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Charging management;  
5G system, charging service;  
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# Foreword

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# 1 Scope

The present document specifies the protocol that is used for service based interface. The API definitions and data type definitions are aligned with the common charging architecture specified in TS 32.240 [1]. The present document is related to other 3GPP charging TSs as follows:

- The common 3GPP charging architecture is specified in TS 32.240 [1].
- The 5G data connectivity charging is specified in TS 32.255 [30].
- The 5G connection and mobility charging is specified in TS 32.256 [31].
- The service, operations and procedures of 5G charging for service based interface is specified in TS 32.290 [58].

The Technical Realization of the Service Based Architecture and the Principles and Guidelines for Services Definition of the 5G System are specified in 3GPP TS 29.500 [299] and 3GPP TS 29.501 [300].

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# 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 TS 32.240: "Telecommunication management; Charging management; Charging architecture and principles".
- [2] - [13] Void.
- [14] 3GPP TS 32.254: "Telecommunication management; Charging management; Exposure function Northbound Application Program Interfaces (APIs) charging".
- [15] - [28] Void.
- [29] 3GPP TS 32.274: "Telecommunication management; Charging management; Short Message Service (SMS) charging".
- [30] 3GPP TS 32.255: "Telecommunication management; Charging management; 5G Data connectivity domain charging; stage 2".
- [31] 3GPP TS 32.256: "Telecommunication management; Charging management; 5G connection and mobility domain charging; stage 2".
- [32] - [49] Void.
- [50] - [57] Void.
- [58] 3GPP TS 32.290: "Telecommunication management; Charging management; 5G system; Services, operations and procedures of charging using Service Based Interface (SBI)".
- [59] - [99] Void.
- [100] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [101] 3GPP TR 21.900: "Technical Specification Group working methods".
- [102] - [199] Void

[200] - [203]	Void
[204] - [298]	Void
[299]	3GPP TS 29.500: "5G System; Technical Realization of Service Based Architecture; Stage 3".
[300]	3GPP TS 29.501: "5G System; Principles and Guidelines for Services Definition; Stage 3".
[301]	3GPP TS 29.594: "5G System; Spending Limit Control Service; Stage 3".
[302]	3GPP TS 29.512: "5G System; Session Management Policy Control Service; Stage 3".
[303]	3GPP TS 24.501: "Non-Access-Stratum (NAS) Protocol for 5G System (5GS); Stage 3".
[304]	3GPP TS 38.413: "NG-RAN; NG Application Protocol (NGAP)".
[305] - [370]	Void
[371]	3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces; Stage 3".
[372] - [389]	Void
[390]	3GPP TS 33.501: "Security architecture and procedures for 5G System".
[391] - [399]	Void
[400]	Void.
[401]	IETF RFC 7540: "Hypertext Transfer Protocol Version 2 (HTTP/2)".
[402]	IETF RFC 8259: "The JavaScript Object Notation (JSON) Data Interchange Format".
[403] - [499]	Void.
[500]	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> .
[501] - [599]	Void.

---

## 3 Definitions, symbols 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 [100].

### 3.2 Symbols

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

Nchf Service based interface exhibited by CHF.

### 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].

AF	Application Function
AMF	Access and Mobility Management Function
CHF	Charging Function

CTF	Charging Trigger Function	
GPSI	Generic Public Subscription Identifier	
GUAMI	Globally Unique AMF Identifier	Intermediate SMF
NF	Network Function	
PEI	Permanent Equipment Identifier	
QBC	QoS flow Based Charging	
QFI	QoS Flow Identifier	
SMSF	Short Message Service Function	
SMF	Session Management Function	
SSC	Session and Service Continuity	
SUPI	Subscription Permanent Identifier	

## 4 Overview

### 4.1 Service architecture

The Converged Charging Service or Offline Only Charging Service is provided by the CHF to the consumer and shown in the SBI representation model in figure 4.1.1.

The ConvergedCharging Service (Nchf\_ConvergedCharging) or Offline Only Charging Service (Nchf\_OfflineOnlyCharging) is part of the Nchf service-based interface exhibited by the Charging Function (CHF). The list of NF Service Consumer(s) is provided in Table 5.1-1.

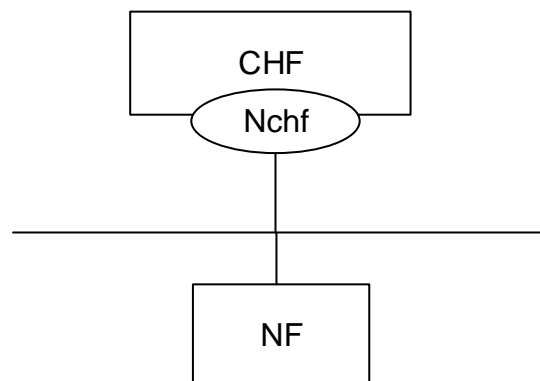


Figure 4.1.1: Reference Architecture for the Nchf\_ConvergedCharging Service; SBI representation

### 4.2 Network functions

#### 4.2.1 Charging Function (CHF)

The CHF is responsible for converged online charging and offline charging functionalities. The CHF provides the following:

- Quota;
- Re-authorisation triggers;
- Notification when Charging Domain determines rating conditions is affected or when CHF determines to terminate the charging service;
- Receiving service usage reports from NF Service Consumer; and

- CDRs generation.

## 4.2.2 NF Service Consumers

The NF Service Consumers shall support:

- Requesting and receiving the quota(s);
- Sending service usage reports; and
- Handling quota re-authorisation or abort notifications.

---

# 5 Services offered by the CHF

## 5.1 Introduction

The following services are provided by the CHF.

**Table 5.1-1: NF Services provided by CHF**

Service Name	Description	Consumer
Nchf_ConvergedCharging service	This service provides a converged charging for session and event based NF services, with and without quota management, as well as charging information record generation	SMF, SMSF, AMF
Nchf_OfflineOnlyCharging service	This service provides an offline only charging for session based NF service.	SMF
Nchf_SpendingLimitControl	This service enables the PCF to retrieve policy counter status information per UE from the CHF by subscribing to spending limit reporting (i.e. notifications of policy counter status changes).	PCF

The "Nchf\_SpendingLimitControl" service is defined in 29.594 [301].

## 5.2 Nchf\_ConvergedCharging service

### 5.2.1 Service description

This service provides charging in converged charging scenario by the CHF to the NF service consumer as defined in subclause 6.2 in 3GPP TS 32.290[58].

It includes the following functionalities:

- Create resource at service establishment or no existing ChargingData resource, and may allocate quotas based on the request from NF consumer;
- During the service consumption lifecycle, update resource upon receiving the quota usage or service usage report under a number of circumstances and allocate subsequent quotas based on the request from NF consumer;
- Release upon service termination, Unit Count Inactivity Timer expiry or error response; and
- Notify NF Service Consumer of the re-authorisation triggers when CHF determines rating conditions is affected, or the abort triggers when CHF determines to terminate the charging service.
- Charging information record generation

## 5.2.2 Service operations

### 5.2.2.1 Introduction

The service operations defined for Nchf\_ConvergedCharging are shown in table 5.2.2.1-1.

