## ETSI TS 129 542 V16.2.0 (2020-11)



LTE;

5G;

5G System;

Session management services for Non-IP Data Delivery (NIDD); Stage 3

(3GPP TS 29.542 version 16.2.0 Release 16)





# Reference RTS/TSGC-0429542vg20 Keywords 5G,LTE

#### **ETSI**

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

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

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

#### Important notice

The present document can be downloaded from: http://www.etsi.org/standards-search

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the prevailing version of an ETSI deliverable is the one made publicly available in PDF format at <a href="https://www.etsi.org/deliver">www.etsi.org/deliver</a>.

Users of the present document should be aware that the document may be subject to revision or change of status.

Information on the current status of this and other ETSI documents is available at <a href="https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx">https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx</a>

If you find errors in the present document, please send your comment to one of the following services: <a href="https://portal.etsi.org/People/CommitteeSupportStaff.aspx">https://portal.etsi.org/People/CommitteeSupportStaff.aspx</a>

#### **Copyright Notification**

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

The content of the PDF version shall not be modified without the written authorization of ETSI.

The copyright and the foregoing restriction extend to reproduction in all media.

© ETSI 2020. All rights reserved.

DECT™, PLUGTESTS™, UMTS™ and the ETSI logo are trademarks of ETSI registered for the benefit of its Members.

3GPP™ and LTE™ are trademarks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.

oneM2M<sup>™</sup> logo is a trademark of ETSI registered for the benefit of its Members and of the oneM2M Partners.

**GSM**® and the GSM logo are trademarks registered and owned by the GSM Association.

## Intellectual Property Rights

#### **Essential patents**

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

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

#### **Trademarks**

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

## **Legal Notice**

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

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

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

## Modal verbs terminology

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

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

## Contents

Intelle	ectual Property Rights	2
Legal	Notice	2
Moda	l verbs terminology	2
Forew	vord	5
1	Scope	7
2	References	7
3	Definitions, symbols and abbreviations	8
3.1	Terms	8
3.2	Symbols	8
3.3	Abbreviations	8
4	Overview	8
4.1	Introduction	8
5	Services offered by the SMF for NIDD	
5.1	Introduction	
5.2	Nsmf_NIDD Service	9
5.2.1	Service Description	9
5.2.2	Service Operations	10
5.2.2.1	Introduction	10
5.2.2.2	Delivery	10
5.2.2.2	·	
6	API Definitions	10
6.1	Nsmf_NIDD Service API	
6.1.1	Introduction.	
6.1.2	Usage of HTTP	
6.1.2.1	· · · · · · · · · · · · · · · · · · ·	
6.1.2.1		
6.1.2.2		
6.1.2.2 6.1.2.2		
6.1.2.2 6.1.2.3	<b>√1</b>	
6.1.3	Resources	
6.1.3.1		
6.1.3.2		
6.1.3.2		
6.1.3.2		
6.1.3.2		
6.1.3.2	1	13
6.1.3.2		
6.1.3.2		13
6.1.3.2		13
6.1.3.2	2.4.2.2 Operation Definition	13
6.1.4	Custom Operations without associated resources	13
6.1.5	Notifications	14
6.1.6	Data Model	14
6.1.6.1	General	14
6.1.6.2	Structured data types	14
6.1.6.2	V 1	
6.1.6.2		
6.1.6.2	*1	
6.1.6.3	**	
6.1.6.3	1 71	
6.1.6.3		
6.1.6.3 6.1.6.4		
0.1.0.4	Eath types describing alternative data types of combinations of data types	13

6.1.6.4.1	Type: Del	verError	
6.1.6.5	Binary data	verError	
6.1.6.5.1	Mobile Te	rminated Data	15
6.1.7	Error Handling		15
6.1.7.1	General		
6.1.7.2	Protocol Erro	rs	
6.1.7.3	Application E	rrors	16
6.1.8	Feature negotiation.		16
6.1.9	Security		16
Annex A	(normative):	OpenAPI specification	17
A.1	General	- F - F	17
A.2	Nsmf_NIDD API		17
Annex B	(informative):	Change history	20
History	·		

#### **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 somethingshall 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 possiblecannot 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 Nsmf Service Based Interfaces for Non-IP Data Delivery (NIDD). It provides stage 3 protocol definitions and message flows, and specifies the API for the service offered by the SMF.

