|  |  |
| --- | --- |
| 3GPP TS 29.540 V16.10.0 (2022-03) | |
| Technical Specification | |
| 3rd Generation Partnership Project;  Technical Specification Group Core Network and Terminals;  5G System; SMS Services;  Stage 3  (Release 16) | |
|  | |
|  |  |
|  | |
| The present document has been developed within the 3rd Generation Partnership Project (3GPP TM) and may be further elaborated for the purposes of 3GPP. The present document has not been subject to any approval process by the 3GPPOrganizational Partners and shall not be implemented. This Specification is provided for future development work within 3GPPonly. The Organizational Partners accept no liability for any use of this Specification. Specifications and Reports for implementation of the 3GPP TM system should be obtained via the 3GPP Organizational Partners' Publications Offices. | |

|  |
| --- |
|  |
| ***3GPP***  Postal address  3GPP support office address  650 Route des Lucioles - Sophia Antipolis  Valbonne - FRANCE  Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16  Internet  http://www.3gpp.org |
| ***Copyright Notification***  No part may be reproduced except as authorized by written permission. The copyright and the foregoing restriction extend to reproduction in all media.  © 2022, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).  All rights reserved.  UMTS™ is a Trade Mark of ETSI registered for the benefit of its members  3GPP™ is a Trade Mark of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners LTE™ is a Trade Mark of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners  GSM® and the GSM logo are registered and owned by the GSM Association |

Contents

Foreword 5

1 Scope 6

2 References 6

3 Definitions and abbreviations 7

3.1 Definitions 7

3.2 Abbreviations 7

4 Overview 7

5 Services offered by the SMSF 7

5.1 Introduction 7

5.2 Nsmsf\_SMService Service 8

5.2.1 Service Description 8

5.2.2 Service Operations 8

5.2.2.1 Introduction 8

5.2.2.2 Activate 8

5.2.2.2.1 General 8

5.2.2.2.2 Registration procedure using Activate service operation 9

5.2.2.3 Deactivate 10

5.2.2.3.1 General 10

5.2.2.3.2 De-Registration procedure to remove SMS service authorization from SMSF 10

5.2.2.3.3 De-Registration procedure to remove SMS service authorization from SMSF for one of the registered Access Type 10

5.2.2.4 UplinkSMS 11

5.2.2.4.1 General 11

5.2.2.4.2 Procedures of sending SMS payload in uplink direction using UplinkSMS service operation 11

6 API Definitions 12

6.1 Nsmsf\_SMService Service API 12

6.1.1 API URI 12

6.1.2 Usage of HTTP 13

6.1.2.1 General 13

6.1.2.2 HTTP standard headers 13

6.1.2.2.1 General 13

6.1.2.2.2 Content type 13

6.1.2.2.3 ETag 13

6.1.2.2.4 If-Match 13

6.1.2.3 HTTP custom headers 13

6.1.2.3.1 General 13

6.1.2.4 HTTP multipart messages 14

6.1.3 Resources 14

6.1.3.1 Overview 14

6.1.3.2 Resource: UEContexts (Store) 15

6.1.3.2.1 Description 15

6.1.3.2.2 Resource Definition 15

6.1.3.2.3 Resource Standard Methods 15

6.1.3.3 Resource: UEContext (Document) 15

6.1.3.3.1 Description 15

6.1.3.3.2 Resource Definition 16

6.1.3.3.3 Resource Standard Methods 16

6.1.3.3.4 Resource Custom Operations 19

6.1.3.3.4.2.1 Description 19

6.1.3.3.4.2.2 Operation Definition 19

6.1.4 Custom Operations without associated resources 21

6.1.5 Notifications 21

6.1.6 Data Model 21

6.1.6.1 General 21

6.1.6.2 Structured data types 21

6.1.6.2.1 Introduction 21

6.1.6.2.2 Type: UeSmsContextData 22

6.1.6.2.3 Type: SmsRecordData 23

6.1.6.2.4 Void 23

6.1.6.2.5 Type: SmsRecordDeliveryData 23

6.1.6.3 Simple data types and enumerations 23

6.1.6.3.1 Introduction 23

6.1.6.3.2 Simple data types 23

6.1.6.3.3 Enumeration: SmsDeliveryStatus 23

6.1.6.4 Binary data 24

6.1.6.4.1 Introduction 24

6.1.6.4.2 SMS Payload Information 24

6.1.7 Error Handling 24

6.1.7.1 General 24

6.1.7.2 Protocol Errors 24

6.1.7.3 Application Errors 24

6.1.8 Feature negotiation 24

6.1.9 Security 25

6.1.10 HTTP redirection 25

Annex A (normative): OpenAPI specification 26

A.1 General 26

A.2 Nsmsf\_SMService API 26

Annex B (Informative): HTTP Multipart Messages 31

B.1 Example of HTTP multipart message 31

B.2 Void 31

B.3 Example HTTP multipart message with SMS binary data 31

Annex C (informative): Change history 32

# 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:

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.

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 stage 3 protocol and data model for the Nsmsf Service Based Interface. It provides stage 3 protocol definitions and message flows, and specifies the API for each service offered by the SMSF.

The 5G System stage 2 architecture and procedures are specified in 3GPP TS 23.501 [2] and 3GPP TS 23.502 [3].

The Technical Realization of the Service Based Architecture and the Principles and Guidelines for Services Definition are specified in 3GPP TS 29.500 [4] and 3GPP TS 29.501 [5].

# 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 23.501: "System Architecture for the 5G System; Stage 2".

[3] 3GPP TS 23.502: "Procedures for the 5G System; Stage 2".

[4] 3GPP TS 29.500: "5G System; Technical Realization of Service Based Architecture; Stage 3".

[5] 3GPP TS 29.501: "5G System; Principles and Guidelines for Services Definition; Stage 3".

[6] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces; Stage 3".

[7] IETF RFC 7540: "Hypertext Transfer Protocol Version 2 (HTTP/2)".

[8] IETF RFC 8259: "The JavaScript Object Notation (JSON) Data Interchange Format".

[9] IETF RFC 2387: "The MIME Multipart/Related Content-type".

[10] IETF RFC 2045: "Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies".

[11] 3GPP TS 23.040: "Technical realization of the Short Message Service (SMS)".

[12] 3GPP TS 24.011: "Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface".

[13] 3GPP TS 33.501: "Security architecture and procedures for 5G system".

[14] IETF RFC 6749: "The OAuth 2.0 Authorization Framework".

[15] 3GPP TS 29.510: "Network Function Repository Services; Stage 3".

[16] 3GPP TR 21.900: "Technical Specification Group working methods".

[17] IETF RFC 7807: "Problem Details for HTTP APIs".

[18] IETF RFC 7232: "Hypertext Transfer Protocol (HTTP/1.1): Conditional Requests".

# 3 Definitions and abbreviations

## 3.1 Definitions

For the purposes of the present document, the terms and definitions 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].

## 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].

5GC 5G Core Network

AMF Access Management Function

JSON Javascript Object Notation

SMSF SMS Function

# 4 Overview

Within the 5GC, the SMSF offers services to the AMF via the Nsmsf service based interface (see 3GPP TS 23.501 [2] and 3GPP TS 23.502 [3]).

Figures 4.1 provides the reference model (in service based interface representation and in reference point representation), with focus on the SMSF and the scope of the present specification.



Figure 4-1: Reference model – SMSF

The functionalities supported by the SMSF are listed in clause 6.2.13 of 3GPP TS 23.501 [2].

The services and service operations provided by the Nsmsf interface are listed in clause 5.2.9 of 3GPP TS 23.502 [3].

# 5 Services offered by the SMSF

## 5.1 Introduction

The SMSF supports the following services.

Table 5.1-1: NF Services provided by SMSF

| Service Name | Description | Example Consumer |
| --- | --- | --- |
| Nsmsf\_SMService | This service allows AMF to authorize SMS and activate SMS for the served user on SMSF. | AMF |

Table 5.1-2 summarizes the corresponding APIs defined for this specification.

