

# ETSI TS 124 623 V12.6.0 (2015-01)



**Digital cellular telecommunications system (Phase 2+);  
Universal Mobile Telecommunications System (UMTS);  
LTE;  
Extensible Markup Language (XML)  
Configuration Access Protocol (XCAP)  
over the Ut interface for Manipulating Supplementary Services  
(3GPP TS 24.623 version 12.6.0 Release 12)**



---

**Reference**

RTS/TSGC-0124623vc60

---

**Keywords**

GSM,LTE,UMTS

**ETSI**

---

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

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C  
Association à but non lucratif enregistrée à la  
Sous-Préfecture de Grasse (06) N° 7803/88

---

**Important notice**

The present document can be downloaded from:

<http://www.etsi.org>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the only prevailing document is the print of the Portable Document Format (PDF) version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status. Information on the current status of this and other ETSI documents is available at

<http://portal.etsi.org/tb/status/status.asp>

If you find errors in the present document, please send your comment to one of the following services:

[http://portal.etsi.org/chaicor/ETSI\\_support.asp](http://portal.etsi.org/chaicor/ETSI_support.asp)

---

**Copyright Notification**

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.  
The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2015.

All rights reserved.

**DECT™**, **PLUGTESTS™**, **UMTS™** and the ETSI logo are Trade Marks of ETSI registered for the benefit of its Members.  
**3GPP™** and **LTE™** are Trade Marks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.  
**GSM®** and the GSM logo are Trade Marks registered and owned by the GSM Association.

---

## Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<http://ipr.etsi.org>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

---

## Foreword

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

The present document may refer to technical specifications or reports using their 3GPP identities, UMTS identities or GSM identities. These should be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between GSM, UMTS, 3GPP and ETSI identities can be found under <http://webapp.etsi.org/key/queryform.asp>.

---

## Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**may not**", "**need**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

# Contents

Intellectual Property Rights .....	2
Foreword.....	2
Modal verbs terminology.....	2
Foreword.....	5
1 Scope .....	6
2 References .....	6
3 Definitions and abbreviations.....	7
3.1 Definitions .....	7
3.2 Abbreviations .....	7
4 Architecture for manipulating supplementary services settings.....	8
5 The eXtensible Markup Language (XML) Configuration Access Protocol (XCAP) .....	8
5.1 Introduction .....	8
5.2 Functional entities .....	9
5.2.1 User Equipment (UE) .....	9
5.2.1.1 General .....	9
5.2.1.2 Subscription for notification of state changes in XML document.....	9
5.2.2 Authentication Proxy (AP) .....	9
5.2.2.1 Introduction.....	9
5.2.2.2 Authentication.....	10
5.2.2.2.0 General .....	10
5.2.2.2.1 Authentication based on the generic authentication architecture.....	10
5.2.2.2.2 Void.....	10
5.2.2.3 Authorization .....	10
5.2.3 Application Server (AS) .....	11
5.2.3.1 General .....	11
5.2.3.2 Authentication and authorization .....	11
5.2.3.2.0 General .....	11
5.2.3.2.1 HTTP digest authentication .....	11
5.2.3.3 Subscription acceptance and notification of state changes in XML document .....	12
5.2.3.4 Validation against service capability.....	12
5.3 Roles.....	12
5.3.1 XCAP client.....	12
5.3.1.1 Introduction.....	12
5.3.1.2 Manipulating supplementary services .....	12
5.3.1.2.1 General .....	12
5.3.1.2.2 U E temporarily prevented from manipulating supplementary service settings via XCAP.....	12
5.3.1.2.3 Supplementary service settings manipulation errors .....	13
5.3.1.2.4 HTTP retry when no response is received .....	13
5.3.2 XCAP server.....	13
5.3.2.1 Introduction.....	13
5.3.2.2 Manipulation acceptance.....	13
5.3.2.3 User not allowed to manipulate settings via XCAP .....	14
5.3.2.4 Supplementary Service subscription errors.....	14
6 Supplementary services XCAP application usage .....	14
6.1 Structure of the XML document.....	14
6.2 XCAP application usage .....	15
6.3 XML schema .....	17
6.4 Template for a supplementary service XML schema .....	18
<b>Annex A (informative): Void .....</b>	<b>19</b>
<b>Annex B (normative): Connectivity Aspects when using XCAP .....</b>	<b>20</b>

B.1 Scope .....20

B.2 Procedures at the UE .....20

**Annex C (informative): Change history .....21**

History .....22

---

## Foreword

This Technical Specification (TS) was been produced by ETSI Technical Committee Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN) and originally published as ETSI TS 183 023 [13]. It was transferred to the 3rd Generation Partnership Project (3GPP) in January 2008.

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:

Version x.y.z

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.

---

# 1 Scope

The present document defines a protocol used for manipulating data related to supplementary services. The protocol is based on the eXtensible Markup Language (XML) Configuration Access Protocol (XCAP) RFC 4825 [8]. A new XCAP application usage is defined for the purpose of manipulating the supplementary services data. The common XCAP related aspects that are applicable to supplementary services are specified in the present document. The protocol allows authorized users to manipulate service-related data either when they are connected to IMS or when they are connected to non-IMS networks (e.g. the public Internet).

The present document is applicable to User Equipment (UE) and Application Servers (AS) which are intended to support XCAP application usage for manipulating data related to supplementary services.