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]	OpenAPI: "OpenAPI 3.0.0 Specification", <a href="https://github.com/OAI/OpenAPI-Specification/blob/master/versions/3.0.0.md">https://github.com/OAI/OpenAPI-Specification/blob/master/versions/3.0.0.md</a> .
[7]	3GPP TR 21.900: "Technical Specification Group working methods".
[8]	3GPP TS 33.501: "Security architecture and procedures for 5G system".
[9]	IETF RFC 6749: "The OAuth 2.0 Authorization Framework".
[10]	3GPP TS 29.510: "5G System; Network Function Repository Services; Stage 3".
[11]	IETF RFC 7540: "Hypertext Transfer Protocol Version 2 (HTTP/2)".
[12]	IETF RFC 8259: "The JavaScript Object Notation (JSON) Data Interchange Format".
[13]	IETF RFC 7807: "Problem Details for HTTP APIs".
[14]	3GPP TS 29.541: "5G System (5GS); Network Exposure (NE) function services for Non-IP Data Delivery (NIDD); Stage 3".
[15]	3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces; Stage 3".

## 3 Definitions, symbols and abbreviations

#### 3.1 Terms

Void.

## 3.2 Symbols

Void.

#### 3.3 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 and Mobility Management Function

H-SMF Home SMF I-SMF Intermediate SMF

NEF Network Exposure Function NIDD Non-IP Data Delivery MT Mobile Terminated

SMF Session Management Function

V-SMF Visited SMF

### 4 Overview

#### 4.1 Introduction

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.

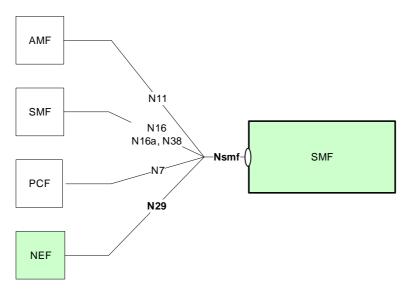


Figure 4.1-1: Reference model – SMF

N29 is the reference point between the (H-)SMF and the NEF.

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 for NIDD

#### 5.1 Introduction

The SMF supports the following service(s) for NIDD.

Table 5.1-1: NF Service(s) provided by SMF for NIDD

Service Name	Description	Example Consumer
Nsmf_NIDD	This service allows the NF consumer NF to deliver NIDD MT data to PDU sessions.	NEF

## 5.2 Nsmf\_NIDD Service

## 5.2.1 Service Description

The Nsmf\_NIDD service operates on the PDU Sessions. The service operations exposed by this service allow an NF consumer (i.e. NEF) to deliver NEF anchored Mobile Terminated (MT) data for a given PDU session of a UE towards the SMF.

The Nsmf\_NIDD service supports the following service operations:

Table 5.2.1-1: Service operations supported by the Nsmf\_NIDD service

Service Operations	Description	Operation Semantics	Example Consumer(s)
Delivery	Deliver MT NIDD user data to the PDU session of the UE.	Request/Response	NEF

#### 5.2.2 Service Operations

#### 5.2.2.1 Introduction

See Table 5.2.1-1 for an overview of the service operations supported by the Nsmf\_NIDD service.

#### 5.2.2.2 Delivery

#### 5.2.2.2.1 General

The Delivery service operation shall be used to transfer NEF anchored MT data for a given PDU session.

It is used in the following procedures:

- NEF anchored Mobile Terminated Data Transport (see clause 4.25.5 of 3GPP TS 23.502 [3]).

The NF Service Consumer (i.e. NEF) shall deliver MT data to the SMF by using the HTTP POST method ("deliver" custom operation) as shown in Figure 5.2.2.2.1-1.

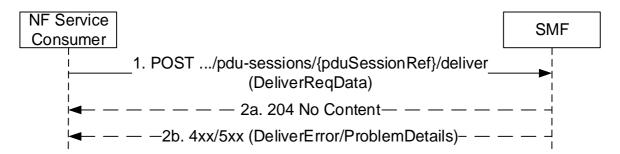


Figure 5.2.2.1-1: Transfer MT Data

1. The NF Service Consumer shall send a POST request to the URI of "deliver" custom operation on an Individual PDU session resource in the SMF. The payload body of the POST request shall contain the MT data to be delivered.

NOTE: The URI of the individual PDU session resource is provided by SMF to the NEF during SMF-NEF connection creation (see clause 5.2.2.2.1 of 3GPP TS 29.541 [14]).

- 2a. On success, "204 No Content" shall be returned.
- 2b. On failure, one of the HTTP status code listed in Table 6.1.3.2.4.2.2-2 shall be returned. For a 4xx/5xx response, the message body may contain a DeliverError or ProblemDetails object, with the "cause" attribute indicating the cause of the failure. If Estimated Maximum Waiting Time is received from AMF, the SMF shall include it in the message body.