**Table 5.2.2.1-1: Nchf\_ConvergedCharging Operations**

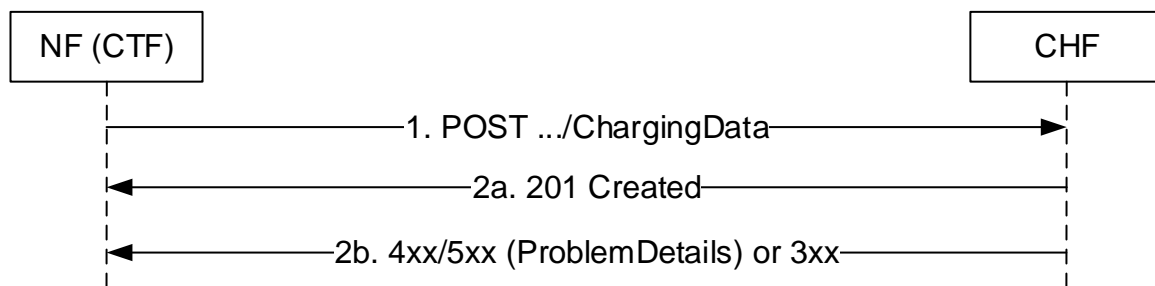
Service Operation Name	Description	Initiated by	Corresponding Converged charging messages in 3GPP TS 32.290[58]
Nchf_ConvergedCharging_Create	First Interrogation of unit reservation; And/or initial report of service usage.	NF consumer	Charging Data Request/Response [Initial]
	One Time request for the service.		Charging Data Request/Response [Event]
Nchf_ConvergedCharging_Update	Intermediate Interrogation for subsequent units reservation when: <ul style="list-style-type: none"> <li>- the granted service unitfor one rating group are spent</li> <li>- expiry of granted service units validity time</li> <li>- service events occur, which might affect the rating of the current service</li> </ul> And/or Intermediate report of service usage.	NF consumer	Charging Data Request/Response [Update]
Nchf_ConvergedCharging_Release	Final Interrogation without any unit reservation And/or last report of service usage.	NF consumer	Charging Data Request/Response [Termination]
Nchf_ConvergedCharging_Notify	Request that the user be re-authorized or the charging session context be terminated.	CHF	Charging Notify Request/Response

#### 5.2.2.2 Nchf\_ConvergedCharging\_Create Operation

The Nchf\_ConvergedCharging\_Create service operation provides means for NF (CTF) to request quotas for service delivery or initial report of service usage.

The following procedures using the Nchf\_ConvergedCharging\_Create service operation are supported:

- No existing charging data resource.



**Figure 5.2.2.2-1: Nchf\_ConvergedCharging\_Create Service Operation**

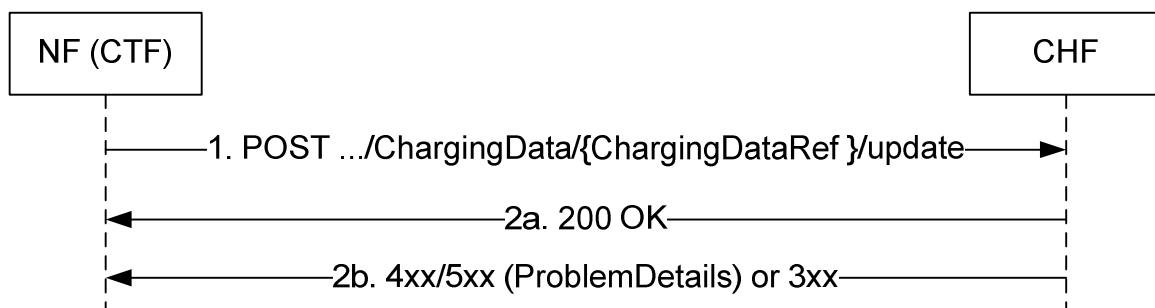
1. NF (CTF) sends a Nchf\_ConvergedCharging\_Create request to the CHF to create resource for charging. Requested quota and notification URI for Nchf\_ConvergedCharging\_Notify service operation are included in the request body.
- 2a. At successful operation, "201 Created" response is returned. In the "201 Created" response, the CHF includes a Location header field and the allocated quota in the body. The Location header field shall contain the URI of the created resource. The NF (CTF) shall use the URI received in the Location header in subsequent requests to the CHF for the same PDU session.
- 2b. On failure or redirection, one of the HTTP status code listed in Table 6.1.3.2.3.1-3 shall be returned. For a 4xx/5xx response, the message body shall contain a ProblemDetails structure with the "cause" attribute set to one of the application error listed in Table 6.1.7.3-1.

### 5.2.2.3 Nchf\_ConvergedCharging\_Update Operation

The Nchf\_ConvergedCharging\_Update service operation provides means for NF (CTF) to update the charging data.

The following procedures using the Nchf\_ConvergedCharging\_Update service operation are supported:

- the granted service units for one rating group are spent
- expiry of granted service units' validity time
- charging events occur, which might affect the rating of the current service
- receiving re-authorization notification from CHF



**Figure 5.2.2.3-1: Nchf\_ConvergedCharging\_Update Service Operation**

1. NF (CTF) sends a Nchf\_ConvergedCharging\_Update request to the CHF. The {ChargingDataRef} in the URI identifies the "Charging Data" to be updated. The requested service unit and previous used service unit is included in the request body.

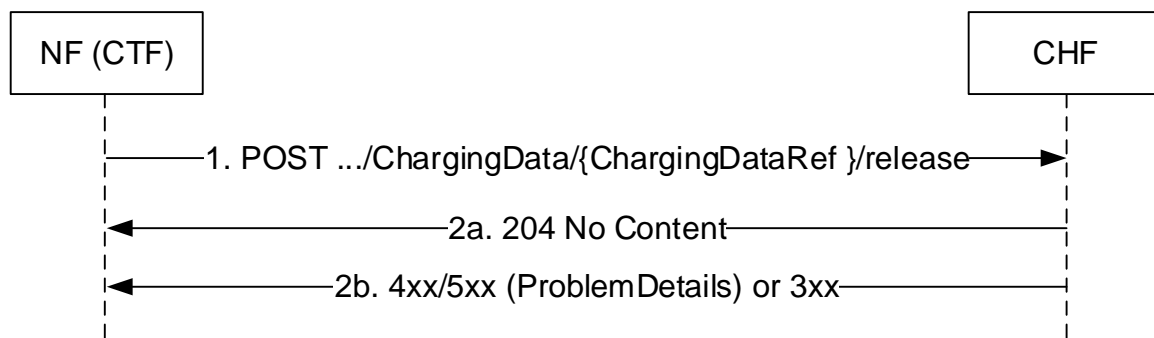
- 2a. At successful operation, "200 OK" response is returned. The CHF includes the granted service unit in the "200 OK" response.
- 2b. On failure or redirection, one of the HTTP status code listed in Table 6.1.3.3.4.2.2-2 shall be returned. For a 4xx/5xx response, the message body shall contain a ProblemDetails structure with the "cause" attribute set to one of the application error listed in Table 6.1.7.3-1.

#### 5.2.2.4 Nchf\_ConvergedCharging\_Release Operation

The Nchf\_ConvergedCharging\_Release service operation provides means for NF (CTF) to terminate charging Session.

The following procedures using the Nchf\_ConvergedCharging\_Release service operation are supported:

- Expiry of unit count inactivity timer in NF Consumer.
- Abort notification is received from CHF.
- Service termination in NF Consumer.