Table 5.1-2: API Descriptions

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Service Name** | **Clause** | **Description** | **OpenAPI Specification File** | **apiName** | **Annex** |
| Nsmsf\_SMService | 6.1 | SMSF SMService | TS29540\_Nsmsf\_SMService.yaml | nsmsf-sms | A.2 |

## 5.2 Nsmsf\_SMService Service

### 5.2.1 Service Description

The Nsmsf\_SMService service provides the service capability for the NF Service Consumer (e.g. AMF) to authorize SMS and activate SMS for a service user on SMSF. The following are the key functionalities of this NF service:

- Activation or deactivation of SMS service for a given service user, which results in creating/updating/deleting an UE Context for SMS in SMSF;

- Send SMS payload in uplink direction to SMSF;

The Nsmsf\_SMService service supports the following service operations.

Table 5.2.1-1: Service operations supported by the Nsmsf\_SMService service

|  |  |  |  |
| --- | --- | --- | --- |
| Service Operations | Description | Operation  Semantics | Example Consumer(s) |
| Activate | Activate SMS service for a given service user, which results in creating or updating a UE Context for SMS in SMSF. | Request/Response | AMF |
| Deactivate | Deactivate SMS service for a given service user, which results in deleting or updating a UE Context for SMS in SMSF. | Request/Response | AMF |
| UplinkSMS | Send SMS payload in uplink direction to SMSF; | Request/Response | AMF |

### 5.2.2 Service Operations

#### 5.2.2.1 Introduction

This clause introduces the related procedures using Nsmsf\_SMService service operations for supporting SMS service.

#### 5.2.2.2 Activate

##### 5.2.2.2.1 General

The Activate service operation shall be used by the NF Service Consumer (e.g. AMF) to activate SMS service for a given service user, which results in creating or updating an individual UE Context for SMS in the SMSF, in the following procedures:

- Registration Procedure for SMS over NAS (see clause 4.13.3.1 of 3GPP TS 23.502 [3]);

- Registration Update Procedure for SMS over NAS due to AMF change (see clause 4.13.3.1 of 3GPP TS 23.502 [3]);

- Registration Update Procedure for SMS over NAS to add authorization for SMS over a new additional Access Type;

There shall be only one individual UE Context for SMS per service user.

##### 5.2.2.2.2 Registration procedure using Activate service operation

The NF Service Consumer (e.g. AMF) shall activate SMS service for a given service user by using the HTTP PUT method as shown in Figure 5.2.2.2.2-1.



Figure 5.2.2.2.2-1: Activation of SMS service

1. The NF Service Consumer (e.g. AMF) shall send a PUT request to the resource representing the UE Context for SMS (i.e. …/ue-contexts/{supi}) in the SMSF to activate SMS service for a given service user. The payload body of the PUT request shall contain a representation of the individual UE Context resource to be created or updated.

Depending on whether the target UE Context for SMS has already been created, the SMSF performs 2a or 2b:

2a. If the target UE Context for SMS is not created in SMSF, the SMSF retrieves subscription data from the UDM, performs service authorization for the given UE, and create UE Context for SMS for this UE;

If successful, "201 Created" shall be returned, the payload body of the PUT response shall contain the representation of the created resource and the "Location" header shall contain the URI of the created resource.

2b. If the target UE Context for SMS has already been created, the SMSF updates the UE Context for SMS with the NF Service Consumer (e.g. AMF) provided parameters.

If successful, "204 No Content" shall be returned.

2c. If the target UE Context for SMS has already been created and the NF Service Consumer (e.g. AMF) provided parameters contains 2 access types (i.e. an additional Access Type), the SMSF registers itself in UDM for the new Access Type for the given UE, performs service authorization for the given UE for the new Access Type and updates the UE context for SMS for this UE with the new additional Access Type.

If successful, "204 No Content" shall be returned.

2d. On failure, the appropriate HTTP status code (e.g. "403 Forbidden") indicating the error shall be returned.

A ProblemDetails IE shall be included in the payload body of PUT response, with the "cause" attribute of ProblemDetails set to application error codes specified in table 6.1.7.3-1.

2e. On redirection, the appropriate HTTP status code (e.g. "307 Temporary Redirect") shall be returned.

A RedirectResponse IE may be included in the payload body of PUT response, as specified in table 6.1.3.3.3.1-3.

#### 5.2.2.3 Deactivate

##### 5.2.2.3.1 General

The Deactivate service operation shall be used by the NF Service Consumer (e.g. AMF) to deactivate SMS service for a given service user, which results in deleting or updating an individual UE Context for SMS in the SMSF, in the following procedures:

- De-Registration Procedure to remove SMS service authorization from SMSF for SMS over NAS (see clause 4.13.3.2 of 3GPP TS 23.502 [3]);

- De-Registration procedure to remove SMS service authorization from SMSF for one of the registered Access Type (see clause 4.13.3.2 of 3GPP TS 23.502 [3]);

##### 5.2.2.3.2 De-Registration procedure to remove SMS service authorization from SMSF

The NF Service Consumer (e.g. AMF) shall deactivate SMS service for a given service user by using the HTTP DELETE method as shown in Figure 5.2.2.3.2-1.



Figure 5.2.2.3.2-1: Deactivation of SMS service

1. The NF Service Consumer (e.g. AMF) shall send a DELETE request to the resource representing the UE Context for SMS (i.e. …/ue-contexts/{supi}) in the SMSF.

2a. The SMSF deactivates the SMS service for the service user, and deletes the UE context for SMS from the SMSF.

On success, "204 No Content" shall be returned.

2b. On failure, the appropriate HTTP status code (e.g. "404 Not Found") indicating the error shall be returned.

A ProblemDetails IE shall be included in the payload body of DELETE response, with the "cause" attribute of ProblemDetails set to application error codes specified in table 6.1.7.3-1.

2c. On redirection, the appropriate HTTP status code (e.g. "307 Temporary Redirect") shall be returned.

A RedirectResponse IE may be included in the payload body of DELETE response, as specified in table 6.1.3.3.3.2-3.

##### 5.2.2.3.3 De-Registration procedure to remove SMS service authorization from SMSF for one of the registered Access Type

When the UE has SMS service activated on both of the Access Types and the NF Service Consumer (e.g. AMF) wants to deactivate SMS service for the given UE for one of the affected Access Type, the NF Service Consumer (e.g. AMF) shall use HTTP PUT method as shown in Figure 5.2.2.3.3-1.



Figure 5.2.2.3.3-1: Removal of SMS service authorization over one of the access types

1. The NF Service Consumer (e.g. AMF) shall send a PUT request to the resource representing the UE Context for SMS (i.e. …/ue-contexts/{supi}) in the SMSF. The payload body of the PUT request shall contain a representation of the individual UE Context resource to be updated. Only one Access Type that is allowed for SMS service shall be included in the PUT request payload body.

2a. Since the target UE Context for SMS was already created at the SMSF with both 3GPP and non-3GPP Access Types for the same NF Service Consumer (e.g. AMF) and the NF Service Consumer provided parameters contains only one Access Type, the SMSF deregisters itself in the UDM for the affected Access Type (i.e. the access type not included in the PUT request) for the given UE and updates the UE context for SMS by removing the affected Access Type.

On success, "204 No Content" shall be returned.

2b. On failure, the appropriate HTTP status code (e.g. "403 Forbidden") indicating the error shall be returned.

A ProblemDetails IE shall be included in the payload body of PUT response, with the "cause" attribute of ProblemDetails set to application error codes specified in table 6.1.7.3-1.

2c. On redirection, the appropriate HTTP status code (e.g. "307 Temporary Redirect") shall be returned.

A RedirectResponse IE may be included in the payload body of PUT response, as specified in table 6.1.3.3.3.1-3.

#### 5.2.2.4 UplinkSMS

##### 5.2.2.4.1 General

The UplinkSMS service operation shall be used by NF Service Consumer (e.g. AMF) to send SMS payload (e.g. SMS message or Ack) in the uplink direction to SMSF, in the following procedures:

- MO SMS delivery procedure (see clause 4.13.3.3-4.13.3.5 of 3GPP TS 23.502 [3]);

- MT SMS delivery procedure (see clause 4.13.3.6-4.13.3.8 of 3GPP TS 23.502 [3]);

##### 5.2.2.4.2 Procedures of sending SMS payload in uplink direction using UplinkSMS service operation

The NF Service Consumer (e.g. AMF) shall send SMS payload in uplink direction by using the "sendsms" custom operation as shown in Figure 5.2.2.4.2-1.



