d) shall send an HTTP 200 (OK) response including parameters specified in clause A.1.3.

6.2.8.1.2.3 Delete a subscription

Upon receiving a request from VAL user to delete existing subscription identified with unique subscription identity, the SGM-C:

- a) shall generate an HTTP DELETE request. In the HTTP DELETE request:
 - 1) shall set the Request URI to the value "/groupEventsSubscription" appended with subscription identity;
 - 2) shall include the Host header with public user identity of SGM-S; and
 - 3) shall include an Authorization header field with the "Bearer" authentication scheme set to an access token of the "bearer" token type as specified in IETF RFC 6750 [6]; and
- b) shall send the HTTP DELETE request to the SGM-S.

Upon reception of an HTTP DELETE request from SGM-C where the Request-URI of the HTTP DELETE request contains "/groupEventsSubscription" appended with subscription identity, the SGM-S:

- a) shall determine the identity of the sender of the received HTTP DELETE request as specified in clause 6.2.1.1, and:
 - 1) if the identity of the sender of the received HTTP DELETE request is not authorized user, shall respond with an HTTP 403 (Forbidden) response to the HTTP DELETE request and skip rest of the steps;
- b) shall determine whether subscription for group events exists or not based on received subscription identity in request URI; and
 - 1) if subscription does not exist, shall respond with an HTTP 406 (Not Acceptable) response to the HTTP DELETE request and skip rest of the steps;
- c) shall delete the subscription details based on received parameters from the HTTP DELETE request; and
- d) shall send an HTTP 200 (OK) response to the SGM-C.

6.2.8.2 Notifications

6.2.8.2.1 SIP based procedures

6.2.8.2.1.1 Client procedure

Upon receiving a SIP NOTIFY request associated with a subscription created as result of the sent initial SIP SUBSCRIBE request, the SGM-S:

- a) shall handle the SIP NOTIFY request according to IETF RFC 5875 [12].

6.2.8.2.1.2 Server procedure

In order to send notification of group document update event, the SGM-S shall send SIP NOTIFY to SGM-C according to IETF RFC 5875 [12].

6.2.8.2.2 HTTP based procedures

6.2.8.2.2.1 Receiving group modify notification

Upon receiving an HTTP POST request over a call back URI which was given to the SGM-S at time of group events subscription, the SGM-C:

- a) shall match subscription identity received in the "Identity" parameter of the HTTP POST request with the locally stored identity of the subscription. If subscription identity is not valid, then
 - 1) send an HTTP 406 (Not Acceptable) response and skip rest of the steps;
- b) shall send an HTTP 200 (OK); and
- c) if "Event" parameter is set to SUBSCRIBE_GROUP_MODIFICATION (0x02) as specified in clause B.3, shall notify the VAL user about modification of group with group-ID.

Based on VAL user's request, the SGM-C may also retrieve the group document identified by group ID received in group modify notification as specified in clause 6.2.5.2.

6.2.8.2.2.2 Sending group modify notification

To send the group modification notification to the SGM-C, the SGM-S:

- a) shall check whether valid group events subscription exists for event SUBSCRIBE_GROUP_MODIFICATION (0x02) as defined in clause A.1.2 or not; if valid subscription does not exist then skip rest of the steps;
- b) shall generate an HTTP POST message to notify group announcement. In the HTTP POST message:
 - 1) shall set request URI to the call back URI received at the time of creating subscription;
 - 2) shall set Content-Type header to "application/json"; and
 - 3) shall include an HTTP request entity-body with the parameters specified in clause B.3 serialized into a JavaScript Object Notation (JSON) structure; and
- c) shall send the HTTP POST request towards SGM-C.

6.2.9 Group member leave

6.2.9.1 Client procedure

Upon receiving request from VAL user to leave the group, the SGM-C:

- a) shall generate an HTTP POST request. In the HTTP POST request:
 - 1) shall set the Request URI to the URI of the SGM-S appended with VAL service identity and the value "/group-deregistration";
 - 2) shall include the Host header with public user identity of SGM-S;
 - 3) shall include an Authorization header field with the "Bearer" authentication scheme set to an access token of the "bearer" token type as specified in IETF RFC 6750 [6]; and
 - 4) shall include in the HTTP request entity-body the "group-ID" parameter set to the group URI of the group which VAL user has requested to leave; and
- b) shall send the HTTP POST request to SGM-S.

Upon receiving an HTTP 200 (OK), the SGM-C shall notify the VAL user about successful group registration.