**Figure 5.2.2.4-1: Nchf\_ConvergedCharging\_Release Service Operation**

1. NF(CTF) sends a Nchf\_ConvergedCharging\_Release request to the CHF. The {ChargingDataRef } in the URI identifies the "Charging Data" to be updated and then released. The final used service unit is included in the request body.
- 2a. At successful operation, "204 No Content" response is returned.
- 2b. On failure or redirection, one of the HTTP status code listed in Table 6.1.3.3.4.3.2-2 shall be returned. For a 4xx/5xx response, the message body shall contain a ProblemDetails structure with the "cause" attribute set to one of the application error listed in Table 6.1.7.3-1.

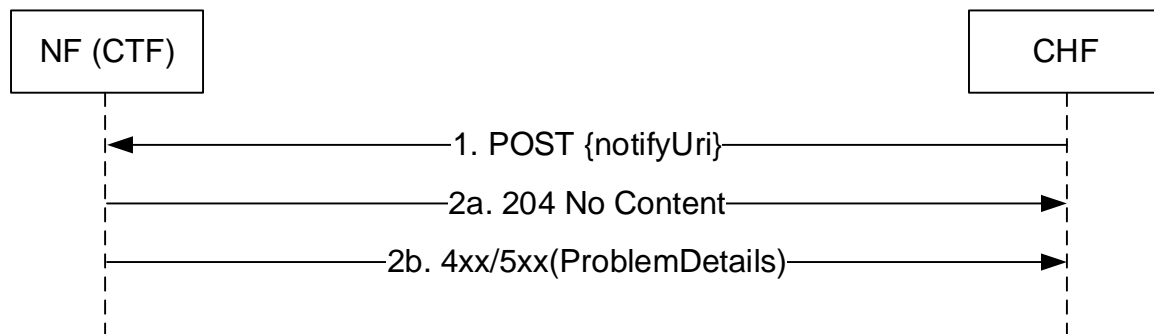
#### 5.2.2.5 Nchf\_ConvergedCharging\_Notify Operation

The Nchf\_ConvergedCharging\_Notify service operation provides means for CHF to notify the NF(CTF) to update or terminate charging of the PDU Session.

The following procedures using the Nchf\_ConvergedCharging\_Notify service operation are supported:

- CHF determines re-authorization.
- CHF determines abort of charging.





**Figure 5.2.2.5-1: Nchf\_ConvergedCharging\_Notify Service Operation**

1. The CHF sends a Nchf\_ConvergedCharging\_Notify request to the NF (CTF). The {notifyUri} identifies the notification URI which is sent in the Nchf\_ConvergedCharging\_Create request. The notification type is included in the request body.
- 2a. At successful operation, "204 No Content" response is returned.
- 2b. On failure, one of the HTTP status code listed in Table 6.1.5.2.3.1-2 shall be returned. For a 4xx/5xx response, the message body shall contain a ProblemDetails structure with the "cause" attribute set to one of the application error listed in Table 6.1.7.3-1.

After successful operation, when the NF Service Consumer receives a Charging Notify Request while not waiting for any Charging Data Response from the CHF, CTF can send a new Charging Data Request.

## 5.3 Nchf\_OfflineOnlyCharging service

### 5.3.1 Service description

This service provides charging in offline only charging scenario by the CHF to the NF service consumer (i.e. SMF) as defined in subclause 6.5 in 3GPP TS 32.290 [58].

It includes the following functionalities:

- Create resource at service establishment based on the request from NF consumer;
- During the service consumption lifecycle, update resource based on the request from NF consumer;
- Release upon service termination;
- Charging information record generation.

### 5.3.2 Service Operations

#### 5.3.2.1 Introduction

The service operations defined for Nchf\_OfflineOnlyCharging are shown in table 5.3.2.1-1.

**Table 5.3.2.1-1: Nchf\_OfflineOnlyCharging Operations**

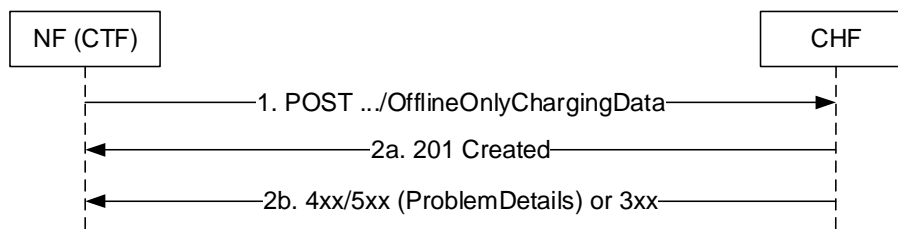
Service Operation Name	Description	Initiated by	Corresponding Offline only charging messages in 3GPP TS 32.290[58]
Nchf_OfflineOnlyCharging_Create	Initial report of service usage.	NF consumer	Charging Data Request/Response [Initial]
Nchf_OfflineOnlyCharging_Update	Intermediate report of service usage.	NF consumer	Charging Data Request/Response [Update]
Nchf_OfflineOnlyCharging_Release	Last report of service usage.	NF consumer	Charging Data Request/Response [Termination]

**5.3.2.2 Nchf\_OfflineOnlyCharging\_Create Operation**

The Nchf\_OfflineOnlyCharging\_Create operation provides means for NF (CTF) to request initial report of service usage.

The following procedures using the Nchf\_OfflineOnlyCharging\_Create service operation are supported:

- No existing charging data resource.



**Figure 5.3.2.2-1: Nchf\_OfflineOnlyCharging\_Create Service Operation**

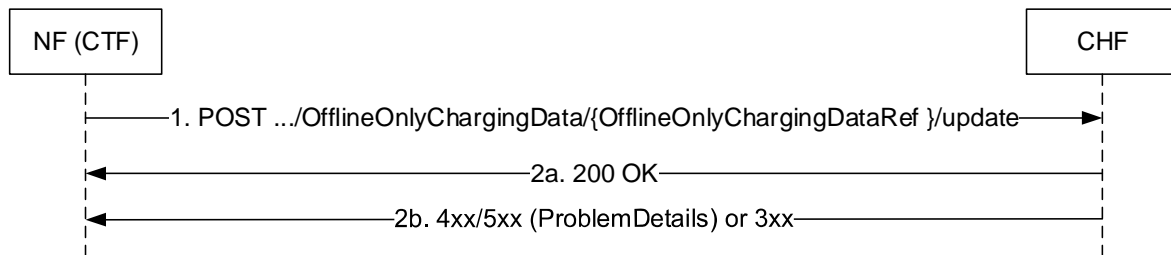
1. NF (CTF) sends a Nchf\_OfflineOnlyCharging\_Create request to the CHF to create resource for starting charging.
- 2a. At successful operation, "201 Created" response is returned. In the "201 Created" response, the CHF includes a Location header field in the body. The Location header field shall contain the URI of the created resource. The NF (CTF) shall use the URI received in the Location header in subsequent requests to the CHF for the same PDU session.
- 2b. On failure or redirection, one of the HTTP status code listed in Table 6.2.3.2.3.1-3 shall be returned. For a 4xx/5xx response, the message body shall contain a ProblemDetails structure with the "cause" attribute set to one of the application error listed in Table 6.2.7.3-1.

**5.3.2.3 Nchf\_OfflineOnlyCharging\_Update Operation**

The Nchf\_OfflineOnlyCharging\_Update operation provides means for NF (CTF) to update the charging data.

The following procedures using the Nchf\_OfflineOnlyCharging\_Update service operation are supported:

- charging events occur.