---

# 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] IETF RFC 2616: "Hypertext Transfer Protocol - HTTP/1.1".
- [2] W3C REC-xmlschema-1-20010502: "XML Schema Part 1: Structures".
- [3] IETF RFC 2617: "HTTP Authentication: Basic and Digest Access Authentication".
- [4] IETF RFC 2246: "The TLS Protocol Version 1.0".
- [5] 3GPP TS 24.109: "Bootstrapping interface (Ub) and Network application function interface (Ua); Protocol details".
- [6] 3GPP TS 33.222: "Generic Authentication Architecture (GAA); Access to network application functions using Hypertext Transfer Protocol over Transport Layer Security (HTTPS)".
- [7] Void.
- [8] IETF RFC 4825: "The Extensible Markup Language (XML) Configuration Access Protocol (XCAP)".
- [9] Void
- [10] Void.
- [11] IETF RFC 5875 (May 2010): "An Extensible Markup Language (XML) Configuration Access Protocol (XCAP) Diff Event Package".
- [12] ETSI TS 183 038: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); PSTN/ISDN Simulation Services; Extensible Markup Language (XML) Document Management; Protocol Specification (Endorsement of OMA-TS-XDM-Core-V1-0-20051103-C and OMA-TS-XDM-Shared-V1-0-20051006-C)".
- [13] ETSI TS 183 023 V1.4.0: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); PSTN/ISDN simulation services; Extensible Markup Language (XML) Configuration Access Protocol (XCAP) over the Ut interface for Manipulating NGN PSTN/ISDN Simulation Services".

- [14] OMA-TS-XDM\_Core-V1\_1-20080627-A: "XML Document Management (XDM) Specification".
- [15] 3GPP TS 23.003: "Numbering, addressing and identification".
- [16] 3GPP TS 24.315: "IP Multimedia Subsystem (IMS) Operator Determined Barring (ODB); Stage 3".
- [17] 3GPP TS 33.141: "Presence service; Security".
- [18] IETF RFC 6665 (July 2012): "SIP-Specific Event Notification".
- [19] 3GPP TS 24.167: "3GPP IMS Management Object (MO); Stage 3".
- [20] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

---

## 3 Definitions and abbreviations

### 3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [20] and IETF RFC 4825 [8] apply.

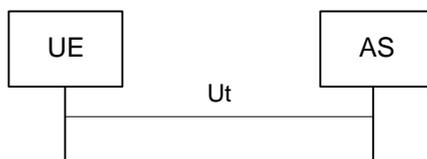
### 3.2 Abbreviations

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

AP	Authentication Proxy
AS	Application Server
AUID	Application Unique ID
HTTP	HyperText Transfer Protocol
ISDN	Integrated Services Digital Network
MIME	Multipurpose Internet Mail Extensions
NAF	Network Application Function
NGN	Next Generation Network
ODB	Operator Determined Barring
PSTN	Public Switched Telephone Network
TLS	Transport Layer Security
UE	User Equipment
URI	Uniform Resource Identifier
XCAP	XML Configuration Access Protocol
XML	eXtended Markup Language
XUI	XCAP User Identifier

## 4 Architecture for manipulating supplementary services settings

The protocol described in the present document allows to manipulate settings and variables related that influence the execution of one or more supplementary services. Manipulation of the supplementary services take place over the Ut interface (UE to AS), as shown in figure 1.

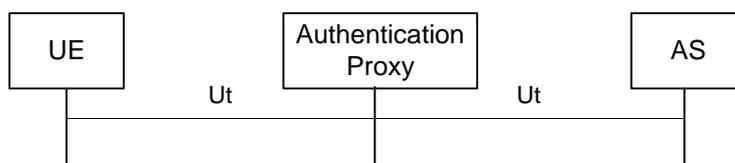


**Figure 1: Ut interface**

Manipulation of supplementary services does not usually take place during real-time operation. Typically users manipulate their services configuration data prior to the invocation and execution of the service.

Authentication of the user with HTTP may take place directly at the AS, such as in figure 1, or with the support of an Authentication Proxy, such as in figure 2. The architecture for authentication is provided in 3GPP TS 33.222 [6].

NOTE: The Network Application Function (NAF) can be an AS.



**Figure 2: Authentication proxy in the Ut interface path**

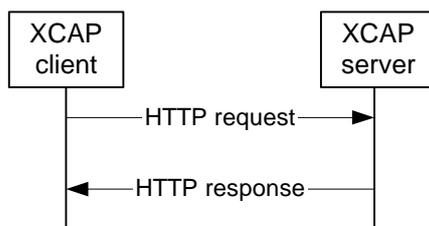
## 5 The eXtensible Markup Language (XML) Configuration Access Protocol (XCAP)

### 5.1 Introduction

For the purpose of manipulating data stored in an application server the XML Configuration Access Protocol (XCAP) [8] is used. XCAP allows a client to read, write and modify application configuration data, stored in XML format on a server. XCAP maps XML document sub-trees and element attributes to HTTP URIs, so that these components can be directly accessed by HTTP (see IETF RFC 2616 [1]). XCAP uses the HTTP methods PUT, GET, and DELETE to operating on XML documents stored in the server.

In the case of supplementary services, the data stored in a server is related to the execution of that given service. The present document defines a new XCAP Application Usage for the purpose of allowing a client to manipulate data related to supplementary services.

XCAP (see IETF RFC 4825 [8]) defines two logical roles: XCAP client and XCAP servers. An XCAP client is an HTTP/1.1 compliant client. Similarly an XCAP server is an HTTP/1.1 compliant server. The XCAP server acts as a repository of XML documents that customize and modify the execution of the supplementary services. Figure 3 depicts the XCAP architecture where an XCAP client sends an HTTP/1.1 request to an XCAP server. The server replies with an HTTP/1.1 response.