Figure 5.2.2.4.2-1: Send SMS payload in uplink direction

1. The NF Service Consumer (e.g. AMF) shall send a POST request to the resource representing the UEContext (i.e. …/ue-contexts/{supi}/sendsms) of the SMSF. The payload body of the POST request shall contain the SMS record to be sent.

2a. On success, "200 OK" shall be returned with "SmsRecordDeliveryData" object in the response body.

The SMSF may immediately respond to the NF service consumer, after successful inspection of the SMS payload, and set the "deliveryStatus" attribute to "SMS\_DELIVERY\_SMSF\_ACCEPTED"; the SMSF may also attempt to forward the SMS payload to SMS-GMSC/IWMSC/IP-SM-GW/SMS Router.

NOTE: The interaction between SMSF and SMS-GMSC/IWMSC/IP-SM-GW/SMS Router is out of the scope of this specification.

If successful, "200 OK" shall be returned. If needed, the payload body of the POST response shall contain the status of SMS record delivery attempts at the SMSF.

2b. On failure, the appropriate HTTP status code (e.g. "403 Forbidden") indicating the error shall be returned.

A ProblemDetails IE shall be included in the payload body of POST response, with the "cause" attribute of ProblemDetails set to application error codes specified in table 6.1.7.3-1.

2c. On redirection, the appropriate HTTP status code (e.g. "307 Temporary Redirect") shall be returned.

A RedirectResponse IE may be included in the payload body of POST response, as specified in table 6.1.3.3.4.2.2-2.

# 6 API Definitions

## 6.1 Nsmsf\_SMService Service API

### 6.1.1 API URI

The Nsmsf\_SMService shall use the Nsmsf\_SMService API.

The request URI used in HTTP request from the NF service consumer towards the NF service producer shall have the structure defined in clause 4.4.1 of 3GPP TS 29.501 [5], i.e.:

**{apiRoot}/<apiName>/<apiVersion>/<apiSpecificResourceUriPart>**

with the following components:

- The {apiRoot} shall be set as described in 3GPP TS 29.501 [5].

- The <apiName>shall be "nsmsf-sms".

- The <apiVersion> shall be "v2".

- The <apiSpecificResourceUriPart> shall be set as described in clause 6.1.3.

### 6.1.2 Usage of HTTP

#### 6.1.2.1 General

HTTP/2, as defined in IETF RFC 7540 [7], shall be used as specified in clause 5 of 3GPP TS 29.500 [4].

#### 6.1.2.2 HTTP standard headers

##### 6.1.2.2.1 General

The usage of HTTP standard headers is specified in clause 5.2.2 of 3GPP TS 29.500 [4].

##### 6.1.2.2.2 Content type

The following content types shall be supported:

- the JSON format (IETF RFC 8259 [8]). The use of the JSON format shall be signalled by the content type "application/json". See also clause 5.4 of 3GPP TS 29.500 [4].

- the Problem Details JSON Object (IETF RFC 7807 [17]). The use of the Problem Details JSON object in a HTTP response body shall be signalled by the content type "application/problem+json".

Multipart messages shall also be supported (see clause 6.1.2.4) using the content type "multipart/related", comprising:

- one JSON body part with the "application/json" content type; and

- one binary body part with 3gpp vendor specific content subtypes.

The 3gpp vendor specific content subtypes defined in Table 6.1.2.2.2-1 shall be supported.

Table 6.1.2.2.2-1: 3GPP vendor specific content subtypes

|  |  |
| --- | --- |
| content subtype | Description |
| vnd.3gpp.sms | Binary encoded payload, encoding SMS payload, as specified in 3GPP TS 23.040 [11] and 3GPP TS 24.011 [12]. |
| NOTE: Using 3GPP vendor content subtypes allows to describe the nature of the opaque payload (e.g. SMS payload) without having to rely on metadata in the JSON payload. | |

See clause 6.1.2.4 for the binary payloads supported in the binary body part of multipart messages.

##### 6.1.2.2.3 ETag

As described in IETF RFC 7232 [18] clause 2.32, an "ETag" (entity-tag) header should be included in HTTP responses except for non-cacheable resources to allow an NF Service Consumer performing a conditional request with "If-Match" header. If it is included, it shall contain a server-generated strong validator, that allows further matching of this value (included in subsequent client requests) with a given resource representation stored in the server or in a cache.

##### 6.1.2.2.4 If-Match

As described in IETF RFC 7232 [18] clause 3.1, an NF Service Consumer may issue conditional DELETE request towards SMSF by including an "If-Match" header in HTTP requests containing an entity tags received in previous response for the same resource.

#### 6.1.2.3 HTTP custom headers

##### 6.1.2.3.1 General

In this release of this specification, no custom headers specific to the Nsmsf\_SMService service are defined. For 3GPP specific HTTP custom headers used across all service based interfaces, see clause 5.2.3 of 3GPP TS 29.500 [4].

#### 6.1.2.4 HTTP multipart messages

HTTP multipart messages shall be supported, to transfer opaque SMS payload (e.g. SMS message, CP Ack, etc.), in the following service operations (and HTTP messages):

- UplinkSMS service operation;

HTTP multipart messages shall include one JSON body part and one binary body part comprising content of SMS payload content (see clause 6.1.6.4).

The JSON body part shall be the "root" body part of the multipart message. It shall be encoded as the first body part of the multipart message. The "Start" parameter does not need to be included.

The multipart message shall include a "type" parameter (see IETF RFC 2387 [9]) specifying the media type of the root body part, i.e. "application/json".

NOTE: The "root" body part (or "root" object) is the first body part the application processes when receiving a multipart/related message, see IETF RFC 2387 [9]. The default root is the first body within the multipart/related message. The "Start" parameter indicates the root body part, e.g. when this is not the first body part in the message.

A binary body part shall include a Content-ID header (see IETF RFC 2045 [10]), and the JSON body part shall make a reference to the binary body part using the Content-ID header field.

Examples of multipart/related messages can be found in Annex B.

### 6.1.3 Resources

#### 6.1.3.1 Overview

The figure 6.1.3.1-1 describes the resource URI structure of the Nsmsf-sms API.



Figure 6.1.3.1-1: Resource URI structure of the nsmsf-sms API

Table 6.1.3.1-1 provides an overview of the resources and applicable HTTP methods.

Table 6.1.3.1-1: Resources and methods overview

|  |  |  |  |
| --- | --- | --- | --- |
| Resource name | Resource URI | HTTP method or custom operation | Description |
| UEContext (Document) | /ue-contexts/{supi} | PUT | It is used for the Activate service operation, for the purpose of:  - Activate SMS service for a given UE, which results in creating an individual UE Context resource in SMSF.  - Update SMS service parameters for a given UE, which results in updating an existing individual UE Context resource in SMSF.  - Deactivate SMS service for a given UE for one of the two registered Access Types, which results in updating an existing individual UE context resource in SMSF. |
| DELETE | It is used for the Deactivate service operation, for the purpose of:  - Deactivate SMS service for a given UE, which results in deleting an existing individual UE Context resource in SMSF. |
| /ue-contexts/{supi}/sendsms | sendsms  (POST) | It is used for the UplinkSMS service operation, to allow NF Service Consumer to send SMS payload in uplink direction. |

#### 6.1.3.2 Resource: UEContexts (Store)

##### 6.1.3.2.1 Description

This resource represents the collection of UE Context for SMS in SMSF.

This resource is modelled with the Store resource archetype (see clause C.2 of 3GPP TS 29.501 [5]).

No HTTP method has been defined for this resource.

##### 6.1.3.2.2 Resource Definition

Resource URI: {apiRoot}/nsmsf-sms/<apiVersion>/ue-contexts

This resource shall support the resource URI variables defined in table 6.1.3.2.2-1.

Table 6.1.3.2.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.1.1 |
|  |  |  |

##### 6.1.3.2.3 Resource Standard Methods

No HTTP method has been defined for the UE Context collection resource.

#### 6.1.3.3 Resource: UEContext (Document)

##### 6.1.3.3.1 Description

This resource represents an individual UE Context for SMS in SMSF.

This resource is modelled with the Document resource archetype (see clause C.2 of 3GPP TS 29.501 [5]).

A PUT method to this resource can be invoked by the NF Service Consumer (e.g. AMF) to:

- activate SMS service for a given UE, which results in creating new individual UE Context for SMS in SMSF, during the Registration procedure for SMS over NAS (see 3GPP TS 23.502 [3] clause 4.13.3.1);

- update SMS service parameters for a given UE, which results in updating individual UE Context for SMS in SMSF, , during the Registration Update procedure due to AMF change (see 3GPP TS 23.502 [3] clause 4.13.3.1).