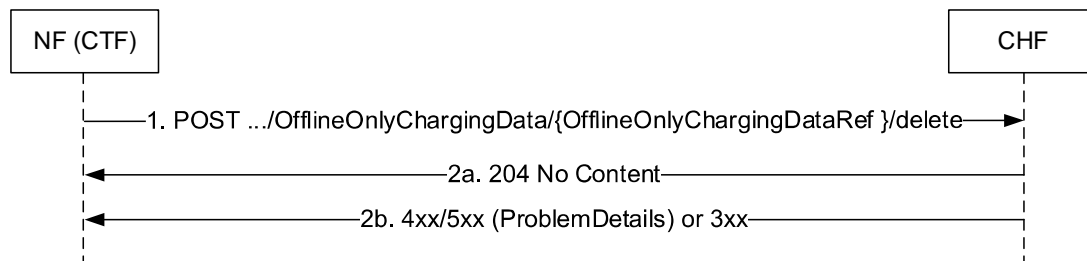


**Figure 5.3.2.3-1: Nchf\_OfflineOnlyCharging\_Update Service Operation**

1. NF (CTF) sends a Nchf\_OfflineOnlyCharging\_Update request to the CHF. The {OfflineChargingDataRef} in the URI identifies the "Offline Only Charging Data" to be updated. The used service unit is included in the request body.
- 2a. At successful operation, "200 OK" response is returned.
- 2b. On failure or redirection, one of the HTTP status code listed in Table 6.2.3.3.4.2.2-2 shall be returned. For a 4xx/5xx response, the message body shall contain a ProblemDetails structure with the "cause" attribute set to one of the application error listed in Table 6.2.7.3-1.

#### 5.3.2.4 Nchf\_OfflineOnlyCharging\_Release Operation

The Nchf\_OfflineOnlyCharging\_Release service operation provides means for NF (CTF) to terminate charging Session. The following procedures using the Nchf\_OfflineOnlyCharging\_Release service operation are supported.



**Figure 5.3.2.4-1: Nchf\_OfflineOnlyCharging\_Release Service Operation**

1. NF(CTF) sends a Nchf\_OfflineOnlyCharging\_Release request to the CHF. The {OfflineChargingDataRef} in the URI identifies the "Offline Only Charging Data" to be updated and then released. The final used service unit is included in the request body.
- 2a. At successful operation, "204 No Content" response is returned.
- 2b. On failure or redirection, one of the HTTP status code listed in Table 6.2.3.3.4.3.2-2 shall be returned. For a 4xx/5xx response, the message body shall contain a ProblemDetails structure with the "cause" attribute set to one of the application error listed in Table 6.2.7.3-1.

## 6 API definitions

### 6.1 Nchf\_ConvergedCharging Service API

#### 6.1.1 Introduction

The APIs defined in this subclause implement the service operation defined in subclause 5.2.2.

The Nchf\_ConvergedCharging service shall use the Nchf\_ConvergedCharging API.

The request URI used in each HTTP request from the NF service consumer towards the CHF shall have the structure defined in subclause 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 "nchf-convergedcharging".
- The {apiVersion} shall be "v3".
- The {apiSpecificResourceUriPart} shall be set as described in subclause 6.1.3.

## 6.1.2 Usage of HTTP

### 6.1.2.1 General

HTTP/2 as described in IETF RFC 7540 [401] shall be used as specified in subclause 5.2 of 3GPP TS 29.500 [299].

### 6.1.2.2 HTTP standard headers

#### 6.1.2.2.1 General

See subclause 5.2.2 of 3GPP TS 29.500 [299] for the usage of HTTP standard headers.

HTTP/2, shall be transported as specified in subclause 5.3 of 3GPP TS 29.500 [299].

#### 6.1.2.2.2 Content type

JSON, IETF RFC 8259 [402], shall be used as content type of the HTTP bodies specified in the present specification, as specified in subclause 5.4 of 3GPP TS 29.500 [299].

### 6.1.2.3 HTTP custom headers

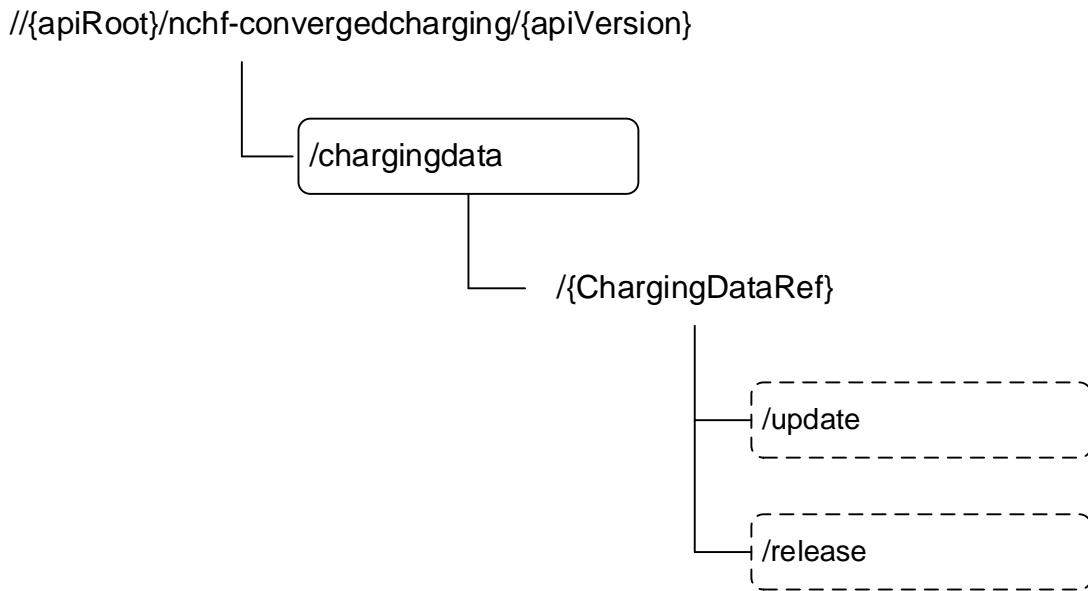
#### 6.1.2.3.1 General

HTTP custom header fields shall be supported as specified in subclause 5.2.3.2 of 3GPP TS 29.500 [299].

In this Release of the specification, no specific custom headers are defined.

### 6.1.3 Resources

#### 6.1.3.1 Overview



**Figure 6.1.3.1-1: Resource URI structure of the Nchf\_ConvergedCharging API**

Charging Data Ref is a unique identifier for a charging data resource in a PLMN. It's created in CHF when CHF receives a Nchf\_ConvergedCharging\_Create request and provided to NF (CTF) in the Location header field in the Nchf\_ConvergedCharging\_Create response. The NF (CTF) shall use the Charging Data Ref received in subsequent requests to the CHF for the same charging data resource.

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	Corresponding service operation
Charging Data	{apiRoot}/nchf-convergedcharging/{apiVersion}/chargingdata/	POST	Create a new Charging Data resource	Nchf_ConvergedCharging_Create
Individual Charging Data	{apiRoot}/nchf-convergedcharging/{apiVersion}/chargingdata/{ChargingDataRef}/update	update (POST)	Update an existing Charging Data resource.	Nchf_ConvergedCharging_Update
	{apiRoot}/nchf-convergedcharging/{apiVersion}/chargingdata /{ChargingDataRef}/release	release (POST)	Update and release an existing Charging Data resource.	Nchf_ConvergedCharging_Release

### 6.1.3.2 Resource: Charging Data

#### 6.1.3.2.1 Description

Charging Data resource represents a collection of the different charging data resources created by the CHF for converged charging as defined in 3GPP TS 32.290 [58].