**Figure 3: XCAP architecture**

According to XCAP (see IETF RFC 4825 [8]), each application that makes use of XCAP defines its own XCAP application usage. The present document defines an supplementary services XCAP application usage in clause 6. This application usage defines the XML schema W3C REC-xmlschema-1-20010502 [2] for the data used by the application, along with other key pieces of information.

XCAP focuses on the definition of XML documents that are compliant with the XML schema and constraints defined for a particular XCAP application usage. XCAP allows application to provide XML documents that are common for all users or XML documents that affect the service of a given user.

Central to XCAP is the construction of the HTTP URI that points to particular XML document or certain components of it. A component in an XML document can be an XML element, attribute, or the value of it.

## 5.2 Functional entities

### 5.2.1 User Equipment (UE)

#### 5.2.1.1 General

The UE implements the role of an XCAP client, as described in subclause 5.3.1 accessing the XCAP application usage as described in subclause 6.2.

For systems where Generic Authentication Architecture [6] is used, the UE shall support the authentication mechanisms specified in 3GPP TS 33.222 [6] and 3GPP TS 24.109 [5].

For systems where Generic Authentication Architecture [6] is not used, the UE shall support RFC 2617 [3] and IETF RFC 2246 [4] according to ETSI TS 183 038 [12].

For systems where Generic Authentication Architecture [6] is not used, the UE may support the authentication mechanisms specified in 3GPP TS 33.141 [17] annex D.

On sending an HTTP request, the UE may indicate the user's identity intended to be used with the AS by adding a HTTP X-3GPP-Intended-Identity header (3GPP TS 24.109 [5]) to the outgoing HTTP request. If the authentication mechanism specified in 3GPP TS 33.141 [17] annex D is used, the UE shall add a HTTP X-3GPP-Intended-Identity header field.

#### 5.2.1.2 Subscription for notification of state changes in XML document

In order to keep the supplementary services state synchronized with the network elements and other terminals that the user might be using, the UE should subscribe to changes in the XCAP simserv documents by generating a SUBSCRIBE request in accordance with RFC 5875 [11] and RFC 6665 [18].

### 5.2.2 Authentication Proxy (AP)

#### 5.2.2.1 Introduction

An Authentication Proxy is an HTTP/1.1 IETF RFC 2616 [1] compliant server whose main purpose is to authenticate the user requests. The Authentication Proxy is used to separate the authentication procedure and the Application Server (AS) specific application logic to different logical entities.

The AP is configured as a HTTP reverse proxy, i.e. the FQDN of the AS is configured to the AP such a way that the IP traffic intended to the AS is directed to the AP by the network. The AP performs the authentication of the UE. After the authentication procedure has been successfully completed, the AP assumes the typical role of a reverse proxy, i.e. the AP forwards HTTP requests originating from the UE to the correct AS, and returns the corresponding HTTP responses from the AS to the originating UE.

The AP allows authorized users to manipulate services when they are connected to an IMS network or when they are connected to a non-IMS network (e.g. the public Internet). Authentication details can differ in both situations. Provisioning of credentials to authenticate the user is outside the scope of the present document. 3GPP TS 33.222 [6] provides further architectural authentication details.

NOTE: Multiple APs can exist between the UE and the AS, and the UE can obtain a list of different AP addresses via DNS query.

## 5.2.2.2 Authentication

### 5.2.2.2.0 General

On receiving an HTTP request, the AP shall first determine the mechanism used to authenticate the user. If the Generic Authentication Architecture [6] is used, the AP shall attempt to authenticate the user via the mechanisms specified in 3GPP TS 33.222 [6] and the AP shall follow the procedures indicated in subclause 5.2.2.2.1. For systems where Generic Authentication Architecture 3GPP TS 33.222 [6] is not used, the AP shall attempt to authenticate the user according to IETF RFC 2617 [3] (ETSI TS 183 038 [12] provides guidelines for the Authentication Proxy) or 3GPP TS 33.141 [17] annex D.

#### 5.2.2.2.1 Authentication based on the generic authentication architecture

On receiving an HTTP request that contains the Authorization header field, the AP shall:

- a) use the value of that username parameter of the Authorization header field to authenticate the user;
- b) apply the procedures specified in IETF RFC 2617 [3] for authentication;
- c) if the HTTP request contains an X-3GPP-Intended-Identity header field (3GPP TS 24.109 [5]), then the AP may verify that the user identity belongs to the subscriber. This verification of the user identity shall be performed dependant on the subscriber's application specific or AP specific user security settings;
- d) if authentication is successful, remove the Authorization header field from the HTTP request;
- e) insert an HTTP X-3GPP-Asserted-Identity header field (3GPP TS 24.109 [5]) that contains the asserted identity or a list of identities; and
- f) forward the HTTP request to the appropriate AS.

On receiving an HTTP response for the previous request, the AP shall:

- a) add an Authentication-Info header field in accordance to the procedures described in 3GPP TS 33.222 [6]; and
- b) forward the response to the XCAP client.

On receiving an HTTP request that does not contain the Authorization header field, the AP shall:

- a) challenge the user by generating a 401 Unauthorized response according to the procedures specified in 3GPP TS 33.222 [6] and IETF RFC 2617 [3]; and
- b) forward the 401 Unauthorized response to the sender of the HTTP request.