- update SMS service parameters for a given UE, which results in updating individual UE Context for SMS in SMSF, to add a new Access Type for SMS over NAS.

- Deactivate SMS service for a given UE for one of the two registered Access Types, which results in updating an existing individual UE context resource in SMSF to remove the affected Access Type for SMS over NAS.

A DELETE method to this resource can be invoked by the NF Service Consumer (e.g. AMF) to:

- deactivate SMS service for a given UE, which results in deleting existing individual UE Context for SMS in SMSF, during the De-Registration procedure form SMS over NAS (see 3GPP TS 23.502 [3] clause 4.13.3.2).

##### 6.1.3.3.2 Resource Definition

Resource URI: {apiRoot}/nsmsf-sms/<apiVersion>/ue-contexts/{supi}

This resource shall support the resource URI variables defined in table 6.1.3.3.2-1.

Table 6.1.3.3.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.1.1 |
| supi | Supi | Represents the Subscription Permanent Identifier (see 3GPP TS 23.501 [2] clause 5.9.2)  pattern: See pattern of type Supi in 3GPP TS 29.571 [6] |

##### 6.1.3.3.3 Resource Standard Methods

6.1.3.3.3.1 PUT

This method creates an individual resource of UE Context for SMS in the SMSF, or updates the indicated resource of UE Context for SMS in the SMSF.

This method shall support the URI query parameters specified in table 6.1.3.3.3.1-1.

Table 6.1.3.3.3.1-1: URI query parameters supported by the PUT method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| n/a |  |  |  |  |

This method shall support the request data structures specified in table 6.1.3.3.3.1-2 and the response data structures and response codes specified in table 6.1.3.3.3.1-3.

Table 6.1.3.3.3.1-2: Data structures supported by the PUT Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| UeSmsContextData | M | 1 | Representation of the UE Context for SMS to be created in the SMSF, or to be updated in the SMSF. |

Table 6.1.3.3.3.1-3: Data structures supported by the PUT Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| UeSmsContextData | M | 1 | 201 Created | This case represents the successful creation of an UE Context for SMS.  The HTTP response shall include a "Location" HTTP header that contains the resource URI of the created resource. |
| n/a |  |  | 204 No Content | This case represents the successful update of an UE Context for SMS. |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing a different URI, or the same URI if this is a redirection triggered by an SCP to the same target resource via another SCP. In the former case, the URI shall be an alternative URI of the resource located on an alternative service instance within the same SMSF or SMSF (service) set.  (NOTE 2) |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing a different URI, or the same URI if this is a redirection triggered by an SCP to the same target resource via another SCP. In the former case, the URI shall be an alternative URI of the resource located on an alternative service instance within the same SMSF or SMSF (service) set.  (NOTE 2) |
| ProblemDetails | O | 0..1 | 403 Forbidden | When used to represent the failure of creation / update of an UE Context for SMS, the "cause" attribute of the "ProblemDetails" shall be set to one of the following application error codes:  - SERVICE\_NOT\_ALLOWED, if SMS service is not allowed for the given service user; |
| ProblemDetails | O | 0..1 | 404 Not Found | When used to represent the failure of creation / update of an UE Context for SMS, the "cause" attribute of the "ProblemDetails" shall be set to one of the following application error codes:  - USER\_NOT\_FOUND, if the provided subscriber identifier is invalid or the service user is not found from UDM; |
| NOTE 1: The mandatory HTTP error status codes for the PUT method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply.  NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [4]. | | | | |

Table 6.1.3.3.3.1-4: Headers supported by the 201 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains the URI of the newly created resource, according to the structure: {apiRoot}/nsmsf-sms/<apiVersion>/ue-contexts/{supi} |
| ETag | string | O | 0..1 | Entity Tag, containing a strong validator, as described in IETF RFC 7232[18], clause 2.3. |

Table 6.1.3.3.3.1-5: Headers supported by the 204 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| ETag | string | O | 0..1 | Entity Tag, containing a strong validator, as described in IETF RFC 7232 [18], clause 2.3. |

Table 6.1.3.3.3.1-6: Headers supported by the 307 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI of the resource located on an alternative service instance within the same SMSF or SMSF (service) set.  Or the same URI, if a request is redirected to the same target resource via a different SCP. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance ID towards which the request is redirected |

Table 6.1.3.3.3.1-7: Headers supported by the 308 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI of the resource located on an alternative service instance within the same SMSF or SMSF (service) set.  Or the same URI, if a request is redirected to the same target resource via a different SCP. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance ID towards which the request is redirected |

6.1.3.3.3.2 DELETE

This method deletes an individual resource of UE Context for SMS in the SMSF.

This method shall support the URI query parameters specified in table 6.1.3.3.3.2-1.

Table 6.1.3.3.3.2-1: URI query parameters supported by the DELETE method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| n/a |  |  |  |  |

This method shall support the request data structures specified in table 6.1.3.3.3.2-2 and the response data structures and response codes specified in table 6.1.3.3.3.2-3.

Table 6.1.3.3.3.2-2: Data structures supported by the DELETE Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| n/a |  |  |  |

Table 6.1.3.3.3.2-3: Data structures supported by the DELETE Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| n/a |  |  | 204 No Content | This case represents a successful deletion of an UE Context for SMS. |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing a different URI, or the same URI if this is a redirection triggered by an SCP to the same target resource via another SCP. In the former case, the URI shall be an alternative URI of the resource located on an alternative service instance within the same SMSF or SMSF (service) set.  (NOTE 2) |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing a different URI, or the same URI if this is a redirection triggered by an SCP to the same target resource via another SCP. In the former case, the URI shall be an alternative URI of the resource located on an alternative service instance within the same SMSF or SMSF (service) set.  (NOTE 2) |
| ProblemDetails | O | 0..1 | 404 Not Found | When used to represent an unsuccessful deletion of an UE Context for SMS, the "cause" attribute of the "ProblemDetails" may be used to include one of the following application error codes:  - CONTEXT\_NOT\_FOUND, if the UE context for SMS to be operated is invalid or not found in SMSF. |
| NOTE 1: The mandatory HTTP error status codes for the DELETE method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply.  NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [4]. | | | | |

Table 6.1.3.3.3.2-4: Headers supported by the DELETE method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| If-Match | String | O | 0..1 | Validator for conditional requests, as described in IETF RFC 7232 [18], clause 3.1 |

Table 6.1.3.3.3.2-5: Headers supported by the 307 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | String | M | 1 | An alternative URI of the resource located on an alternative service instance within the same SMSF or SMSF (service) set.  Or the same URI, if a request is redirected to the same target resource via a different SCP. |
| 3gpp-Sbi-Target-Nf-Id | String | O | 0..1 | Identifier of the target NF (service) instance ID towards which the request is redirected |

Table 6.1.3.3.3.2-6: Headers supported by the 308 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI of the resource located on an alternative service instance within the same SMSF or SMSF (service) set.  Or the same URI, if a request is redirected to the same target resource via a different SCP. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance ID towards which the request is redirected |

##### 6.1.3.3.4 Resource Custom Operations

6.1.3.3.4.1 Overview

Table 6.1.3.3.4.1-1: Custom operations

|  |  |  |  |
| --- | --- | --- | --- |
| Operation Name | Custom operaration URI | Mapped HTTP method | Description |
| sendsms | /ue-contexts/{supi}/sendsms | POST | Send SMS payload or CP Ack in uplink direction. |

6.1.3.3.4.2 Operation: sendsms

6.1.3.3.4.2.1 Description

This custom operation is used for NF Service Consumers to send SMS record in uplink direction.

6.1.3.3.4.2.2 Operation Definition

This custom operation is used to send a SMS payload to an individual UEContext resource in the SMSF.

This operation shall support the request data structures specified in table 6.1.3.3.4.2.2-1 and the response data structure and response codes specified in table 6.1.3.3.4.2.2-2.

