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Foreword

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

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

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.

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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.

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1 Scope

The present document specifies the stage 3 protocol and data model for the Nsmf Service Based Interface. It provides stage 3 protocol definitions and message flows, and specifies the API for each service offered by the SMF other than the Session Management Event Exposure service and Session Management services for Non-IP Data Delivery (NIDD).

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].

The Session Management Event Exposure Service is specified in 3GPP TS 29.508 [6]. The Session Management services for Non-IP Data Delivery (NIDD) are specified in 3GPP TS 29.542 [37].

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 29.508: "5G System; Session Management Event Exposure Service; Stage 3".
- [7] 3GPP TS 24.501: "Non-Access-Stratum (NAS) protocol for 5G System (5GS); Stage 3".
- [8] 3GPP TS 24.007: "Mobile radio interface signalling layer 3; General aspects".
- [9] 3GPP TS 38.413: "NG Radio Access Network (NG-RAN); NG Application Protocol (NGAP)".
- [10] IETF RFC 2387: "The MIME Multipart/Related Content-type".
- [11] IETF RFC 8259: "The JavaScript Object Notation (JSON) Data Interchange Format".
- [12] IETF RFC 2045: "Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies".
- [13] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces; Stage 3".
- [14] IETF RFC 7540: "Hypertext Transfer Protocol Version 2 (HTTP/2)".
- [15] OpenAPI Initiative, "OpenAPI 3.0.0 Specification", <https://github.com/OAI/OpenAPI-Specification/blob/master/versions/3.0.0.md>.
- [16] 3GPP TS 29.274: "3GPP Evolved Packet System (EPS); Evolved General Packet Radio Service (GPRS) Tunnelling Protocol for Control plane (GTPv2-C); Stage 3".
- [17] 3GPP TS 33.501: "Security architecture and procedures for 5G system".

- [18] IETF RFC 6749: "The OAuth 2.0 Authorization Framework".
- [19] 3GPP TS 29.510: "Network Function Repository Services; Stage 3".
- [20] 3GPP TS 29.518: "5G System; Access and Mobility Management Service; Stage 3".
- [21] 3GPP TS 23.380: "IMS Restoration Procedures".
- [22] 3GPP TS 32.422: "Telecommunication management; Subscriber and equipment trace; Trace control and configuration management".
- [23] IETF RFC 7807: "Problem Details for HTTP APIs".
- [24] 3GPP TS 23.527: "5G System; Restoration Procedures".
- [25] 3GPP TS 32.255: "Charging management; 5G data connectivity domain charging; stage 2".
- [26] 3GPP TS 32.291: "Charging management; 5G system, charging service; Stage 3".
- [27] 3GPP TS 24.301: "Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3".
- [28] 3GPP TR 21.900: "Technical Specification Group working methods".
- [29] 3GPP TS 29.244: "Interface between the Control Plane and the User Plane Nodes; stage 3".
- [30] 3GPP TS 29.512: "5G System; Session Management Policy Control Service; Stage 3".
- [31] IETF RFC 7230: "Hypertext Transfer Protocol (HTTP/1.1): Message Syntax and Routing".
- [32] IETF RFC 7231: "Hypertext Transfer Protocol (HTTP/1.1): Semantics and Content".
- [33] 3GPP TS 23.401: "General Packet Radio Service (GPRS) enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access; Stage 2".
- [34] 3GPP TS 29.524: "5G System; Cause codes mapping between 5GC interfaces; Stage 3".
- [35] 3GPP TS 23.216: "Single Radio Voice Call Continuity (SRVCC); Stage 2".
- [36] 3GPP TS 23.316: "Wireless and wireline convergence access support for the 5G System (5GS)".
- [37] 3GPP TS 29.542: "5G System; Session Management Services for Non-IP Data Delivery (NIDD); Stage 3".
- [38] 3GPP TS 29.519: "5G System; Usage of the Unified Data Repository service for Policy Control Data, Application Data and Structured Data for Exposure; Stage 3".