6.2.9.2 Server procedure

Upon reception of an HTTP POST request where the Request-URI of the HTTP POST request is set to "/group-deregistration", the SGM-S:

- a) shall determine the identity of the sender of the received HTTP POST request as specified in clause 6.2.1.1, and:
 - 1) if the identity of the sender of the received HTTP POST request is not authorized user, shall respond with an HTTP 403 (Forbidden) response to the HTTP POST request and skip rest of the steps;
- b) shall update the members information in group document; and
- c) shall send an HTTP 200 (OK) response to SGM-C.

6.3 Off-network procedures

The off-network procedures are out of scope of the present document in this release of the specification.

7 Coding

7.1 General

7.2 Application unique ID

The AUID shall be set to the VAL service ID as specified in specific VAL service specification.

7.3 Data structure

The <list-service> element:

- a) shall include an "uri" attribute representing the VAL group identity;
- b) may include a <display-name> element containing a human readable name of the VAL group;
- c) shall include a <common> element. The <common> element:
 - 1) may include a <seal-subject> element indicating group description;
 - 2) shall include a <category> element indicating category of the group; and
 - 3) shall include a <val-services> element indicating list of services supported by the group;
- d) may include a <administrators> element containing list of group members who are administrator for the group;
- e) may include a <explicit-members-list> element containing list of users who explicitly needs to register to join the group;
- f) may include a <list> element containing list of members who are implicitly registered to join the group; and
- g) shall include <val-specific-config> element. The <val-specific-config> element:
 - 1) may include <group-priority> element.

7.4 XML Schema

7.4.1 General

The Group Document shall be composed according to the XML schema described in [7] and extended with extensions from the XML Schemas defined in [8] and [9], and extended with extensions from the XML schema defined in clause 7.4.2.

7.4.2 XML schema for SEAL group document specific extension

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema
  xmlns="urn:3gpp:ns:seal:GroupInfo:1.0"
  targetNamespace="urn:3gpp:ns:seal:GroupInfo:1.0"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  xmlns:ls="urn:oma:xml:poc:list-service"
  xmlns:sealgi="urn:3gpp:ns:seal:GroupInfo:1.0"
  elementFormDefault="qualified"
  attributeFormDefault="unqualified">

  <xs:import namespace="urn:oma:xml:xm:extensions"/>
  <xs:import namespace="urn:ietf:params:xml:ns:resource-lists"/>

  <!-- SEAL specific "list-service" child elements -->
  <xs:element name="common" type="sealgi:common-type"/>
  <xs:element name="administrators" type="ls:list-type" minOccurs="0"/>
  <xs:element name="explicit-member-list" type="ls:list-type" minOccurs="0"/>
  <xs:element name="val-specific-config" type="sealgi:valSpecificConfigType"/>

  <xs:complexType name="common-type">
    <xs:sequence>
      <xs:element name="seal-subject" type="sealgi:subjectType" minOccurs="0"/>
      <xs:element name="category" type="sealgi:groupCategoryType"/>
      <xs:element name="val-services" type="sealgi:valServiceListType"/>
      <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:any namespace="##other" processContents="lax" minOccurs="0"/>
  </xs:complexType>
  <xs:complexType name="valSpecificConfigType">
    <xs:sequence>
      <xs:element name="group-priority" type="sealgi:priorityType" minOccurs="0"/>
      <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:any namespace="##other" processContents="lax" minOccurs="0"/>
  </xs:complexType>

  <xs:simpleType name="subjectType">
    <xs:restriction base="xs:string">
      <xs:minLength value="0"/>
      <xs:maxLength value="255"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="groupCategoryType">
    <xs:restriction base="xs:string">
      <xs:enumeration value="normal"/>
      <xs:enumeration value="location-based"/>
      <xs:enumeration value="regroup"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:complexType name="valServiceListType">
    <xs:sequence minOccurs="0" maxOccurs="unbounded">
      <xs:element name="service-name" type="sealgi:serviceNameType" minOccurs="0"/>
      <xs:any namespace="##other" processContents="lax" minOccurs="0"/>
    </xs:sequence>
  </xs:complexType>
  <xs:simpleType name="priorityType">
    <xs:restriction base="xs:unsignedShort">
      <xs:minInclusive value="0"/>
      <xs:maxInclusive value="255"/>
    </xs:restriction>
  </xs:simpleType>

  <xs:complexType name="serviceNameType">
    <xs:sequence>
```

```

    <xs:element name="serviceType" minOccurs="0" maxOccurs="unbounded" type="Services"/>
  </xs:sequence>
  <xs:unique name="uniqueserviceType">
    <xs:selector xpath="serviceType"/>
    <xs:field xpath="."/>
  </xs:unique>
</xs:complexType>