## 6 API Definitions

## 6.1 Nsmf\_NIDD Service API

#### 6.1.1 Introduction

The Nsmf\_NIDD service shall use the Nsmf\_NIDD API.

The API URI of the Nsmf\_NIDD API shall be:

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

The request URI used in HTTP request from the NF service consumer towards the NF service producer shall have the Resource URI 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 "nsmf-nidd".
- The <apiVersion> shall be "v1".
- 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, IETF RFC 7540 [11], shall be used as specified in clause 5 of 3GPP TS 29.500 [4].

HTTP/2 shall be transported as specified in clause 5.3 of 3GPP TS 29.500 [4].

The OpenAPI [6] specification of HTTP messages and content bodies for the Nsmf\_NIDD API is contained in Annex A.

#### 6.1.2.2 HTTP standard headers

#### 6.1.2.2.1 General

The usage of HTTP standard headers shall be supported as 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 [12]). 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 [13]). The use of the Problem Details JSON object in a HTTP response body shall be signalled by the content type "application/problem+json".

NOTE: "application/json" is used in a response that includes a payload body containing an application-specific data structure, see clause 4.8 of 3GPP TS 29.501 [5].

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 or two binary body parts 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.5gnas	Binary encoded payload, encoding a 5GS NAS message or 5G NAS IEs,		
	as specified in 3GPP TS 24.501 [7].		

See clause 6.1.6.5 for the binary payloads supported in the binary body part of multipart messages.

#### 6.1.2.3 HTTP custom headers

In this release of the specification, no specific custom headers are defined for the Nsmf\_NIDD service.

For 3GPP specific HTTP custom headers used across all service based interfaces, see clause 5.2.3 of 3GPP TS 29.500 [4].

#### 6.1.3 Resources

#### 6.1.3.1 Overview

Figure 6.1.3.1-1 describes the resource URI structure of the Nsmf\_NIDD API.

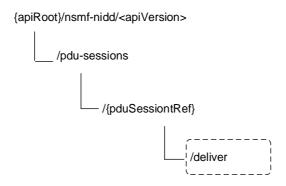


Figure 6.1.3.1-1: Resource URI structure of the Nsmf\_NIDD API

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
Individual PDU session	/pdu-	deliver	Delivery Service Operation
	sessions/{pduSessionRef}/deliver	(POST)	

#### 6.1.3.2 Resource: Individual PDU session

#### 6.1.3.2.1 Description

This resource represents an individual PDU session created in SMF for NIDD.

This resource is modelled with the Document resource archetype (see clause C.1 of 3GPP TS 29.501 [5]).

#### 6.1.3.2.2 Resource Definition

Resource URI: {apiRoot}/nsmf-nidd/<apiVersion>/pdu-sessions/{pduSessionRef}

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	Definition
apiRoot	See clause 6.1.1
apiVersion	See clause 6.1.1
pduSessionRef	PDU session reference assigned by the SMF during SMF-NEF Connection creation.

#### 6.1.3.2.3 Resource Standard Methods

None.

#### 6.1.3.2.4 Resource Custom Operations

#### 6.1.3.2.4.1 Overview

Table 6.1.3.2.4.1-1: Custom operations

Custom operaration URI	Mapped HTTP method	Description	
{resourceUri}/deliver	POST	Delivery service operation.	

#### 6.1.3.2.4.2 Operation: deliver

#### 6.1.3.2.4.2.1 Description

This custom operation enables to deliver NEF anchored MT data for a given PDU session towards the SMF.

#### 6.1.3.2.4.2.2 Operation Definition

This operation shall support the request data structures specified in table 6.1.3.2.4.2.2-1 and the response data structure and response codes specified in table 6.1.3.2.4.2.2-2.

Table 6.1.3.2.4.2.2-1: Data structures supported by the POST Request Body on this resource

Data type	Р	Cardinality	Description
DeliverReqData	М	1	Representation of the payload of a Deliver Request

Table 6.1.3.2.4.2.2-2: Data structures supported by the POST Response Body on this resource

Data type	Р	Cardinality	Response	Description	
			codes		
n/a			204 No	Successful delivery of MT data.	
			Content		
DeliverError	0	01	504 Gateway Timeout	The "cause" attribute may be used to indicate the following application errors:  - UE_NOT_REACHABLE, if the UE is not reachable to deliver the mobile terminated data; if Estimated Maximum Waiting Time shall be included if available;	
See table 6.1.7.3-1 for the description of these errors		See table 6.1.7.3-1 for the description of these errors.			
NOTE: The mandatory HTTP error status codes for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] other than those specified in the table above also apply, with a ProblemDetails data type when needed (see clause 5.2.7 of 3GPP TS 29.500 [4]).					