#### 6.1.3.2.2 Resource Definition

Resource URI: **{apiRoot}/nchf-convergedcharging/{apiVersion}/chargingData**

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 subclause 6.1.1

#### 6.1.3.2.3 Resource Standard Methods

##### 6.1.3.2.3.1 POST

This method shall support the URI query parameters specified in table 6.1.3.2.3.1-1.

**Table 6.1.3.2.3.1-1: URI query parameters supported by the POST method on this resource**

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 6.1.3.2.3.1-2 and the response data structures and response codes specified in table 6.1.3.2.3.1-3.

**Table 6.1.3.2.3.1-2: Data structures supported by the POST Request Body on this resource**

Data type	P	Cardinality	Description
ChargingDataRequest	M	1	Parameters to create a new Charging Data resource.

**Table 6.1.3.2.3.1-3: Data structures supported by the POST Response Body on this resource**

Data type	P	Cardinality	Response codes	Description
ChargingDataResponse	M	1	201 Created	The creation of a Charging Data resource is confirmed and a representation of that resource is returned. The Charging Data resource which is created and returned successfully. The representation of created resource is identified via Location header field in the 201 response.
n/a			307 Temporary Redirect	(NOTE 2)
ChargingDataResponse	M	1	400 Bad Request	(NOTE 2)
ChargingDataResponse	M	1	403 Forbidden	(NOTE 2)
ChargingDataResponse	M	1	404 Not Found	(NOTE 2)
n/a			405 Method Not Allowed	(NOTE 2)
n/a			408 Request Timeout	(NOTE 2)
n/a			410 Gone	(NOTE 2)
NOTE 1: In addition, the HTTP status codes which are specified as mandatory in table 5.2.7.1-1 of 3GPP TS 29.500 [299] for the POST method also apply.				
NOTE 2: Failure cases are described in subclause 6.1.7.				

#### 6.1.3.2.4 Resource Custom Operations

None.

#### 6.1.3.3 Resource: Individual Charging Data

##### 6.1.3.3.1 Description

Individual Charging Data resource represents a Charging data resource created in the CHF.

##### 6.1.3.3.2 Resource Definition

Resource URI: **{apiRoot}/nchf-convergedcharging/{apiVersion}/chargingdata/{ChargingDataRef}**

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	Definition
apiRoot	See subclause 6.1.1
ChargingDataRef	Charging data resource reference assigned by the CHF during the Nchf_ConvergedCharging_Create operation,

### 6.1.3.3.3 Resource Standard Methods

None.

### 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**

Custom operation URI	Mapped HTTP method	Description
{apiRoot}/nchf-convergedcharging/{apiVersion}/chargingdata/{ChargingDataRef}/update	POST	Update an existing Charging Data resource.
{apiRoot}/nchf-convergedcharging/{apiVersion}/chargingdata/{ChargingDataRef}/release	POST	Update and release an existing Charging Data resource.

#### 6.1.3.3.4.2 Operation: update

##### 6.1.3.3.4.2.1 Description

This operation updates an existing Charging Data resource.

##### 6.1.3.3.4.2.2 Operation Definition

This operation shall support the request data structures specified in table 6.1.3.3.4.2.2-1 and the response data structures 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
ChargingDataRequest	M	1	Parameters to modify an existing Charging Data resource matching the ChargingDataRef according to the representation in the ChargingData. The request URI is the representation in the Location header field in the 201 response of resource creation.

**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
ChargingDataResponse	M	1	200 OK	The modification of a Charging Data resource is confirmed and a representation of that resource is returned. The Charging Data resource which is modified and returned successfully.
n/a			307 Temporary Redirect	(NOTE 2)
ChargingDataResponse	M	1	400 Bad Request	(NOTE 2)
ChargingDataResponse	M	1	403 Forbidden	(NOTE 2)
ChargingDataResponse	M	1	404 Not Found	(NOTE 2)
n/a			405 Method Not Allowed	(NOTE 2)
n/a			408 Request Timeout	(NOTE 2)
n/a			410 Gone	(NOTE 2)
NOTE 1: In addition, the HTTP status codes which are specified as mandatory in table 5.2.7.1-1 of 3GPP TS 29.500 [299] for the POST method also apply.				
NOTE 2: Failure cases are described in subclause 6.1.7.				

6.1.3.3.4.3 Operation: release

6.1.3.3.4.3.1 Description

This operation update and release an existing Charging session

6.1.3.3.4.3.2 Operation Definition

This operation shall support the request data structures specified in table 6.1.3.3.4.3.2-1 and the response data structures and response codes specified in table 6.1.3.3.4.3.2-2.

**Table 6.1.3.3.4.3.2-1: Data structures supported by the POST Request Body on this resource**

Data type	P	Cardinality	Description
ChargingDataRequest	M	1	Parameters to modify and then release the Charging Data resource matching the ChargingDataRef according to the representation in the ChargingData. The request URI is the representation in the Location header field in the 201 response of resource creation.

**Table 6.1.3.3.4.3.2-2: Data structures supported by the POST Response Body on this resource**

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case: The Charging Data resource matching the ChargingDataRef is modified and then released.
ChargingDataResponse	M	1	404 Not Found	(NOTE 2)
n/a			410 Gone	(NOTE 2)
NOTE 1: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply.				
NOTE 2: Failure cases are described in subclause 6.1.7.				

## 6.1.4 Custom Operations without associated resources

None.

## 6.1.5 Notifications

### 6.1.5.1 General

Notifications shall comply to subclause 6.2 of 3GPP TS 29.500 [299] and subclause 4.6.2.3 of 3GPP TS 29.501 [300].

### 6.1.5.2 Event Notification

#### 6.1.5.2.1 Description

The Notification is used by the CHF to notify NF consumers of the subscribed events is occurs , which implements the Nchf\_ConvergedCharging\_Notify operation defined in 3GPP TS 32.290 [58].

#### 6.1.5.2.2 Target URI

The Notification URI "{**notifyUri**}" shall be used with the resource URI variables defined in table 6.1.5.2.2-1.

**Table 6.1.5.2.2-1: Resource URI variables for this resource**

Name	Definition
notifyUri	String formatted as URI with the Notification URI is provided by the SMF during the creation of the Charging Data resource and within the ChargingData type, as defined in subclause 6.1.6.

### 6.1.5.2.3 Standard Methods

#### 6.1.5.2.3.1 POST

This method shall support the request data structures specified in table 6.1.5.2.3.1-1 and the response data structures and response codes specified in table 6.1.5.2.3.1-2.

**Table 6.1.5.2.3.1-1: Data structures supported by the POST Request Body on this resource**

Data type	P	Cardinality	Description
ChargingNotifyRequest	M	1	Provides Information about active Charging events. ChargingNotifyRequest data type is defined in subclause 6.1.6.

**Table 6.1.5.2.3.1-2: Data structures supported by the POST Response Body on this resource**

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The receipt of the Notification is acknowledged.
ChargingNotifyResponse	M	1	400 Bad Request	(NOTE 2)
NOTE 1: In addition, the HTTP status codes which are specified as mandatory in table 5.2.7.1-1 of 3GPP TS 29.500 [299] for the POST method also apply.				
NOTE 2: Failure cases are described in subclause 6.1.7.				