<xs:simpleType name="Services">
  <xs:restriction base="xs:string">
    <xs:enumeration value="V2X"/>
    <xs:enumeration value="Others"/>
  </xs:restriction>
</xs:simpleType>
</xs:schema>

```

7.5 Semantics

The <display-name> element of <list-service> element contains a human readable name of the VAL group.

The value of the "uri" attribute in the <list-service> element shall represent a VAL group identity.

The <administrators> element of a <list-service> element shall contain the group members who are administrator of the group and have special authorities as defined by VAL service to manage the group. The administrator user do not require explicit registration to join the group.

The <explicit-member-list> element of a <list-service> element shall contain the group members who are not administrator of the group and require explicit registration to join the group.

The <list> element of a <list-service> element shall contain the group members who are not administrator of the group and also do not require explicit registration to join the group.

The <seal-subject> child element of a <common> element of a <list-service> element shall indicate the title or description for the Group. The length of the value of the <seal-subject> element should not exceed 255 characters.

The <category> child element of a <common> element of a <list-service> element shall indicate the category of the group. The possible values for this element are "normal", "location-based" and "regroup".

The <val-services> child element of a <common> element of a <list-service> element shall indicate list of services supported by the group.

The <group-priority> child element of a <val-specific-config> element of a <list-service> element contains a positive number which provides VAL group priority among different VAL groups within VAL service. More than one VAL group can have same priority.

The VAL service may further extend the <val-specific-config> element of a <list-service> element to include VAL service specific configuration.

7.6 MIME type

The MIME type for VAL user profile configuration shall be set to "vnd.3gpp.seal-group-doc+xml".

7.7 IANA registration template

Your Name:

<MCC name>

Your Email Address:

<MCC email address>

Media Type Name:

Application

Subtype name:

vnd.3gpp.seal-group-doc+xml

Required parameters:

None

Optional parameters:

"charset" the parameter has identical semantics to the charset parameter of the "application/xml" media type as specified in section 9.1 of IETF RFC 7303.

Encoding considerations:

binary.

Security considerations:

Same as general security considerations for application/xml media type as specified in section 9.1 of IETF RFC 7303. In addition, this media type provides a format for exchanging information in SIP or in HTTP. So the security considerations from IETF RFC 3261 apply while exchanging information in SIP and the security considerations from IETF RFC 2616 apply while exchanging information in HTTP.

The information transported in this media type does not include active or executable content.

Mechanisms for privacy and integrity protection of protocol parameters exist. Those mechanisms as well as authentication and further security mechanisms are described in 3GPP TS 24.229.

This media type does not include provisions for directives that institute actions on a recipient's files or other resources.

This media type does not include provisions for directives that institute actions that, while not directly harmful to the recipient, may result in disclosure of information that either facilitates a subsequent attack or else violates a recipient's privacy in any way.

This media type does not employ compression.

Interoperability considerations:

Same as general interoperability considerations for application/xml media type as specified in section 9.1 of IETF RFC 7303. Any unknown XML elements and any unknown XML attributes are to be ignored by recipient of the MIME body.

Published specification:

3GPP TS 24.544 "Group Management - Service Enabler Architecture Layer for Verticals (SEAL); Protocol specification", available via <http://www.3gpp.org/specs/numbering.htm>.

Applications Usage:

Applications supporting the SEAL group management procedures as described in the published specification.

Fragment identifier considerations:

The handling in section 5 of IETF RFC 7303 applies.

Restrictions on usage:

None

Provisional registration? (standards tree only):

N/A

Additional information:

1. Deprecated alias names for this type: none

2. Magic number(s): none
3. File extension(s): none
4. Macintosh File Type Code(s): none
5. Object Identifier(s) or OID(s): none

Intended usage:

Common

Person to contact for further information:

- Name: <MCC name>
- Email: <MCC email address>
- Author/Change controller:
 - i) Author: 3GPP CT1 Working Group/3GPP_TSG_CT_WG1@LIST.ETSI.ORG
 - ii) Change controller: <MCC name>/<MCC email address>