#### 5.2.2.2.2 Void

### 5.2.2.3 Authorization

The AP shall be able to decide whether particular subscriber, i.e. the UE, is authorized to access a particular AS. On doing so, the AP may use the User Security Settings specified in 3GPP TS 24.109 [5].

The AP may indicate an asserted identity or a list of identities to the AS by adding an HTTP X-3GPP-Asserted-Identity header field to the HTTP requests prior to forwarding the request to the AS. In case of multiple identities, they shall be separated by comma (,) and each identity shall be surrounded by quotation marks ("). Whether the AP supports this handling of an asserted identity or a list of identities then it shall depend on local policy in the AP. In addition the subscriber's application specific or AP specific user security settings may be considered.

The AP may indicate an authorization flag or a list of authorization flags from the application specific user security settings (USS) to the AS by adding a HTTP X-3GPP-Authorization-Flags header field to the HTTP request prior to forward it to the XCAP server. The HTTP X-3GPP-Authorization-Flags header field shall contain a list of authorization flags separated by comma (,) and each authorization flag is surrounded by quotation marks ("). In case the AP supports this handling of authorization flags from USS then it shall depend on local policy in the AP.

## 5.2.3 Application Server (AS)

### 5.2.3.1 General

An Application Server implements the role of an XCAP server as described in subclause 5.3.2 providing the XCAP application usage as described in subclause 6.2.

For systems where Generic Authentication Architecture [6] is used, the AS shall support the authentication mechanisms specified in 3GPP TS 33.222 [6] and 3GPP TS 24.109 [5].

For systems where Generic Authentication Architecture [6] is not used, the AS shall support IETF RFC 2617 [3] and IETF RFC 2246 [4] according to ETSI TS 183 038 [12].

Procedures regarding Operator Determined Barring (ODB) are defined in 3GPP TS 24.315 [16].

For systems where Generic Authentication Architecture [6] is not used, the AS may support the authentication mechanisms specified in 3GPP TS 33.141 [17] annex D.

### 5.2.3.2 Authentication and authorization

#### 5.2.3.2.0 General

If an Authentication Proxy (AP) is provided in the path of the HTTP request, then the AS receives an HTTP request from a trusted source (the AP) and contains an HTTP X-3GPP-Asserted-Identity header (3GPP TS 24.109 [5]) that includes an asserted identity of the user. In this case the AS does not need to authenticate the user, but just provide authorization to access the requested resource.

If an HTTP X-3GPP-Asserted-Identity header (3GPP TS 24.109 [5]) is not present in the HTTP request or if the request is received from a non-trusted source, then the AS needs to authenticate the user prior to providing authorization to the XCAP resource by applying the procedures of authentication mechanisms specified in 3GPP TS 33.222 [6] and 3GPP TS 24.109 [5] in case Generic Authentication Architecture is selected, or as described in subclause 5.2.3.2.1 or 3GPP TS 33.141 [17] annex D otherwise.

#### 5.2.3.2.1 HTTP digest authentication

On receiving an HTTP request that does not contain an Authorization header the AS shall:

- a) challenge the user by generating a 401 Unauthorized response that contains the proper Digest authentication parameters (e.g. realm), according to IETF RFC 2617 [3]. Provisioning of credentials to authenticate the user is outside the scope of the present document; and
- b) forward the 401 Unauthorized response to the sender of the HTTP request.

On receiving an HTTP request that contains an Authorization header, the AS shall:

- a) apply the authentication procedures defined in IETF RFC 2617 [3]; and
- b) authorize or deny authorization depending on the authenticated identity.

### 5.2.3.3 Subscription acceptance and notification of state changes in XML document

When the AS receives a SUBSCRIBE request having the Event header field value set to "xcap-diff", the AS shall first authenticate the source of the SUBSCRIBE request and then perform authorization. Afterwards, the AS shall generate a response to the SUBSCRIBE request and notifications in accordance with RFC 5875 [11] and RFC 6665 [18].

### 5.2.3.4 Validation against service capability

On receiving a XCAP request to modify service settings for a supplementary service, the AS shall check whether service capability fragments within the sirmservs document for the subscription of the sender for the XCAP request are available. If a service capability fragment within the sirmservs document is available, the AS shall validate the XCAP request against constraints defined in that service capability fragment and only accept modifications that are allowed by the service capability fragment. If the validation fails, the AS shall respond with a HTTP 409 (Conflict) response as defined in IETF RFC 4825 [8].

NOTE: The XML schema for a service capability fragment for a supplementary service is defined in the respective supplementary service specification.

## 5.3 Roles

### 5.3.1 XCAP client

#### 5.3.1.1 Introduction

The XCAP client is a logical function as defined in IETF RFC 4825 [8]. The XCAP client provides the means to manipulate the general data, such as configuration settings related to supplementary services.

In order to manipulate XCAP resources stored on the XCAP server, the XCAP client uses the XCAP Root URI as defined in subclause 13.9.1 of 3GPP TS 23.003 [15]. The UE implementing the XCAP client can be provisioned with an XCAP Root URI as specified in Appendix C in OMA-TS-XDM\_Core-V1\_1-20080627-A [14].

NOTE: In order to be able to manipulate XCAP resources stored on the XCAP server, the XCAP client needs to know the user's directory name. It is assumed that this value is pre-provisioned or the UE uses some means to discover it. Discovery mechanisms are outside the scope of the present document.