## 6.1.6 Data Model

### 6.1.6.1 General

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

The Nchf\_ConvergedCharging Service API allows the NF consumer to consume the converged charging service from the CHF as defined in 3GPP TS 32.290 [58].

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

**Table 6.1.6.1-1: Nchf\_ConvergedCharging specific Data Types**

Data type	Section defined	Description	Applicability
ChargingDataRequest	6.1.6.2.1.1 6.1.6.2.2.1	Describes the attributes of Charging Data Request to CHF for initial, update and termination of the charging session.	
ChargingDataResponse	6.1.6.2.1.2 6.1.6.2.2.2	Describes the attributes of Charging Data Response from CHF on charging session initial, update and termination.	
ChargingNotifyRequest	6.1.6.2.1.3	Describes Notifications about events that occurred in request message.	
ChargingNotifyResponse	6.1.6.2.1.16	Describes the response of notification.	

Table 6.1.6.1-2 specifies data types re-used by the Nchf\_ConvergedCharging 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 Nchf\_ConvergedCharging service based interface.

**Table 6.1.6.1-2: Nchf\_ConvergedCharging re-used Data Types**

Data type	Reference	Comments	Applicability
Supi	3GPP TS 29.571 [371]	The identification of the user (i.e. IMSI, NAI, GLI, GCI). (NOTE 1)	
Uint32	3GPP TS 29.571 [371]	Unsigned 32-bit integers	
Uint64	3GPP TS 29.571 [371]	Unsigned 64-bit integers	
PduSessionId	3GPP TS 29.571 [371]	The identification of the PDU session.	
PduSessionType	3GPP TS 29.571 [371]	the type of a PDU session	
Uri	3GPP TS 29.571 [371]	String providing an URI	
AccessType	3GPP TS 29.571 [371]	The identification of the type of access network.	
DateTime	3GPP TS 29.571 [371]	The time.	
ChargingId	3GPP TS 29.571 [371]	Charging identifier allowing correlation of charging information	
RatType	3GPP TS 29.571 [371]	The identification of the RAT type.	
RatingGroup	3GPP TS 29.571 [371]	The identification of the rating group	
Ipv4Addr	3GPP TS 29.571 [371]	Ipv4 address.	
Ipv6Prefix	3GPP TS 29.571 [371]	The Ipv6 prefix allocated for the user.	
Ipv6Addr	3GPP TS 29.571 [371]	Ipv6 Address.	
Pei	3GPP TS 29.571 [371]	The Identification of a Permanent Equipment.	
TimeZone	3GPP TS 29.571 [371]	Time zone information	
NfInstanceId	3GPP TS 29.571 [371]	String uniquely identifying a NF instance.	
Gpsi	3GPP TS 29.571 [371]	String identifying a Gpsi	
DefaultQosInformation	3GPP TS 29.571 [371]	Identifies the information of the default QoS.	
SubscribedDefaultQos	3GPP TS 29.571 [371]	subscribed default QoS.	
AuthorizedDefaultQos	3GPP TS 29.512 [302]	Authorized default QoS.	
Ambr	3GPP TS 29.571 [371]	Aggregate Maximum Bit rate	
QosData	3GPP TS 29.512 [302]	Contains QoS parameters	
UserLocation	3GPP TS 29.571 [371]	User location information	
PlmnId	3GPP TS 29.571 [371]	PLMN id	
Guami	3GPP TS 29.571 [371]	Globally Unique AMF Identifier	
DurationSec	3GPP TS 29.571 [371]	Identifies a period of time in units of seconds.	
Snssai	3GPP TS 29.571 [371]	SNSSAI	
ProblemDetails	3GPP TS 29.571 [371]	additional details of the error	
ServiceId	3GPP TS 29.571 [371]	Identifier of service	
SscMode	3GPP TS 29.571 [371]	SSC Mode type	

PresenceInfo	3GPP TS 29.571 [371]	PRA information including PRAId, PRA element list and PRA status	
Qfi	3GPP TS 29.571 [371]	QoS flow identifier designated as "Qfi".	
Amfld	3GPP TS 29.571 [371]	AMF identifier	
Dnn	3GPP TS 29.571 [371]	Data Network Name	
Groupld	3GPP TS 29.571 [371]	Identifies a group	
Bytes	3GPP TS 29.571 [371]	String with format "byte"	
Tai	3GPP TS 29.571 [371]	Tracking Area Identifier	
Area	3GPP TS 29.571 [371]	List of TACs or Operator specific codes	
CoreNetworkType	3GPP TS 29.571 [371]	5GC or EPC	
ServiceAreaRestriction	3GPP TS 29.571 [371]	Service Area restriction	
GlobalRanNodeId	3GPP TS 29.571 [371]	Global RAN Node Id	
QosCharacteristics	3GPP TS 29.512 [302]	Map of QoS characteristics for non standard 5QIs and non-preconfigured 5QIs.	
SupportedFeatures	3GPP TS 29.571 [371]	See 3GPP TS 29.500 [4] clause 6.6	
NOTE 1: A SUPI containing GLI or GCI is used to support 5G-RG and FN-RG in scenarios of wireline network.			

## 6.1.6.2 Structured data types

## 6.1.6.2.1 Common Data Type

## 6.1.6.2.1.1 Type ChargingDataRequest

**Table 6.1.6.2.1.1-1: Definition of type ChargingDataRequest**

Attribute name	Data type	P	Cardinality	Description	Applicability
subscriberIdentifier	Supi	O <sub>M</sub>	0..1	Identifier of the subscriber that uses the requested service.	
nfConsumerIdentification	NFIdentification	M	1	This is a grouped field which contains a set of information identifying the NF consumer of the charging service.	
invocationTimeStamp	DateTime	M	1	The time at which the request is send	
invocationSequenceNumber	Uint32	M	1	This field contains the sequence number of the charging service invocation by the NF consumer.	
retransmissionIndicator	boolean	O <sub>C</sub>	0..1	This field indicates, if included, this is a retransmitted request message.	
oneTimeEvent	boolean	O <sub>C</sub>	0..1	Indicates, if included, that this is event based charging and whether this is a one-time event. If true, this is a one-time event that there will be no update or release.	
oneTimeEventType	EventType	O <sub>C</sub>	0..1	indicates the type of the one time event, i.e. Immediate or Post event charging.	
notifyUri	Uri	O <sub>C</sub>	0..1	Identifies the recipient of Notifications sent by the CHF. In case of session based charging it shall be present in create request message, and may be present in update.	
supportedFeatures	SupportedFeatures	O <sub>C</sub>	0..1	This IE shall be present if at least one optional feature defined in clause 6.1.8 is supported.	
serviceSpecificationInformation	String	O <sub>C</sub>	0..1	Identifies service specific document that applies to the request, e.g. the service specific document ('middle tier' TS) and 3GPP release the service specific document is based upon.	
multipleUnitUsage	array(MultipleUnitUsage)	O <sub>C</sub>	0..N	This field contains the parameters for the quota management request and/or usage reporting.	
triggers	array(Trigger)	O <sub>C</sub>	0..N	This field identifies the event(s) triggering the request.	