Table 6.1.3.3.4.2.2-1: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| SmsRecordData | M | 1 | Representation of the SMS Record to be created in the SMSF. |

Table 6.1.3.3.4.2.2-2: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| SmsRecordDeliveryData | M | 1 | 200 OK | This case represents the successful of sending SMS record in uplink direction, with necessary response data. |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing a different URI, or the same URI if this is a redirection triggered by an SCP to the same target resource via another SCP. In the former case, the URI shall be an alternative URI of the resource located on an alternative service instance within the same SMSF or SMSF (service) set.  (NOTE 2) |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing a different URI, or the same URI if this is a redirection triggered by an SCP to the same target resource via another SCP. In the former case, the URI shall be an alternative URI of the resource located on an alternative service instance within the same SMSF or SMSF (service) set.  (NOTE 2) |
| ProblemDetails | O | 0..1 | 400 Bad Request | This case represents an unsuccessful delivery of SMS payload.  The "cause" attribute may be used to indicate one of the following application errors:  - SMS\_PAYLOAD\_MISSING, if the expected SMS payload content is missing;  - SMS\_PAYLOAD\_ERROR, if error exists in the SMS payload content. |
| ProblemDetails | O | 0..1 | 403 Forbidden | This case represents an unsuccessful delivery of SMS payload.  The "cause" attribute may be used to indicate one of the following application errors:  - SERVICE\_NOT\_ALLOWED, if SMS service is not allowed for the given service user; |
| ProblemDetails | O | 0..1 | 404 Not Found | This case represents an unsuccessful delivery of SMS payload.  The "cause" attribute may be used to indicate one of the following application errors:  - CONTEXT\_NOT\_FOUND, if the UE context for SMS to be operated is invalid or not found in SMSF. |
| NOTE 1: The mandatory HTTP error status codes for the DELETE method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply.  NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [4]. | | | | |

Table 6.1.3.3.4.2.2-3: Headers supported by the 307 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI of the resource located on an alternative service instance within the same SMSF or SMSF (service) set.  Or the same URI, if a request is redirected to the same target resource via a different SCP. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance ID towards which the request is redirected |

Table 6.1.3.3.4.2.2-4: Headers supported by the 308 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI of the resource located on an alternative service instance within the same SMSF or SMSF (service) set.  Or the same URI, if a request is redirected to the same target resource via a different SCP. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance ID towards which the request is redirected |

### 6.1.4 Custom Operations without associated resources

In this release of this specification, no custom operations without associated resources are defined.

### 6.1.5 Notifications

In this release of this specification, no notification procedures are defined.

### 6.1.6 Data Model

#### 6.1.6.1 General

This clause specifies the application data model supported by the API.

Table 6.1.6.1-1 specifies the data types defined for the Nsmsf service based interface protocol.

Table 6.1.6.1-1: Nsmsf specific Data Types

|  |  |  |
| --- | --- | --- |
| Data type | Clause defined | Description |
| UeSmsContextData | 6.1.6.2.2 | Information used for activating SMS service for a service user, or updating the parameters for SMS service. |
| SmsRecordData | 6.1.6.2.3 | Information within request message invoking UplinkSMS service operation, for delivering SMS payload. |
| SmsRecordDeliveryData | 6.1.6.2.5 | Information for result of invoking UplinkSMS service operation. |
| RecordId | 6.1.6.3.2 | Record ID used to identify a message carrying SMS payload. |
| SmsDeliveryStatus | 6.1.6.3.3 | Status of SMS delivery attempts. |

Table 6.1.6.1-2 specifies data types re-used by the Nsmsf service based interface protocol from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the Nsmsf service based interface.

Table 6.1.6.1-2: Nsmsf re-used Data Types

|  |  |  |
| --- | --- | --- |
| Data type | Reference | Comments |
| ProblemDetails | 3GPP TS 29.571 [10] | Common Data Type used in response bodies |
| RedirectResponse | 3GPP TS 29.571 [10] | Redirect Response |
| Supi | 3GPP TS 29.571 [6] | Subscription Permanent Identifier |
| Gpsi | 3GPP TS 29.571 [6] | General Public Subscription Identifier |
| Pei | 3GPP TS 29.571 [6] | Permanent Equipment, it contains an IMEI or IMEISV. |
| Guami | 3GPP TS 29.571 [6] | Globally Unique AMF Identifier |
| AccessType | 3GPP TS 29.571 [6] | Access Type (3GPP or non-3GPP access) |
| UserLocation | 3GPP TS 29.571 [6] | User location information |
| TimeZone | 3GPP TS 29.571 [6] | User time zone information |
| NfInstanceId | 3GPP TS 29.571 [6] | NF Instance ID |
| RefToBinaryData | 3GPP TS 29.571 [6] | Information for indicating the binary content of SMS payload. |
| TraceData | 3GPP TS 29.571 [6] | Trace control and configuration parameters |
| BackupAmfInfo | 3GPP TS 29.571 [6] | Backup AMF Information |
| NfGroupId | 3GPP TS 29.571 [6] | Network Function Group Id |
| RatType | 3GPP TS 29.571 [6] | RAT Type |
| SupportedFeatures | 3GPP TS 29.571 [6] | Supported Features |

#### 6.1.6.2 Structured data types

##### 6.1.6.2.1 Introduction

This clause defines the structures to be used in resource representations.

##### 6.1.6.2.2 Type: UeSmsContextData

Table 6.1.6.2.2-1: Definition of type UeSmsContextData

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| supi | Supi | M | 1 | This IE shall be present, and it shall contain the subscriber permanent identify of the service user. |
| gpsi | Gpsi | O | 0..1 | When present, this IE shall contain the generic public subscriber identifier of the service user. |
| pei | Pei | O | 0..1 | When present, this IE shall contain the IMEI or IMEISV of the service user. |
| accessType | AccessType | M | 1 | This IE shall be present, and it shall contain the access type from which the service user accesses to network. |
| additionalAccessType | AccessType | C | 0..1 | This IE shall be present in activate service operations to indicate that the service user accesses the network and request SMS service from both 3GPP access and Non-3GPP access.  This IE shall be absent in deactivate service operations to indicate that service user is no longer served with SMS service via two access types. In this case the accessType attribute shall indicate the remaining access type. |
| amfId | NfInstanceId | M | 1 | This IE shall be present, and it shall contain the NF instance ID of the requesting AMF. |
| guamis | array(Guami) | O | 1..N | When present, this IE shall contain the GUAMI(s) of the AMF. |
| ueLocation | UserLocation | O | 0..1 | When present, this IE shall contain the UE location information (e.g. TAI and CGI). |
| ueTimeZone | TimeZone | O | 0..1 | When present, this IE shall contain the current time zone of the service user. |
| traceData | TraceData | O | 0..1 | Trace Data. The Null value indicates that trace is not active. |
| backupAmfInfo | array(BackupAmfInfo) | C | 1..N | This IE shall be included if the NF service consumer is an AMF and the AMF supports the AMF management without UDSF when the UE Context for SMS to be created in the SMSF, or to be updated in the SMSF.  The SMSF uses this attribute to do an NRF query in order to invoke later services in a backup AMF e.g. Namf\_MT. |
| udmGroupId | NfGroupId | O | 0..1 | Identity of the UDM group serving the supi |
| routingIndicator | string | O | 0..1 | When present, it shall indicate the Routing Indicator of the UE. |
| ratType | RatType | C | 0..1 | When present, it shall indicate the RAT type of the UE. |
| additionalRatType | RatType | C | 0..1 | When present, it shall indicate the RAT type of the UE corresponding to additionalAccessType. This IE shall not be included if additionalAccessType IE is not present. |
| supportedFeatures | SupportedFeatures | C | 0..1 | This IE shall be present if at least one optional feature defined in clause 6.1.8 is supported. |

##### 6.1.6.2.3 Type: SmsRecordData

Table 6.1.6.2.3-1: Definition of type SmsRecordData

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| smsRecordId | RecordId | M | 1 | This IE shall be present, and it shall contain the record id uniquely identify a message carrying SMS payload. |
| smsPayload | RefToBinaryData | M | 1 | This IE shall be present, and it shall contain the reference to the SMS Payload Information binary data (see clause 6.1.6.4) |
| gpsi | Gpsi | O | 0..1 | When present, this IE shall contain the global permanent subscriber identifier of the service user. |
| pei | Pei | O | 0..1 | When present, this IE shall contain the IMEI or IMEISV of the service user. |
| accessType | AccessType | O | 0..1 | When present, this IE shall contain the access type from which the service user accesses to network. |
| ueLocation | UserLocation | O | 0..1 | When present, this IE shall contain the UE location information (e.g. TAI and CGI). |
| ueTimeZone | TimeZone | O | 0..1 | When present, this IE shall contain the time zone of the service user. |

##### 6.1.6.2.4 Void

##### 6.1.6.2.5 Type: SmsRecordDeliveryData

Table 6.1.6.2.5-1: Definition of type SmsRecordDeliveryData

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| smsRecordId | RecordId | M | 1 | This IE shall be present, and it shall contain the record id uniquely identify a message carrying SMS payload. |
| deliveryStatus | SmsDeliveryStatus | M | 1 | This IE shall be present, and it shall indicate the status of SMS payload delivery attempt in the SMSF, after SMSF receiving SMS payload on Nsmsf interface. |

#### 6.1.6.3 Simple data types and enumerations

##### 6.1.6.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

##### 6.1.6.3.2 Simple data types

The simple data types defined in table 6.1.6.3.2-1 shall be supported.