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].

BP	Branching Point
DNAI	Data Network Access Identifier
DNN	Data Network Name
HR	Home Routed
H-SMF	Home SMF
I-SMF	Intermediate SMF
JSON	Javascript Object Notation
LADN	Local Area Data Network
MA	Multi-Access
MO	Mobile Originated
MT	Mobile Terminated
RSN	Redundancy Sequence Number
SM	Session Management
SMF	Session Management Function
SNPN	Stand-alone Non-Public Network
TNGF	Trusted Non-3GPP Gateway Function
TWIF	Trusted WLAN Interworking Function
UL CL	Uplink Classifier
UPF	User Plane Function
V-SMF	Visited SMF
W-AGF	Wireline Access Gateway Function

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4 Overview

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4.1 Introduction

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Within the 5GC, the SMF offers services to the AMF, other SMF (V-SMF, H-SMF or I-SMF), PCF and NEF via the Nsmf service based interface (see 3GPP TS 23.501 [2] and 3GPP TS 23.502 [3]).

Figure 4.1-1 provides the reference model (in service based interface representation and in reference point representation), with focus on the SMF and the scope of the present specification.

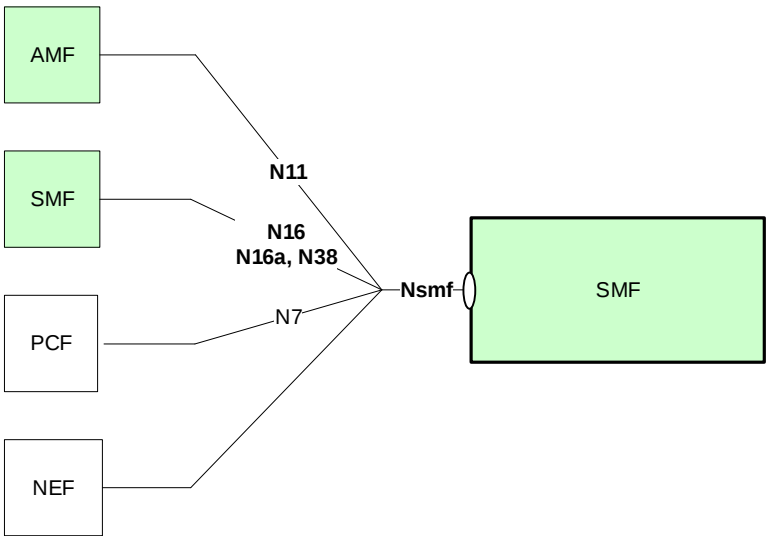


Figure 4.1-1: Reference model – SMF

N16 is the reference point between the V-SMF and H-SMF in Home Routed (HR) roaming cases.

N16a is the reference point between SMF and I-SMF.

N38 is the reference point between I-SMFs or V-SMFs.

The functionalities supported by the SMF are listed in clause 6.2.2 of 3GPP TS 23.501 [2].

5 Services offered by the SMF

5.1 Introduction

The SMF supports the following services.

Table 5.1-1: NF Services provided by SMF

Service Name	Description	Example Consumer
Nsmf_PDUSession	This service manages the PDU sessions and uses the policy and charging rules received from the PCF. The service operations exposed by this NF service allows the consumer NFs to establish, modify and delete the PDU sessions, and to send mobile originated data.	V-SMF, H-SMF, I-SMF, SMF, AMF
Nsmf_EventExposure	This service exposes the events happening on the PDU sessions to the consumer NFs.	PCF, NEF, AMF, SMF
Nsmf_NIDD	This service enables the delivery of Non-IP data towards a UE.	NEF

The Nsmf_EventExposure service is specified in 3GPP TS 29.508 [6]. The Session Management services for Non-IP Data Delivery (NIDD) are specified in 3GPP TS 29.542 [37].

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

Table 5.1-2: API Descriptions

Service Name	Clause	Description	OpenAPI Specification File	apiName	Annex
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