## 6.1.6.2.1.2 Type ChargingDataResponse

**Table 6.1.6.2.1.2-1: Definition of type ChargingDataResponse**

Attribute name	Data type	P	Cardinality	Description	Applicability
invocationTimestamp	DateTime	M	1	This field holds the timestamp of the charging service response from the CHF.	
invocationResult	InvocationResult	O <sub>C</sub>	0..1	This field holds the result of charging service invocation by the NF consumer	
invocationSequenceNumber	Uint32	M	1	This field contains the sequence number of the charging service invocation by the NF consumer.	
sessionFailover	SessionFailover	O <sub>C</sub>	0..1	This field indicates whether alternative CHF is supported for ongoing charging service failover handling by NF consumer.	
supportedFeatures	SupportedFeatures	O <sub>C</sub>	0..1	This IE shall be present if at least one optional feature defined in clause 6.1.8 is supported.	
multipleUnitInformation	array(MultipleUnitInformation)	O <sub>C</sub>	0..N	This field holds the parameters for the quota management and/or usage reporting information. It may have multiple occurrences.	
triggers	array(Trigger)	O <sub>C</sub>	0..N	This field identifies the chargeable event(s) supplied by CHF to override/activate the existing chargeable event(s) in NF consumer. The presence of the triggers attribute without any triggerType is used by CHF to disable all the triggers except rating group level triggers.	

## 6.1.6.2.1.3 Type ChargingNotifyRequest

**Table 6.1.6.2.1.3-1: Definition of type ChargingNotifyRequest**

Attribute name	Data type	P	Cardinality	Description	Applicability
notificationType	NotificationType	M	1	Type of notification to indicate re-authorization or termination.	
reauthorizationDetails	array(ReauthorizationDetails)	O <sub>C</sub>	0..N	descriptors for re-authorization to determine which quota or usage reporting is updated.	



## 6.1.6.2.1.4 Type NFIdentification

Table 6.1.6.2.1.4-1: Definition of type NFIdentification

Attribute name	Data type	P	Cardinality	Description	Applicability
nodeFunctionality	NodeFunctionality	M	1	This field contains the function of the node.	
nFName	NfInstanceId	O <sub>C</sub>	0..1	Identifier of NF instance. At least one of the nFName or nFIPv4Address or nFIPv6Address shall be present.	
nFIPv4Address	Ipv4Addr	O <sub>C</sub>	0..1	The IPv4 address of the NF. At least one of the nFName or nFIPv4Address or nFIPv6Address shall be present.	
nFIPv6Address	Ipv6Addr	O <sub>C</sub>	0..1	The IPv6 address of the NF. At least one of the nFName or nFIPv4Address or nFIPv6Address shall be present.	
nFFqdn	string	O <sub>C</sub>	0..1	FQDN of the NF	
nFPLMNID	PlmnId	O <sub>C</sub>	0..1	This field holds the PLMN ID of the network the NF belongs to.	

## 6.1.6.2.1.5 Type MultipleUnitUsage

**Table 6.1.6.2.1.5-1: Definition of type MultipleUnitUsage**

Attribute name	Data type	P	Cardinality	Description	Applicability
ratingGroup	RatingGroup	M	1	The identifier of a rating group.	
requestedUnit	RequestedUnit	O <sub>C</sub>	0..1	This field indicates, if included, that quota management is required. It may additionally contain the amount of requested service units for a particular category.	
usedUnitContainer	array(UsedUnitContainer)	O <sub>C</sub>	0..N	This field contains the amount of used non-monetary service units measured.	

## 6.1.6.2.1.6 Type InvocationResult

**Table 6.1.6.2.1.6-1: Definition of type InvocationResult**

Attribute name	Data type	P	Cardinality	Description	Applicability
error	ProblemDetails	O <sub>C</sub>	0..1	More information on the error shall be provided in the "cause" attribute of the "ProblemDetails" structure in case of unsuccessful charging service invocation by the NF consumer. The "invalidParams" attribute of the "ProblemDetails" structure shall contain invalid parameters which caused the rejection.	
failureHandling	FailureHandling	O <sub>C</sub>	0..1	This field holds the failure handling to be performed by the NF consumer when charging service invocation is temporarily prevented. The provided value shall always override any already existing value in NF consumer. In case of failure, it indicates which action to be performed by the NF consumer. In case of success, it indicates which action to be performed by the NF consumer in case subsequent charging service invocation are temporarily prevented.	

## 6.1.6.2.1.7 Type Trigger

Table 6.1.6.2.1.7-1: Definition of type Trigger

Attribute name	Data type	P	Cardinality	Description	Applicability
triggerType	TriggerType	O <sub>C</sub>	0..1	the events whose occurrence lead to charging event is issued towards the CHF	
triggerCategory	TriggerCategory	M	1	This field indicates whether the charging data generated by the NF consumer for the trigger lead to a Charging Event towards the CHF immediately or not.	
timeLimit	DurationSec	O <sub>C</sub>	0..1	Time limit if trigger type is "Expiry of data time limit"	
volumeLimit	Uint32	O <sub>C</sub>	0..1	Volume limit if trigger type is "Expiry of data volume limit". This attribute is not valid from Nchf_ ConvergedCharging API version v2.0.0	
volumeLimit64	Uint64	O <sub>C</sub>	0..1	Volume limit if trigger type is "Expiry of data volume limit". This attribute replaces the volumeLimit attribute from Nchf_ ConvergedCharging API v2.0.0	
maxNumberOfcc	Uint32	O <sub>C</sub>	0..1	Maximum number if trigger type is "Max nb of number of charging condition changes"	

## 6.1.6.2.1.8 Type MultipleUnitInformation

**Table 6.1.6.2.1.8-1: Definition of type MultipleUnitInformation**

Attribute name	Data type	P	Cardinality	Description	Applicability
resultCode	ResultCode	O <sub>C</sub>	0..1	This field contains the result of the Rating group quota allocation.	
ratingGroup	RatingGroup	M	1	The identifier of a rating group.	
grantedUnit	GrantedUnit	O <sub>C</sub>	0..1	This field holds the granted quota.	
triggers	array(Trigger)	O <sub>C</sub>	0..N	This field holds triggers for usage reporting associated to the rating group, which is supplied from the CHF.  The presence of the triggers attribute without any triggerType is used by CHF to disable all the triggers to the associated rating group.	
validityTime	DurationSec	O <sub>C</sub>	0..1	This field defines the time in order to limit the validity of the granted quota for a given category instance.	
quotaHoldingTime	DurationSec	O <sub>C</sub>	0..1	This field holds the quota holding time in seconds. It applies equally to the granted time quota and to the granted volume quota. The NF Consumer shall deem a quota to have expired when no traffic associated with the quota is observed for the value indicated by this attribute. A quotaHoldingTime value of zero indicates that this mechanism shall not be used. If the quotaHoldingTime attribute is not present, then a locally configurable default value in the NF Consumer shall be used.	
finalUnitIndication	FinalUnitIndication	O <sub>C</sub>	0..1	This field indicates the granted final units for the service.	
timeQuotaThreshold	integer	O <sub>C</sub>	0..1	indicates the threshold in seconds for the granted time quota.	
volumeQuotaThreshold	Uint64	O <sub>C</sub>	0..1	indicates the threshold in octets when the granted quota is volume	
unitQuotaThreshold	integer	O <sub>C</sub>	0..1	indicates the threshold in service specific units, that are defined in the service specific documents, when the granted quota is service specific	

## 6.1.6.2.1.9 Type RequestedUnit

**Table 6.1.6.2.1.9-1: Definition of type RequestedUnit**

Attribute name	Data type	P	Cardinality	Description	Applicability
time	Uint32	O <sub>C</sub>	0..1	This field holds the amount of requested time.	
totalVolume	Uint64	O <sub>C</sub>	0..1	This field holds the amount of requested volume in both uplink and downlink directions.	
uplinkVolume	Uint64	O <sub>C</sub>	0..1	This field holds the amount of requested volume in uplink direction.	
downlinkVolume	Uint64	O <sub>C</sub>	0..1	This field holds the amount of requested volume in downlink direction.	
serviceSpecificUnits	Uint64	O <sub>C</sub>	0..1	This field holds the amount of requested service specific units.	
NOTE 1: If none is included the category and amount is determined by CHF.					