Annex A (normative): Parameters for different operations

A.1 Creating group events subscription

A.1.1 General

The information in this annex provides a normative description of the parameters which will be sent by SGM-C while creating group events subscription and the parameters which will be sent by SGM-S as a response to request for creating subscription.

A.1.2 Client side parameters

The SGM-C shall convey the following parameters while sending request for creating group events subscription.

Table A.1.2-1: Client side parameters for creating group events subscription

Parameter	Description
VAL User Id	REQUIRED. Represents a VAL user who initiates subscription.
Callback-URI	REQUIRED. Represents where to send HTTP notifications
Subscription Info	REQUIRED. Represents a space-separated list of the subscription type information as specified in table A.1.2-2.

Table A.1.2-2: Subscription information

Parameter	Description
Event	REQUIRED. Represents the type of notification which client requires. This specification defines following type of notifications: - 0x01: SUBSCRIBE_GROUP_ANNOUNCEMENT - 0x02: SUBSCRIBE_GROUP_MODIFICATION
expiry time	REQUIRED. Represents the time in seconds up to which the subscription is desired to be kept active and the time after which the subscribed event shall stop generating notifications.
Group ID list	REQUIRED if "Event" parameter is set to SUBSCRIBE_GROUP_MODIFICATION (0x02). Represents a space-separated list of VAL_group ID of the groups

A.1.3 Server side parameters

The SGM-S shall convey the following parameters while sending response to the creating group events subscription request.

Table A.1.3-1: Server side parameters for response to creating group events subscription

Parameter	Description
Identity	REQUIRED. A unique string representing subscription identity.

Annex B (normative): Parameters for notifications

B.1 General

The information in this annex provides a normative description of the parameters which will be sent by SGM-S while sending different types of notification

B.2 Group announcement notification

The SGM-S shall convey the following parameters while sending group announcement notification to SGM-C.

Table B.2-1: Parameters for group announcement notification

Parameter	Description
Identity	REQUIRED. A unique string representing notification channel identity.
Event	REQUIRED. Shall be set to SUBSCRIBE_GROUP_ANNOUNCEMENT (0x01) as specified in table A.1.2-2.
GroupID	REQUIRED. An URI that represent a VAL group identity
Subject	REQUIRED. A string representing the title or description for the group.
IsJoinReq	OPTIONAL. A Boolean indicating whether user needs to perform registration to join the group or not. This Boolean will be set to "true" for each user in <explicit-member-list> element if present in the document.
Val-services	OPTIONAL. Represents list of services supported by the group.
Members-list	OPTIONAL. Represents list of VAL users who are member of the group.

B.3 Group modify notification

The SGM-S shall convey the following parameters while sending identify list notification to SGM-C.

Table B.3-1: Parameters for group announcement notification

Parameter	Description
Identity	REQUIRED. A unique string representing notification channel identity.
Event	REQUIRED. Shall be set to SUBSCRIBE_GROUP_MODIFICATION (0x02) as specified in table A.1.2-2.
groupID	REQUIRED. An URI that represent a VAL group identity

Annex C (informative): Change history

Change history							
Date	Meeting	TDoc	CR	Rev	Cat	Subject/Comment	New version
2019-09	CT1#120	C1-196115				Draft skeleton provided by the rapporteur.	0.0.0
2019-10	CT1#120					Implementing the following p-CR agreed by CT1: C1-196603, C1-196605, C1-196851, C1-196852	0.1.0
2019-11	CT1#121					Implementing the following p-CR agreed by CT1: C1-198615, C1-198811, C1-198812, C1-198813, C1-198814	0.2.0
2019-12	CT-86	CP-193152				Presentation for information at TSG CT	1.0.0
2020-03	CT1#122-e					Implementing the following p-CR agreed by CT1: C1-201004, C1-200634, C1-200635, C1-200636, C1-200637, C1-200887, C1-200888, C1-200640, C1-200884, C1-200885, C1-200822, C1-200644	1.1.0
2020-03	CT-87e	CP-200168				Presentation for approval at TSG CT	2.0.0
2020-03	CT-87e					Version 16.0.0 created after approval	16.0.0
2020-06	CT-88e	CP-201129	0001		B	SIP based subscribe/notify procedures for SEAL group management	16.1.0
2020-06	CT-88e	CP-201129	0002	1	F	Removal of Editor's notes	16.1.0
2020-06	CT-88e	CP-201129	0003		F	Indication from SGM-S to SGM-C about group join required	16.1.0
2020-06	CT-88e	CP-201129	0004		F	Corrections in HTTP request-uri value	16.1.0
2020-06	CT-88e	CP-201129	0005	1	B	Adding IANA registration template for SEAL group document	16.1.0
2020-06	CT-88e	CP-201129	0006		F	Adding VAL user id in subscription parameter	16.1.0
2020-09	CT-89e	CP-202163	0007		D	Removing Heading level-7 as per drafting rules	16.2.0

History

Document history		
V16.1.0	August 2020	Publication
V16.2.0	October 2020	Publication