#### 6.1.4 Custom Operations without associated resources

None

#### 6.1.5 Notifications

None.

#### 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 Nsmf\_NIDD service based interface protocol.

Table 6.1.6.1-1: Nsmf\_NIDD specific Data Types

Data type	Clause defined	Description	Applicability
DeliverReqData	6.1.6.2.2	Information within Deliver Request	
DeliverAddInfo	6.1.6.2.3	Deliver Error Response Additional Information	
DeliverError	6.1.6.4.1	Deliver Error Response	

Table 6.1.6.1-2 specifies data types re-used by the  $N_{\mbox{\tiny NF>}}$  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  $N_{\mbox{\tiny NF>}}$  service based interface.

Table 6.1.6.1-2: Nsmf\_NIDD re-used Data Types

Data type	Reference	Comments	Applicability
RefToBinaryData		Cross-Reference to binary data encoded within a binary body part in an HTTP multipart message.	
ProblemDetails	3GPP TS 29.571 [15]	Error description	
DurationSec	3GPP TS 29.571 [15]	Duration in units of seconds	

#### 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: DeliverReqData

Table 6.1.6.2.2-1: Definition of type DeliverReqData

Attribute name	Data type	Р	Cardinality	Description	Applicability
mtData	RefToBinaryData	M	1	This IE shall reference the	
				Mobile Terminated Data	
				(see clause 6.1.6.5.1).	

#### 6.1.6.2.3 Type: DeliverAddInfo

Table 6.1.6.2.3-1: Definition of type DeliverAddInfo

Attribute name	Data type	-	Cardi nality	Description	Applicabili ty
maxWaitingTime	DurationSec	С		This IE shall contain the estimated maximum wait time (see clause 4.25.5 of 3GPP 23.502 [3]).	

#### 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	Applicability

#### 6.1.6.4 Data types describing alternative data types or combinations of data types

#### 6.1.6.4.1 Type: DeliverError

Table 6.1.6.4.1-1: Definition of type DeliverError as a list of "to be combined data types"

Data type	Cardinality	Description	Applicability
ProblemDetails	1	Detail information of the problem	
DeliverAddInfo	1	Additional information to be returned in error	
		response.	

#### 6.1.6.5 Binary data

#### 6.1.6.5.1 Mobile Terminated Data

Mobile Terminated Data shall encode the Data Contents of the Payload Container specified in 3GPP TS 24.501 [7], using the vnd.3gpp.5gnas content-type, as summarized in Table 6.1.6.5.1-1.

Table 6.1.6.5.1-1: Mobile Terminated Data

Mobile Terminated Data	Reference (3GPP TS 24.501 [7])	Related NAS SM message
Payload container contents in	9.11.3.39	DL NAS Transport
octets 4 to n		

## 6.1.7 Error Handling

#### 6.1.7.1 General

For the Nsmf\_NIDD API, HTTP error responses shall be supported as specified in clause 4.8 of 3GPP TS 29.501 [5]. Protocol errors and application errors specified in table 5.2.7.2-1 of 3GPP TS 29.500 [4] shall be supported for an HTTP method if the corresponding HTTP status codes are specified as mandatory for that HTTP method in table 5.2.7.1-1 of 3GPP TS 29.500 [4].

In addition, the requirements in the following clauses are applicable for the Nsmf\_NIDD API.

#### 6.1.7.2 Protocol Errors

No specific procedures for the Nsmf\_NIDD service are specified.

#### 6.1.7.3 Application Errors

The common application errors defined in Table 5.2.7.2-1 of 3GPP TS 29.500 [4] may be used for the Nsmf\_NIDD service.

The application errors defined for the Nsmf\_NIDD service are listed in Table 6.1.7.3-1.

**Table 6.1.7.3-1: Application errors** 

Application Error	HTTP status code	Description
UE_NOT_REACHABLE	504 Gateway	The UE is not reachable for the service.
	Timeout	

## 6.1.8 Feature negotiation

The optional features in table 6.1.8-1 are defined for the Nsmf\_NIDD 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: Supported Features

Feature number	Feature Name	Description

## 6.1.9 Security

As indicated in 3GPP TS 33.501 [8] and 3GPP TS 29.500 [4], the access to the Nsmf\_NIDD API may be authorized by means of the OAuth2 protocol (see IETF RFC 6749 [9]), based on local configuration, using the "Client Credentials" authorization grant, where the NRF (see 3GPP TS 29.510 [10]) plays the role of the authorization server.

