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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".

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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.

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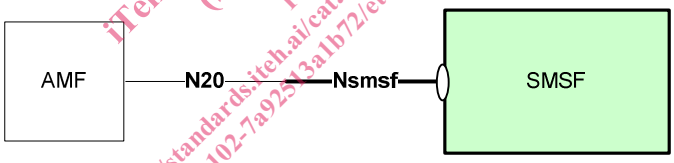

Figure 4-1: Reference model – SMSF

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

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 a UE Context for SMS in SMSF.	Request/Response	AMF
UplinkSMS	Send SMS payload in uplink direction to SMSF;	Request/Response	AMF

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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]);

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.

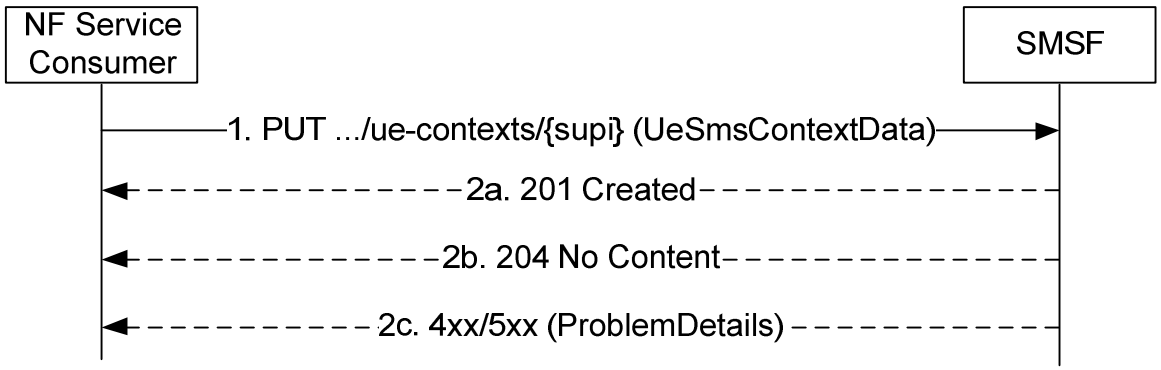

Figure 5.2.2.2.2-1: Activation of SMS service

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 POST 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. 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.

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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 an individual UE Context for SMS in the SMSF, in the following procedures:

- De-Registration Procedure for SMS over NAS (see clause 4.13.3.2 of 3GPP TS 23.502 [3]);

5.2.2.3.2 De-Registration procedure using Deactivate service operation

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.

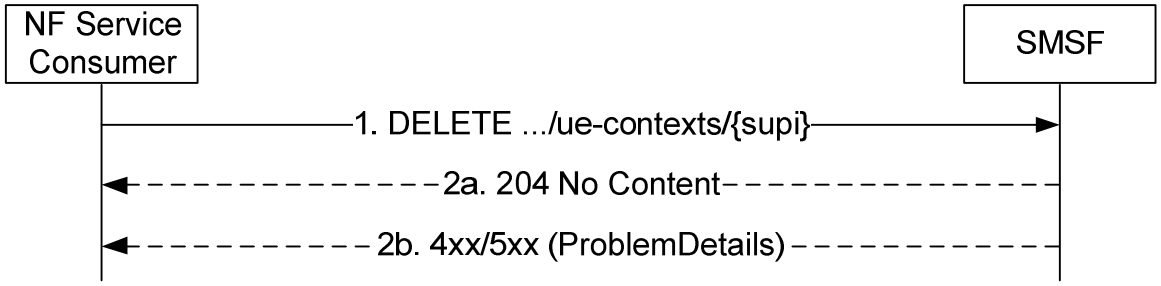

Figure 5.2.2.3.2-1: Deactivation of SMS service

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. "403 Forbidden") 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.

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.

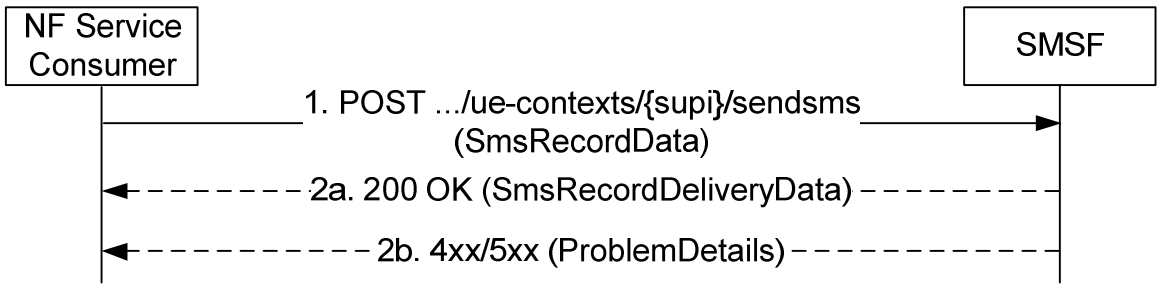

Figure 5.2.2.4.2-1: Send SMS payload in uplink direction

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

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