Table 6.1.6.3.2-1: Simple data types

|  |  |  |
| --- | --- | --- |
| Type Name | Type Definition | Description |
| RecordId | string | String uniquely identifying a record in the SMSF. The format of RecordId is implementation specific, e.g. using UUID format.  In an OpenAPI Specification [3] schema, the format shall be designated as "RecordId". |

##### 6.1.6.3.3 Enumeration: SmsDeliveryStatus

The enumeration SmsDeliveryStatus represents the status of SMS payload delivery attempt at the SMSF. It shall comply with the previsions defined in table 6.1.6.3.3-1.

Table 6.1.6.3.3-1: Enumeration SmsDeliveryStatus

|  |  |
| --- | --- |
| Enumeration value | Description |
| SMS\_DELIVERY\_PENDING | The SMS payload delivery at SMSF is pended. |
| SMS\_DELIVERY\_COMPLETED | The SMS payload delivery at SMSF is completed. |
| SMS\_DELIVERY\_FAILED | The SMS payload delivery at SMSF is failed due to certain reasons. |
| SMS\_DELIVERY\_SMSF\_ACCEPTED | The SMS payload is accepted by the SMSF for further delivery. |

#### 6.1.6.4 Binary data

##### 6.1.6.4.1 Introduction

This clause defines the binary data that shall be supported in a binary body part in an HTTP multipart message (see clauses 6.1.2.2.2 and 6.1.2.4), to support delivery of binary content of SMS payload.

Table 6.1.6.4.1-1: Binary Data Types

|  |  |  |
| --- | --- | --- |
| Name | Clause defined | Content type |
| SMS Payload Information | 6.1.6.4.2 | vnd.3gpp.sms |

##### 6.1.6.4.2 SMS Payload Information

SMS Payload Information shall encode a SMS payload as specified in 3GPP TS 23.040 [11] and 3GPP TS 24.011 [12], using the vnd.3gpp.sms content-type.

SMS Payload Information may encode e.g. the following content:

- CP-DATA, CP-ACK, CP-ERROR as specified in 3GPP TS 23.040 [11] and 3GPP TS 24.011 [12];

### 6.1.7 Error Handling

#### 6.1.7.1 General

HTTP error handling shall be supported as specified in clause 5.2.4 of 3GPP TS 29.500 [4].

#### 6.1.7.2 Protocol Errors

Protocol errors handling shall be supported as specified in clause 5.2.7 of 3GPP TS 29.500 [4].

#### 6.1.7.3 Application Errors

The common application errors defined in the Table 5.2.7.2-1 in 3GPP TS 29.500 [4] may also be used for the Nsmsf\_SMService service, and the following application errors listed in Table 6.1.7.3-1 are specific for the Nsmsf\_SMService service.

Table 6.1.7.3-1: Application errors

|  |  |  |
| --- | --- | --- |
| Application Error | HTTP status code | Description |
| USER\_NOT\_FOUND | 404 Not Found | The provided subscriber identifier is invalid or the service user not found from UDM. |
| CONTEXT\_NOT\_FOUND | 404 Not Found | The UE context for SMS to be operated is invalid or not found in SMSF. |
| SERVICE\_NOT\_ALLOWED | 403 Forbidden | The requested service is not allowed for this service user. |
| SMS\_PAYLOAD\_MISSING | 400 Bad Request | The expected SMS payload content is missing. |
| SMS\_PAYLOAD\_ERROR | 400 Bad Request | Errors exist in the format of SMS payload. |

### 6.1.8 Feature negotiation

The optional features in table 6.1.8-1 are defined for the Nsmsf\_SMService API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [4].

Table 6.1.8-1: Features of supportedFeatures attribute used by Nsmsf\_SMService service

|  |  |  |  |
| --- | --- | --- | --- |
| Feature Number | Feature | M/O | Description |
| 1 | ES3XX | M | Extended Support of HTTP 307/308 redirection  An NF Service Consumer (e.g. AMF) that supports this feature shall support handling of HTTP 307/308 redirection for any service operation of the Nsmsf\_SMService service. An NF Service Consumer that does not support this feature does only support HTTP redirection as specified for 3GPP Release 15. |
| Feature number: The order number of the feature within the supportedFeatures attribute (starting with 1).  Feature: A short name that can be used to refer to the bit and to the feature.  M/O: Defines if the implementation of the feature is mandatory ("M") or optional ("O").  Description: A clear textual description of the feature. | | | |

### 6.1.9 Security

As indicated in 3GPP TS 33.501 [13] and 3GPP TS 29.500 [4], the access to the Nsmsf\_SMService API may be authorized by means of the OAuth2 protocol (see IETF RFC 6749 [14]), based on local configuration, using the "Client Credentials" authorization grant, where the NRF (see 3GPP TS 29.510 [15]) plays the role of the authorization server.

If OAuth2 is used, an NF Service Consumer, prior to consuming services offered by the Nsmsf\_SMService API, shall obtain a "token" from the authorization server, by invoking the Access Token Request service, as described in 3GPP TS 29.510 [15], clause 5.4.2.2.

NOTE: When multiple NRFs are deployed in a network, the NRF used as authorization server is the same NRF that the NF Service Consumer used for discovering the Nsmsf\_SMService service.

The Nsmsf\_SMService API defines a single scope "nsmsf-sms" for OAuth2 authorization (as specified in 3GPP TS 33.501 [13]) for the entire API, and it does not define any additional scopes at resource or operation level.

### 6.1.10 HTTP redirection

An HTTP request may be redirected to a different SMSF service instance, within the same SMSF or a different SMSF of an SMSF set, e.g. when an SMSF service instance is part of an SMSF (service) set or when using indirect communications (see 3GPP TS 29.500 [4]). See the ES3XX feature in clause 6.1.8.

An SCP that reselects a different SMSF producer instance will return the NF Instance ID of the new SMSF producer instance in the 3gpp-Sbi-Producer-Id header, as specified in clause 6.10.3.4 of 3GPP TS 29.500 [4].

If an SMSF within an SMSF set redirects a service request to a different SMSF of the set using a 307 Temporary Redirect or 308 Permanent Redirect status code, the identity of the new SMSF towards which the service request is redirected shall be indicated in the 3gpp-Sbi-Target-Nf-Id header of the 307 Temporary Redirect or 308 Permanent Redirect response as specified in clause 6.10.9.1 of 3GPP TS 29.500 [4].

Annex A (normative):  
OpenAPI specification

## A.1 General

This Annex specifies the formal definition of the Nsmsf\_SMService service. It consists of OpenAPI 3.0.0 specifications, in YAML format.

This Annex takes precedence when being discrepant to other parts of the specification with respect to the encoding of information elements and methods within the API(s).

NOTE 1: The semantics and procedures, as well as conditions, e.g. for the applicability and allowed combinations of attributes or values, not expressed in the OpenAPI definitions but defined in other parts of the specification also apply.

Informative copies of the OpenAPI specification files contained in this 3GPP Technical Specification are available on

a Git-based repository that uses the GitLab software version control system (see 3GPP TS 29.501 [5] clause 5.3.1 and 3GPP TR 21.900 [16] clause 5B).

## A.2 Nsmsf\_SMService API

openapi: 3.0.0

info:

version: '2.1.6'

title: 'Nsmsf\_SMService Service API'

description: |

SMSF SMService.

© 2022, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).