#### 5.3.1.2 Manipulating supplementary services

##### 5.3.1.2.1 General

When the XCAP client intends to manipulate a resource list, the XCAP client shall generate an HTTP PUT, HTTP GET or HTTP DELETE request in accordance with IETF RFC 4825 [8] and the supplementary services application usage specified in clause 6 of the present document. The XCAP client may attempt to manipulate resources for one or more supplementary services per request.

IETF RFC 4825 [8] describes the usage of a locally cached copy of resource lists. The XCAP client shall ensure that a modification of a resource list is performed using a version of the resource list that is synchronized with the resource list that is stored in the XCAP server.

NOTE: One mechanism to ensure that the locally cached version of a resource list is the same as the version of the resource list on the XCAP server is the usage of If-Match header field for conditional operations as defined in IETF RFC 4825 [8] by the XCAP client.

##### 5.3.1.2.2 U E temporarily prevented from manipulating supplementary service settings via XCAP

If the XCAP client receives a HTTP 403 (Forbidden) response to an HTTP PUT, HTTP GET or HTTP DELETE request, the XCAP client should not retry to manipulate the supplementary service settings via XCAP for a certain time period.

NOTE 1: If the UE is not configured for supplementary service management as specified in 3GPP TS 24.167 [19], the UE can use another mechanism or domain (if available) to manipulate the supplementary services configuration settings (e.g. CS domain).

NOTE 2: The certain time period that the XCAP client does not retry the manipulation of supplementary services settings via XCAP depends on the type of terminal that implements the XCAP client (e.g. XCAP clients residing on mobile terminals can retry after a power-off/power-on or after detection of a change of USIM/ISIM).

### 5.3.1.2.3 Supplementary service settings manipulation errors

If the XCAP client receives an HTTP 409 (Conflict) response to an XCAP request (within an HTTP PUT request or HTTP DELETE request) where the request contained changes to the *simservs* XML document (as defined in subclause 6.1) then the XCAP client shall not attempt to resend the request with the same contents but if there are smaller portion of the change that are appropriate to make then the XCAP client should attempt to resend these smaller portions of changes to the *simservs* XML document, with each smaller portion contained within its own XCAP request (each within an HTTP PUT request or HTTP DELETE request, as appropriate).

NOTE 1: The functionality desired by the user and the XCAP client implementation can determine how and whether to reappportion changes to the *simservs* XML document in a new XCAP request from a previous XCAP request. One example could be to align portions of changes to known supplementary service boundaries.

NOTE 2: An XCAP client might receive an HTTP 409 (Conflict) response for reasons other than a supplementary service subscription error e.g. as defined in IETF RFC 4825 [8]. Indication of the specific reason for the error is not defined in the current version of the present document.

### 5.3.1.2.4 HTTP retry when no response is received

If no response is received within a certain time period, after the XCAP client has sent out an HTTP request and the XCAP client has different IP addresses available, the XCAP client may retry the request using one of the other IP addresses.

NOTE: The certain time period before the XCAP client retries the request depends on the configuration of the terminal that implements the XCAP client.

## 5.3.2 XCAP server

### 5.3.2.1 Introduction

The XCAP server is a logical function as defined in IETF RFC 4825 [8]. The XCAP server can store data related to the configuration of supplementary services. The XCAP server shall provide or deny authorization to access XCAP resources by authenticated users. It is an operator configurable option in the XCAP server as to which supplementary services (if any) are provisioned for a subscription and what constraints (if any) apply to settings for provisioned supplementary services.

### 5.3.2.2 Manipulation acceptance

When the XCAP server receives an HTTP PUT, HTTP GET or HTTP DELETE request for manipulating or fetching a resource list, the XCAP server shall first authenticate the request and then perform authorization. Subclause 5.2.2 provides more details on the authentication and authorization of HTTP requests.

The XCAP server shall support conditional processing as specified in IETF RFC 4825 [8] based on If-Match header field.

Afterwards the XCAP server shall perform the requested action and generate a response in accordance with IETF RFC 4825 [8] and the supplementary services application usage specified in clause 6.

### 5.3.2.3 User not allowed to manipulate settings via XCAP

If the username identified by the XCAP User Identifier (XUI) in the HTTP PUT, HTTP GET or HTTP DELETE request, is not allowed to manipulate settings via XCAP, then the XCAP server shall respond with a HTTP 403 (Forbidden) response.

NOTE: If the UE is not configured for supplementary service management as specified in 3GPP TS 24.167 [xx], it is expected that operators do not configure their XCAP servers to return the HTTP 403 error response code for any other reason than specified above.

### 5.3.2.4 Supplementary Service subscription errors

If the subscription associated with the username identified by the XCAP User Identifier (XUI) in a received HTTP PUT or HTTP DELETE request is allowed to manipulate settings via XCAP and is either not provisioned with one or more supplementary services indicated in the XML document contained within the request or is provisioned but the indicated configuration is not in compliance with one or more operator defined constraints, then the XCAP server shall respond with an HTTP 409 (Conflict) response and shall not update the settings.

NOTE: An XCAP server might send an XCAP client an HTTP 409 (Conflict) response for reasons other than a supplementary service subscription error e.g. as defined in IETF RFC 4825 [8]. Indication of the specific reason for the error is not defined in the current version of the present document.