If OAuth2 is used, an NF Service Consumer, prior to consuming services offered by the Nsmf\_NIDD API, shall obtain a "token" from the authorization server, by invoking the Access Token Request service, as described in 3GPP TS 29.510 [10], 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 Nsmf\_NIDD service.

The Nsmf\_NIDD API defines scopes for OAuth2 authorization as specified in 3GPP TS 33.501 [15]; it defines a single scope consisting on the name of the service (i.e., "nsmf-nidd"), and it does not define any additional scopes at resource or operation level.

## Annex A (normative): OpenAPI specification

#### A.1 General

This Annex specifies the formal definition of the Nsmf\_NIDD Service API. 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: 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 hosted in ETSI Forge, that uses the GitLab software version control system (see 3GPP TS 29.501 [5] clause 5.3.1 and 3GPP TR 21.900 [7] clause 5B).

### A.2 Nsmf\_NIDD API

```
openapi: 3.0.0
info:
  version: '1.0.0'
  title: 'Nsmf_NIDD
  description: |
    SMF NIDD Service.
    © 2020, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
   All rights reserved.
externalDocs:
  description: 3GPP TS 29.542 V16.1.0; 5G System; Session Management Services for Non-IP Data
Delivery (NIDD); Stage 3
  url: http://www.3gpp.org/ftp/Specs/archive/29_series/29.542/
servers:
  - url: '{apiRoot}/nsmf-nidd/v1'
    variables:
      apiRoot:
        default: https://example.com
       description: apiRoot as defined in clause 4.4 of 3GPP TS 29.501.
security:
  - {}
  - oAuth2ClientCredentials:
    - nsmf-nidd
  '/pdu-sessions/{pduSessionRef}/deliver':
      summary: Delivery Service Operation
        - Individual PDII session
      operationId: Deliver
      parameters:
        - name: pduSessionRef
          in: path
          description: PDU session reference
          required: true
          schema:
           type: string
      requestBody:
        description: representation of the payload of Deliver Request
        content:
          multipart/related: # message with a binary body part
            schema:
              type: object
```

```
properties:
                jsonData:
                  $ref: '#/components/schemas/DeliverReqData'
                binaryMtData:
                  type: string
                  format: binary
            encoding:
              isonData:
                contentType: application/json
              binaryMtData:
                contentType: application/vnd.3gpp.5gnas
                headers:
                  Content-Id:
                   schema:
                     type: string
      responses:
        '204':
          description: successful transfering of Delivery
        '400':
          $ref: 'TS29571_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29571_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29571_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29571_CommonData.yaml#/components/responses/404'
        '411':
          $ref: 'TS29571_CommonData.yaml#/components/responses/411'
        '413':
          $ref: 'TS29571 CommonData.yaml#/components/responses/413'
        '415':
          $ref: 'TS29571_CommonData.yaml#/components/responses/415'
        '429':
          $ref: 'TS29571_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29571_CommonData.yaml#/components/responses/500'
          $ref: 'TS29571_CommonData.yaml#/components/responses/503'
        504:
          description: unsuccessful delivery of mobile terminated data - gateway timeout
           application/json:
              schema:
                $ref: '#/components/schemas/DeliverError'
          $ref: 'TS29571_CommonData.yaml#/components/responses/default'
components:
  securitySchemes:
   oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{nrfApiRoot}/oauth2/token'
          scopes:
            nsmf-nidd: Access to the nsmf-nidd API
  schemas:
  STRUCTURED DATA TYPES
   DeliverReqData:
      type: object
      properties:
       mtData:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'
      required:
        - mt.Dat.a
    DeliverAddInfo:
      type: object
      properties:
        maxWaitingTime:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
# DATA TYPES DESCRIBING ALTERNATIVE OR COMBINATION OF DATA TYPES
```

#

```
DeliverError:
```

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

## Annex B (informative): Change history

	Change history						
Date	Meeting	TDoc	CR	Rev	Cat	Subject/Comment	New
							version
2020-03	CT4#96-e	C4-201267				Initial Draft.	0.1.0
2020-03	CT#87e	CP-200093				Presented for information and approval	1.0.0
2020-03	CT#87e					Approved at CT#87e	16.0.0
2020-06	CT#88e	CP-201071	0001	2	F	Storage of YAML files in ETSI Forge	16.1.0
2020-06	CT#88e	CP-201046	0003		F	Miscellaneous Corrections	16.1.0
2020-06	CT#88e	CP-201073	0004		F	29.542 Rel-16 API version and External doc update	16.1.0
2020-09	CT#89e	CP-202105	0005		F	Optionality of DeliverError	16.2.0

## History

	Document history					
V16.1.0	July 2020	Publication				
V16.2.0	November 2020	Publication				