All rights reserved.

externalDocs:

description: 3GPP TS 29.540 V16.10.0; 5G System; SMS Services; Stage 3

url: 'https://www.3gpp.org/ftp/Specs/archive/29\_series/29.540/'

security:

- oAuth2ClientCredentials:

- nsmsf-sms

- {}

servers:

- url: '{apiRoot}/nsmsf-sms/v2'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in clause clause 4.4 of 3GPP TS 29.501.

paths:

/ue-contexts/{supi}:

put:

summary: Activate SMS Service for a given UE

operationId: SMServiceActivation

tags:

- Activation of SMS service

parameters:

- name: supi

in: path

required: true

description: Subscriber Permanent Identifier (SUPI)

schema:

type: string

requestBody:

content:

application/json:

schema:

$ref: '#/components/schemas/UeSmsContextData'

required: true

responses:

'201':

description: UE Context for SMS is created in SMSF

content:

application/json:

schema:

$ref: '#/components/schemas/UeSmsContextData'

headers:

Location:

description: 'Contains the URI of the newly created resource, according to the structure: {apiRoot}/nsmsf-sms/<apiVersion>/ue-contexts/{supi}'

required: true

schema:

type: string

ETag:

description: Entity Tag, containing a strong validator, as described in IETF RFC 7232, 2.3

schema:

type: string

'204':

description: UE Context for SMS is updated in SMSF

headers:

ETag:

description: Entity Tag, containing a strong validator, as described in IETF RFC 7232, 2.3

schema:

type: string

'307':

$ref: 'TS29571\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29571\_CommonData.yaml#/components/responses/308'

'400':

description: Invalid Service Request

content:

application/problem+json:

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ProblemDetails'

'403':

description: Unable to create/update UE Context for SMS in SMSF

content:

application/problem+json:

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ProblemDetails'

'404':

description: Unable to found subscription for service user or UE Context for SMS in SMSF

content:

application/problem+json:

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ProblemDetails'

'503':

description: Service Unavailable

content:

application/problem+json:

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ProblemDetails'

default:

description: Unexpected error

content:

application/problem+json:

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ProblemDetails'

delete:

summary: Deactivate SMS Service for a given UE

operationId: SMServiceDeactivation

tags:

- Deactivation of SMS service

parameters:

- name: supi

in: path

required: true

description: Subscriber Permanent Identifier (SUPI)

schema:

type: string

- name: If-Match

in: header

description: Validator for conditional requests, as described in IETF RFC 7232, 3.1

schema:

type: string

responses:

'204':

description: UE Context for SMS is deleted from SMSF

'307':

$ref: 'TS29571\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29571\_CommonData.yaml#/components/responses/308'

'400':

description: Invalid Service Request

content:

application/problem+json:

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ProblemDetails'

'404':

description: Unable to found UE Context for SMS in SMSF

content:

application/problem+json:

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ProblemDetails'

'503':

description: Service Unavailable

content:

application/problem+json:

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ProblemDetails'

/ue-contexts/{supi}/sendsms:

post:

summary: Send SMS payload for a given UE

operationId: SendSMS

tags:

- Send SMS payload in uplink direction

parameters:

- name: supi

in: path

required: true

description: Subscriber Permanent Identifier (SUPI)

schema:

type: string

requestBody:

content:

multipart/related:

schema:

type: object

properties:

jsonData:

$ref: '#/components/schemas/SmsRecordData'

binaryPayload:

type: string

format: binary

encoding:

jsonData:

contentType: application/json

binaryPayload:

contentType: application/vnd.3gpp.sms

headers:

Content-Id:

schema:

type: string

required: true

responses:

'200':

description: SMS payload is received by SMSF, and is being delivered out

content:

application/json:

schema:

$ref: '#/components/schemas/SmsRecordDeliveryData'

'307':

$ref: 'TS29571\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29571\_CommonData.yaml#/components/responses/308'

'400':

description: Invalid Service Request

content:

application/problem+json:

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ProblemDetails'

'403':

description: Unable to deliver SMS at SMSF

content:

application/problem+json:

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ProblemDetails'

'404':

description: Unable to found UE Context for SMS in SMSF

content:

application/problem+json:

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ProblemDetails'

'503':

description: Service Unavailable

content:

application/problem+json:

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ProblemDetails'

components:

securitySchemes:

oAuth2ClientCredentials:

type: oauth2

flows:

clientCredentials:

tokenUrl: '{nrfApiRoot}/oauth2/token'

scopes:

nsmsf-sms: Access to the nsmsf-sms API

schemas:

UeSmsContextData:

type: object

required:

- supi

- amfId

- accessType

properties:

supi:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Supi'

pei:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Pei'

amfId:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/NfInstanceId'

guamis:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Guami'

minItems: 1

accessType:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/AccessType'

additionalAccessType:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/AccessType'

gpsi:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Gpsi'

ueLocation:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/UserLocation'

ueTimeZone:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/TimeZone'

traceData:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/TraceData'

backupAmfInfo:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/BackupAmfInfo'

minItems: 1

udmGroupId:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/NfGroupId'

routingIndicator:

type: string

ratType:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/RatType'

additionalRatType:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/RatType'

supportedFeatures:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

SmsRecordData:

type: object

required:

- smsRecordId

- smsPayload

properties:

smsRecordId:

$ref: '#/components/schemas/RecordId'

smsPayload:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/RefToBinaryData'

accessType:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/AccessType'

gpsi:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Gpsi'

pei:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Pei'

ueLocation:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/UserLocation'

ueTimeZone:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/TimeZone'

RecordId:

type: string

SmsRecordDeliveryData:

type: object

required:

- smsRecordId

- deliveryStatus

properties:

smsRecordId:

$ref: '#/components/schemas/RecordId'

deliveryStatus:

$ref: '#/components/schemas/SmsDeliveryStatus'

SmsDeliveryStatus:

type: string

enum:

- SMS\_DELIVERY\_PENDING

- SMS\_DELIVERY\_COMPLETED

- SMS\_DELIVERY\_FAILED

- SMS\_DELIVERY\_SMSF\_ACCEPTED

Annex B (Informative):  
HTTP Multipart Messages

## B.1 Example of HTTP multipart message

This Annex provides a (partial) example of HTTP multipart message. The example does not aim to be a complete representation of the HTTP message, e.g. additional information or headers can be included.

This Annex is informative and the normative descriptions in this specification prevail over the description in this Annex if there is any difference.

## B.2 Void

## B.3 Example HTTP multipart message with SMS binary data

Example HTTP multipart message with SMS binary data:

POST /example.com/nsmsf-sms/v1/ue-contexts/{supi}/sendsms HTTP/2

Content-Type: multipart/related; boundary=----Boundary

Content-Length: xyz

------Boundary

Content-Type: application/json

{

"smsRecordId": "777c3edf-129f-486e-a3f8-c48e7b515605",

"smsPayload": {

"contentId": "sms"

},

"gpsi": "msisdn-8613915900000",

"pei": "imei-123456789012345",

"accessType": "3GPP\_ACCESS",

"ueLocation": {

"nrLocation": {

"tai": {

"plmnId": {

"mcc": "46",

"mnc": "000"

},

"tac": "A01001",

"ncgi": {

"plmnId": {

"mcc": "46",

"mnc": "000"

},

"nrCellId": "225BD6007"

}

}

},

"ueTimeZone": "+08:00"

}

------Boundary

Content-Type: application/vnd.3gpp.sms

Content-Id: sms

{ … SMS Message binary data …}

------Boundary

The JSON part of the HTTP POST message includes an attribute named "smsPayload" which refers to RefToBinaryData structure. The "contentId" of RefToBinaryData is encoded as a string and used to reference the value of the Content-ID header field of the binary body part.