---

## 6 Supplementary services XCAP application usage

### 6.1 Structure of the XML document

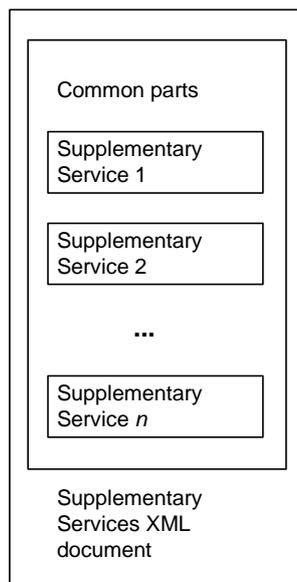
XCAP provides for the existence of application usages that define the conventions and constraints related to the manipulation of XML documents in an XCAP server. The present document defines a supplementary services XCAP application usage.

NOTE: Further releases can extend this application usage when deemed practical.

The present document follows a modular approach, as depicted in figure 4, that provides for the existence of a *simservs* XML document that contains the data associated to one or more supplementary services. The *simservs* XML document is composed of a common part, defined by the present document, and a number of XML fragments each corresponding to one or more supplementary services.

NOTE: This modular approach has significant advantages. Particularly, it is versatile enough to allow any number of configurations. For example, in one configuration, an XCAP server might be managing a given server. In this case, the *simservs* XML document will contain one subtree per service. In another configuration, each service is managed in its own XCAP server, case in which the XML document in each XCAP server will contain the common parts and a single XML subtree that manages the service. Yet in a third configuration the XCAP server stores several XML documents, each document managing one or more services.

The XML schema for the *simservs* XML document, including the common parts, is specified in subclause 6.3 of the present document. This XML schema allows for each of the individual XML schemas pertaining to a particular service to import the common parts XML schema. Each XML fragment affects the settings of one or more supplementary services. The XML schema of each of the supplementary services is specified in its own specification. A template for this XML schema is provided in subclause 6.4 of the present document.



**Figure 4: Structure of a supplementary services XML document**

The *simservs* XML document starts with a <simservs> root XML element that can contain one or more child elements pertaining to supplementary services. Each of these service elements can contain an "active" attribute that indicates whether the service is activated or not. When the "active" attribute is absent on a service element, it indicates that the service is activated. Elements and attributes from different namespaces can be present as well. Services may also include capability elements that are read-only. These elements indicate which capabilities the network has provisioned for a user.

## 6.2 XCAP application usage

XCAP requires application usages to fulfil a number of steps in the definition of such application usage. The remainder of this clause specifies the required definitions of the supplementary services XCAP Application Usage.

**Application Unique ID (AUID):** Each XCAP application usage is associated with a unique name called the Application Unique ID (AUID). The AUID defined by this application usage falls into the vendor-proprietary namespace of XCAP AUID, where ETSI is considered a vendor.

The AUID allocated to the supplementary services XCAP application usage is:

`simservs.ngn.etsi.org`

**XML schema:** Implementations in compliance with the present document shall implement the XML schema that includes the XML Schema defined in clause 6.3. Additionally, each supplementary service (or group of them) is modelled with a XML fragment that is validated according to a specific XML schema. The XML schema that affects the settings of the related service is specified in the specification of the given supplementary service. Subclause 6.4 provides a template that shall be included in XML Schema that also includes the XML Schema defined in subclause 6.3 along with inclusion of XML schema defined by each of the supplementary services that implement XML schemas for data manipulation. Additionally the schema in subclause 6.3 contains the specification of a number of common service specific elements and types, the semantics and applicability of these elements is described in the service specifications that use them.

**Default document namespace:** XCAP requires application usages to declare the default document namespace specified in IETF RFC 4825 [8]. The default document namespace of the supplementary services XCAP application usage is:

`http://uri.etsi.org/ngn/params/xml/simservs/xcap`

**MIME type:** The MIME type of supplementary services XML documents is:

`application/vnd.etsi.simservs+xml`

**Validation constraints:** The present document does not specify any additional constraint beyond those defined by XCAP RFC 4825 [8]. Note, however, that each of the supplementary services may specify additional constraints on each of the XML subdocuments.

**Data semantics:** The XML schema does not accept URIs that could be expressed as a relative URI reference causing a resolution problem. However, each of the supplementary services should consider if relative URIs are allowed in the subdocument tree, and in that case, they should indicate how to resolve relative URI references. In the absence of further indications, relative URI references should be resolved using the document URI as the base of the relative URI reference.

**Naming conventions:** Supplementary services XML documents are stored under the user's Home Directory (which is located under the "users" sub-tree). The filename in the document selector is:

`simservs.xml`

**Resource interdependencies:** The present document does not specify additional resource interdependency beyond those specified in the XML schema and beyond any resource interdependency that may be specified in each of supplementary services.

**Authorization policies:** The following authorization policy applies to the owner of *simservs* XML document:

- a) authorised to retrieve any part of the document;
- b) unauthorised to create:
  - 1) new child element(s) to the <simservs> root element; and
  - 2) new attribute(s) for a child element of the the <simservs> root element;
- c) unauthorised to remove:
  - 1) existing child element(s) from the <simservs> root element; and
  - 2) existing attribute(s) from a child element of the <simservs> root element;
- d) unauthorised to replace or remove:
  - 1) read-only child element(s) of the <simservs> root element, their attributes and their content;
- e) unauthorised to replace:
  - 1) descendant element(s) of the <simservs> root element that are not allowed to be modified by the service capability fragments as described in subclause 5.2.3.4; and
  - 2) attribute(s) within descendant element(s) of the the <simservs> root element that are not allowed to be modified by the service capability fragments as described in subclause 5.2.3.4; and
- f) authorized to replace element(s) and attribute(s) other than those specified in bullet d).

Users other than the owner of the *simservs* XML document are unauthorised to perform any operation on the document.

Unauthorized manipulation attempts on the *simservs* XML document are rejected with an HTTP 409 (Conflict) response as defined in IETF RFC 4825 [8].

NOTE 1: It is allowed to replace the *simservs* XML document or its <simservs> root element containing read-only child elements provided that the read-only child elements, including their content, are preserved.

NOTE 2: Any child elements of the <simservs> root element of the *simservs* XML document unknown to the XCAP client can be potentially read-only.

## 6.3 XML schema

```

<?xml version="1.0" encoding="UTF-8"?>
<xs:schema targetNamespace="http://uri.etsi.org/ngn/params/xml/simservs/xcap"
  xmlns:ss="http://uri.etsi.org/ngn/params/xml/simservs/xcap"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  elementFormDefault="qualified"
  attributeFormDefault="unqualified">

<!-- The element "simservs" maps to the Common Parts of a supplementary services document -->

  <xs:element name="simservs">
    <xs:annotation>
      <xs:documentation>XML Schema for data manipulation of Supplementary
        Services
      </xs:documentation>
    </xs:annotation>
    <xs:complexType>
      <xs:sequence>
        <xs:element ref="ss:absService" minOccurs="0" maxOccurs="unbounded"/>
        <xs:element name="extensions" minOccurs="0">
          <xs:complexType>
            <xs:sequence>
              <xs:any namespace="##other" processContents="lax"
                minOccurs="0" maxOccurs="unbounded"/>
            </xs:sequence>
          </xs:complexType>
        </xs:element>
      </xs:sequence>
      <xs:anyAttribute namespace="##any" processContents="lax"/>
    </xs:complexType>
  </xs:element>

  <xs:element name="absService" abstract="true" type="ss:simservType"/>

  <xs:complexType name="simservType">
    <xs:attribute name="active" type="xs:boolean"
      use="optional" default="true" />
    <xs:anyAttribute namespace="##any" processContents="lax"/>
  </xs:complexType>

  <xs:complexType name="provisioned-type">
    <xs:attribute name="provisioned" type="xs:boolean"
      use="optional" default="true" />
    <xs:anyAttribute namespace="##any" processContents="lax"/>
  </xs:complexType>

  <xs:complexType name="supported-media-type">
    <xs:choice>
      <xs:element name="all-media" type="ss:empty-element-type"/>
      <xs:element name="no-media" type="ss:empty-element-type"/>
      <xs:sequence maxOccurs="unbounded">
        <xs:element name="media" type="ss:media-type"/>
      </xs:sequence>
      <xs:any namespace="##other" processContents="lax"/>
    </xs:choice>
  </xs:complexType>

  <xs:complexType name="provisioned-target-type">
    <xs:choice>
      <xs:element name="any-target-type" type="ss:empty-element-type"/>
      <xs:element name="telephony-type" type="ss:empty-element-type"/>
      <xs:any namespace="##other" processContents="lax"/>
    </xs:choice>
  </xs:complexType>

  <!-- service specific IETF common policy condition elements-->
  <xs:element name="anonymous" type="ss:empty-element-type"/>
  <xs:element name="presence-status" type="ss:presence-status-activity-type"/>
  <xs:element name="media" type="ss:media-type"/>
  <xs:element name="communication-diverted" type="ss:empty-element-type"/>
  <xs:element name="rule-deactivated" type="ss:empty-element-type"/>
  <xs:element name="not-registered" type="ss:empty-element-type"/>
  <xs:element name="busy" type="ss:empty-element-type"/>
  <xs:element name="no-answer" type="ss:empty-element-type"/>
  <xs:element name="not-reachable" type="ss:empty-element-type"/>
  <xs:element name="roaming" type="ss:empty-element-type"/>
  <xs:element name="international" type="ss:empty-element-type"/>

```

```

<xs:element name="international-exHC" type="ss:empty-element-type"/>
<xs:element name="request-name" type="ss:request-name-type"/>

<!-- service specific type declarations -->
<xs:simpleType name="media-type" final="list restriction">
  <xs:restriction base="xs:string"/>
</xs:simpleType>
<xs:simpleType name="presence-status-activity-type" final="list restriction">
  <xs:restriction base="xs:string"/>
</xs:simpleType>
<xs:complexType name="empty-element-type"/>
<xs:simpleType name="request-name-type" final="list restriction">
  <xs:restriction base="xs:string">
    <xs:pattern value="[A-Z]*/>
  </xs:restriction>
</xs:simpleType>

</xs:schema>

```

## 6.4 Template for a supplementary service XML schema

Supplementary services that implement XCAP operations to manipulate the data associated to its service shall base their XML schema in the following template. Replace "ServiceName" with the name or acronym of the actual service.

```

<?xml version="1.0" encoding="UTF-8"?>
<xs:schema targetNamespace="http://uri.etsi.org/ngn/params/xml/simservs/xcap"
  xmlns:ss="http://uri.etsi.org/ngn/params/xml/simservs/xcap"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  elementFormDefault="qualified"
  attributeFormDefault="unqualified">

  <xs:element name="ServiceName" substitutionGroup="ss:absService">
    <xs:annotation>
      <xs:documentation>Template of a
        Supplementary Service XML Schema
      </xs:documentation>
    </xs:annotation>

    <!-- If the service needs to add children elements or attributes -->
    <!-- it can use the following complexType for such purpose -->
    <xs:complexType>
      <xs:complexContent>
        <xs:extension base="ss:simservType">
          <xs:sequence>
            <!-- service specific elements can be defined here -->
            </xs:sequence>
            <!-- service specific attributes can be defined here -->
          </xs:extension>
        </xs:complexContent>
      </xs:complexType>

    </xs:element>
  </xs:schema>

```

Annex A (informative):  
Void

---

## Annex B (normative): Connectivity Aspects when using XCAP

### B.1 Scope

The present annex defines aspects for the connection between UE and the network to be used for XCAP.