Annex C (informative):  
Change history

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Change history** | | | | | | | |
| **Date** | **Meeting** | **TDoc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
| 2017-10 | CT4#80 | C4-175084 |  |  |  | Initial Draft. | 0.1.0 |
| 2017-10 | CT4#80 | C4-175399 |  |  |  | Implementation of C4-175281, C4-175282, C4-175284. | 0.2.0 |
| 2017-12 | CT4#81 | C4-176441 |  |  |  | Implementation of C4-176092, C4-176097, C4-176346, C4-176347, C4-176349, C4-176351, C4-176353. | 0.3.0 |
| 2018-03 | CT4#83 | C4-182439 |  |  |  | Implementation of C4-182300, C4-182301, C4-182303, C4-182416 | 0.4.0 |
| 2018-04 | CT4#84 | C4-183520 |  |  |  | Implementation of C4-183375, C4-183376, C4-183377, C4-183378, C4-183379. | 0.5.0 |
| 2018-05 | CT4#85 | C4-184633 |  |  |  | Implementation of C4-184467, C4-184605, C4-184470, C4-184473, C4-184474, C4-184634. | 0.6.0 |
| 2018-06 | CT#80 | CP-181109 |  |  |  | Presented for information and approval | 1.0.0 |
| 2018-06 | CT#80 |  |  |  |  | Approved in CT#80. | 15.0.0 |
| 2018-09 | CT#81 | CP-182064 | 0002 | 1 | F | Change to Common Data Type | 15.1.0 |
| 2018-09 | CT#81 | CP-182064 | 0003 | 1 | F | Correct HTTP Response Code | 15.1.0 |
| 2018-09 | CT#81 | CP-182064 | 0004 | 1 | F | Add Missing Parameters | 15.1.0 |
| 2018-09 | CT#81 | CP-182064 | 0005 | - | F | Clarify the Format of SMS Record ID | 15.1.0 |
| 2018-09 | CT#81 | CP-182064 | 0006 | - | F | Add support of 5G Trace | 15.1.0 |
| 2018-09 | CT#81 | CP-182064 | 0007 | 2 | F | Backup AMF Info | 15.1.0 |
| 2018-09 | CT#81 | CP-182064 | 0008 | - | F | Description of Structured data types | 15.1.0 |
| 2018-09 | CT#81 | CP-182064 | 0009 | 1 | F | API Version Update | 15.1.0 |
| 2018-12 | CT#82 | CP-183023 | 0010 | 1 | F | API Correction | 15.2.0 |
| 2018-12 | CT#82 | CP-183023 | 0011 | - | F | CR cardinality | 15.2.0 |
| 2018-12 | CT#82 | CP-183023 | 0012 | 1 | F | NF group Id | 15.2.0 |
| 2018-12 | CT#82 | CP-183023 | 0013 | - | F | APIRoot Clarification | 15.2.0 |
| 2018-12 | CT#82 | CP-183023 | 0014 | - | F | Location Header in HTTP 201 Response | 15.2.0 |
| 2018-12 | CT#82 | CP-183023 | 0015 | - | F | Open API version | 15.2.0 |
| 2018-12 | CT#82 | CP-183188 | 0016 | - | F | Optionality of OAuth2 | 15.2.0 |
| 2018-12 | CT#82 | CP-183189 | 0017 | - | F | Correction of "externalDocs" for Nsmsf\_SMService Service | 15.2.0 |
| 2019-03 | CT#83 | CP-190069 | 0018 | 2 | F | SMS payload | 15.3.0 |
| 2019-03 | CT#83 | CP-190028 | 0020 | - | F | API version update | 15.3.0 |
| 2019-06 | CT#84 | CP-191040 | 0019 | 2 | F | Resolve Editor's Notes | 15.4.0 |
| 2019-06 | CT#84 | CP-191040 | 0021 | 1 | F | Resource URI correction | 15.4.0 |
| 2019-06 | CT#84 | CP-191040 | 0022 | 1 | F | API URI Description | 15.4.0 |
| 2019-06 | CT#84 | CP-191040 | 0023 | 2 | F | Storage of OpenAPI specification files | 15.4.0 |
| 2019-06 | CT#84 | CP-191040 | 0025 | 1 | F | API Version Correction | 15.4.0 |
| 2019-06 | CT#84 | CP-191040 | 0026 | 1 | F | Supported Content Type | 15.4.0 |
| 2019-06 | CT#84 | CP-191040 | 0027 | 1 | F | Essential Corrections on MultiPart Message | 15.4.0 |
| 2019-06 | CT#84 | CP-191040 | 0029 | 1 | F | Copyright Note in YAML file | 15.4.0 |
| 2019-06 | CT#84 | CP-191040 | 0031 | 1 | F | 3GPP TS 29.540 API Version Update | 15.4.0 |
| 2019-06 | CT#84 | CP-191057 | 0024 | - | B | Remove useless and misleading application error | 16.0.0 |
| 2019-09 | CT#85 | CP-192112 | 0033 | 1 | F | Decouple uplinkSMS Response with SMS-C Communication | 16.1.0 |
| 2019-09 | CT#85 | CP-192123 | 0034 | - | F | CRLF between Header fields and Data | 16.1.0 |
| 2019-09 | CT#85 | CP-192120 | 0036 | - | F | 29.540 Rel-16 Open API version externalDocs | 16.1.0 |
| 2019-12 | CT#86 | CP-193044 | 0040 | - | F | 29.540 Rel-16 API version and External doc update | 16.2.0 |
| 2020-03 | CT#87 | CP-200039 | 0041 | 2 | F | Add Corresponding API descriptions in clause 5.1 | 16.3.0 |
| 2020-03 | CT#87 | CP-200039 | 0042 | 2 | F | Correction - formatting consistency | 16.3.0 |
| 2020-03 | CT#87 | CP-200033 | 0043 | - | B | RAT Type | 16.3.0 |
| 2020-03 | CT#87 | CP-200020 | 0044 | 2 | F | Optionality of ProblemDetails | 16.3.0 |
| 2020-03 | CT#87 | CP-200052 | 0045 | - | F | API version and External doc update | 16.3.0 |
| 2020-06 | CT#88 | CP-201059 | 0046 | 1 | F | Supported Headers table for response code 201 | 16.4.0 |
| 2020-06 | CT#88 | CP-201059 | 0047 | 1 | F | Binary Data Types Table | 16.4.0 |
| 2020-06 | CT#88 | CP-201024 | 0048 | 1 | F | Correct the Data Type Descriptions | 16.4.0 |
| 2020-06 | CT#88 | CP-201059 | 0051 | 1 | F | Data type column in Resource URI variables Table | 16.4.0 |
| 2020-06 | CT#88 | CP-201059 | 0052 | 1 | F | Add custom operation Name | 16.4.0 |
| 2020-06 | CT#88 | CP-201024 | 0054 | - | F | Essential Corrections | 16.4.0 |
| 2020-06 | CT#88 | CP-201073 | 0055 | - | F | API version and External doc update | 16.4.0 |
| 2020-09 | CT#89 | CP-202101 | 0056 | 1 | F | Storage of YAML files in 3GPP Forge | 16.5.0 |
| 2020-09 | CT#89 | CP-202096 | 0057 | - | F | API version and External doc update | 16.5.0 |
| 2020-12 | CT#90 | CP-203027 | 0059 | 1 | F | Correction to support multiple access type for SMS | 16.6.0 |
| 2020-12 | CT#90 | CP-203054 | 0060 | 1 | F | HTTP 3xx redirection | 16.6.0 |
| 2020-12 | CT#90 | CP-203048 | 0064 | 1 | F | Essential corrections | 16.6.0 |
| 2020-12 | CT#90 | CP-203027 | 0066 | 2 | F | Header check at deactivation of SMS service | 16.6.0 |
| 2020-12 | CT#90 | CP-203036 | 0069 | - | F | API version and External doc update | 16.6.0 |
| 2021-03 | CT#91 | CP-210062 | 0074 | - | F | Etag in 204 Response | 16.7.0 |
| 2021-03 | CT#91 | CP-210054 | 0078 | - | F | API version and External doc update | 16.7.0 |
| 2021-06 | CT#92 | CP-211176 | 0081 | 2 | F | Redirect Response | 16.8.0 |
| 2021-06 | CT#92 | CP-211073 | 0084 | - | F | 29.540 Rel-16 API version and External doc update | 16.8.0 |
| 2021-09 | CT#93 | CP-212060 | 0086 | - | F | 3xx description correction for SCP | 16.9.0 |
| 2021-09 | CT#93 | CP-212080 | 0089 | - | F | 29.540 Rel-16 API version and External doc update | 16.9.0 |
| 2022-03 | CT#95 | CP-220026 | 0095 | 1 | F | 3xx Redirect Response | 16.10.0 |
| 2022-03 | CT#95 | CP-220067 | 0098 | - | F | 29.540 Rel-16 API version and External doc update | 16.10.0 |