---

### B.2 Procedures at the UE

In order to manipulate XCAP resources stored on the XCAP server, a UE can be configured with parameters describing a connection to be used for XCAP. Connection parameters can be configured as specified in appendix C in OMA-TS-XDM\_Core-V1\_1-20080627-A [14].

## Annex C (informative): Change history

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
2005-09					Publication as <b>ETSI TS 183 023</b>		1.1.1
2006-03					Publication as ETSI TS 183 023		1.2.1
2007-04					Publication as ETSI TS 183 023		1.3.1
2008-01					Publication as ETSI TS 183 023		1.4.0
2008-01					Conversion to <b>3GPP TS 24.423</b>		1.4.1
2008-01					Technically identical copy as <b>3GPP TS 24.623</b> as basis for further development.		1.4.2
2008-02					CT1#51 agreed to sent spec for information to plenary		1.4.3
2008-04					The following CR"s were incorporated and the editor adopted their content / structure to the structure of the TS  C1-081006	1.4.3	1.5.0
2008-05					The following CR"s were incorporated and the editor adopted their content / structure to the structure of the TS  C1-081616 C1-081894 C1-081916	1.5.0	1.6.0
2008-05					Editorial changes done by MCC	1.6.0	1.6.1
2008-06	CT#40	CP-080333			CP-080333 was approved by CT#40 and version 8.0.0 is created by MCC for publishing	1.6.1	8.0.0
2008-06					Version 8.0.1 created to include attachments (.xml and .xsd files)	8.0.0	8.0.1
2008-09	CT#41	CP-080533	0001	1	Tidyup .xml and .xsd files	8.0.1	8.1.0
2008-09	CT#41	CP-080533	0002		Applicability statement in scope	8.0.1	8.1.0
2009-06	CT#44	CP-090432	0005	2	Addition of international-communications condition	8.1.0	9.0.0
2009-09	CT#45	CP-090687	0007	1	Validation against capabilities	9.0.0	9.1.0
2009-09	CT#45	CP-090687	0008	1	Supported-media-type	9.0.0	9.1.0
2009-09	CT#45	CP-090687	0010		Supported target type	9.0.0	9.1.0
2009-09	CT#45				Editorial cleanup by MCC	9.1.0	9.1.1
2009-12	CT#46	CP-091040	0012	1	Change of ua-profile package to xcap-diff package	9.1.1	9.2.0
2009-12	CT#46	CP-090928	0013	2	Authorization policy update	9.1.1	9.2.0
2009-12	CT#46	CP-090928	0014	1	Service capabilities fragment	9.1.1	9.2.0
2009-12	CT#46	CP-090928	0015		Correct .xml schema	9.1.1	9.2.0
2011-03	CT#51				Upgrade to Rel-10	9.2.0	10.0.0
2011-09	CT#53	CP-110657	0021		IETF reference updates	10.0.0	10.1.0
2011-12	CT#54	CP-110857	0024	1	Incorrect MIME definition	10.1.0	10.2.0
2012-03	CT#55	CP-120097	0027	1	Connection to be used for XCAP	10.2.0	10.3.0
2012-03	CT#55	CP-120097	0030	1	Configuration of XCAP root URI	10.2.0	10.3.0
2012-09	CT#57				Upgrade to Rel-11	10.3.0	11.0.0
2012-12	CT#58	CP-120816	0032	2	Reference to ODB specification for ut based service configuration	11.0.0	11.1.0
2012-12	CT#58	CP-120817	0031	1	Alignment of authentication mechanisms with SA3 specifications	11.1.0	12.0.0
2013-06	CT#60	CP-130265	0033	1	Addition of 'request-name' XML element	12.0.0	12.1.0
2013-09	CT#61	CP-130511	0034	2	Supplementary Services Configuration fallback procedure	12.1.0	12.2.0
2013-12	CT#62	CP-130770	0036	2	Update to RFC 6665	12.2.0	12.3.0
2013-12	CT#62	CP-130763	0038	1	Breaking the "Manipulating supplementary services" clause into two subclauses	12.2.0	12.3.0
2013-12	CT#62	CP-130763	0040		XCAP disabling and retry CS domain.	12.2.0	12.3.0
2014-06	CT#64	CP-140330	0046	1	Default document namespace clarification	12.3.0	12.4.0
2014-06	CT#64	CP-140330	0051	2	Conditional operation for XCAP	12.3.0	12.4.0
2014-09	CT#65	CP-140665	0045	10	Handling of Supplementary Service provisioning errors	12.4.0	12.5.0
2014-12	CT#66	CP-140837	0053	1	simservs filename clarification	12.5.0	12.6.0
2014-12	CT#66	CP-140837	0054	2	Ut interface retry when no response received	12.5.0	12.6.0

---

## History

<b>Document history</b>		
V12.5.0	October 2014	Publication
V12.6.0	January 2015	Publication