## 6.1.6.2.1.10 Type UsedUnitContainer

Table 6.1.6.2.1.10-1: Definition of type UsedUnitContainer

Attribute name	Data type	P	Cardinality	Description	Applicability
serviceId	ServiceId	O <sub>C</sub>	0..1	This field identity of the used service	
quotaManagementIndicator	QuotaManagementIndicator	O <sub>C</sub>	0..1	an indicator on whether the reported used units are with or without quota management control. If the attribute is not present, it indicates the used unit is without quota management applied.	
triggers	array (Trigger)	O <sub>C</sub>	0..N	This field specifies the reason for usage reporting for one or more types of unit associated to the rating group.	
triggerTimestamp	DateTime	O <sub>C</sub>	0..1	This field holds the timestamp when the reporting trigger occur.	
time	Uint32	O <sub>C</sub>	0..1	This field holds the amount of used time.	
totalVolume	Uint64	O <sub>C</sub>	0..1	This field holds the amount of used volume in both uplink and downlink directions.	
uplinkVolume	Uint64	O <sub>C</sub>	0..1	This field holds the amount of used volume in uplink direction.	
downlinkVolume	Uint64	O <sub>C</sub>	0..1	This field holds the amount of used volume in downlink direction.	
serviceSpecificUnits	Uint64	O <sub>C</sub>	0..1	This field holds the amount of used service specific units.	
eventTimestamps	DateTime	O <sub>C</sub>	0..1	This field holds the timestamps of the event reported in the Service Specific Units, if the reported units are event based	
localSequenceNumber	integer	M	1	holds the Used Unit sequence number, i.e. the order when charging event occurs. It starts from 1 and increased by 1 for each Used Unit generation.	

## 6.1.6.2.1.11 Type GrantedUnit

**Table 6.1.6.2.1.11-1: Definition of type GrantedUnit**

Attribute name	Data type	P	Cardinality	Description	Applicability
tariffTimeChange	DateTime	O <sub>C</sub>	0..1	This field contains the switch time when the tariff will be changed.	
time	Uint32	O <sub>C</sub>	0..1	This field holds the amount of granted time.	
totalVolume	Uint64	O <sub>C</sub>	0..1	This field holds the amount of granted volume in both uplink and downlink directions.	
uplinkVolume	Uint64	O <sub>C</sub>	0..1	This field holds the amount of granted volume in uplink direction.	
downlinkVolume	Uint64	O <sub>C</sub>	0..1	This field holds the amount of granted volume in downlink direction.	
serviceSpecificUnits	Uint64	O <sub>C</sub>	0..1	This field holds the amount of granted requested service specific units.	

## 6.1.6.2.1.12 Type FinalUnitIndication

**Table 6.1.6.2.1.12-1: Definition of type FinalUnitIndication**

Attribute name	Data type	P	Cardinality	Description	Applicability
finalUnitAction	FinalUnitAction	M	1	indicates to the service consumer the action to be taken when the user's account cannot cover the service cost	
restrictionFilterRule	IPFilterRule	O <sub>C</sub>	0..1	filter rules corresponding to services that are to remain accessible even if there are no more service units granted.	
filterId	string	O <sub>C</sub>	0..1	the IP packet filters corresponding to services that are to remain accessible even if there are no more service units granted.	
redirectServer	RedirectServer	O <sub>C</sub>	0..1	the address information of the redirect server with which the end user is to be connected when the account cannot cover the service cost.	

## 6.1.6.2.1.13 Type RedirectServer

**Table 6.1.6.2.1.13-1: Definition of type RedirectServer**

Attribute name	Data type	P	Cardinality	Description	Applicability
redirectAddressType	RedirectAddressType	M	1	The type of redirect server address	
redirectServerAddress	string	M	1	the address of redirect server	

## 6.1.6.2.1.14 Type ReauthorizationDetails

**Table 6.1.6.2.1.14-1: Definition of type ReauthorizationDetails**

Attribute name	Data type	P	Cardinality	Description	Applicability
service	ServiceId	O <sub>C</sub>	0..1	identifier for a service	
ratingGroup	RatingGroup	O <sub>C</sub>	0..1	identifier of a rating group. This attribute shall be present if serviceIdentifier attribute is present.	
quotaManagementIndicator	QuotaManagementIndicator	O <sub>C</sub>	0..1	an indicator on whether the re-authorization notification is for quota management control or not.	

## 6.1.6.2.1.15 Void

## 6.1.6.2.1.16 Type ChargingNotifyResponse

**Table 6.1.6.2.1.16-1: Definition of type ChargingNotifyResponse**

Attribute name	Data type	P	Cardinality	Description	Applicability
invocationResult	InvocationResult	O <sub>C</sub>	0..1	This field holds the result of notification.	

## 6.1.6.2.2 5G Data Connectivity Specified Data Type

## 6.1.6.2.2.1 Type ChargingDataRequest

This clause is additional attributes of the type ChargingDataRequest defined in clause 6.1.6.2.1.1 for 5G data connectivity charging described in 3GPP TS 32.255[30].

**Table 6.1.6.2.2.1-1: 5G Data Connectivity Specified attribute of type ChargingDataRequest**

Attribute name	Data type	P	Cardinality	Description	Applicability
pDUSessionChargingInformation	PDUSessionChargingInformation	O <sub>M</sub>	0..1	This field holds the 5G data connectivity specific information.	
roamingQBCInformation	RoamingQBCInformation	O <sub>M</sub>	0..1	This field holds the 5G data connectivity specific information roaming QBC.	

## 6.1.6.2.2.2 Type ChargingDataResponse

This clause is additional attributes of the type ChargingDataResponse defined in clause 6.1.6.2.1.2 for 5G data connectivity charging described in 3GPP TS 32.255[30].

**Table 6.1.6.2.2.2-1: 5G Data Connectivity Specified attribute of type ChargingDataResponse**

Attribute name	Data type	P	Cardinality	Description	Applicability
pDUSessionChargingInformation	PDUSessionChargingInformation	O <sub>M</sub>	0..1	This field holds the 5G data connectivity specific information.	
roamingQBCInformation	RoamingQBCInformation	O <sub>M</sub>	0..1	This field holds the 5G data connectivity specific information roaming QBC.	

## 6.1.6.2.2.3 Type MultipleUnitUsage

This clause is additional attributes of the type MultipleUnitUsage defined in clause 6.1.6.2.1.5 for 5G data connectivity charging described in 3GPP TS 32.255[30].

**Table 6.1.6.2.2.3-1: 5G Data Connectivity Specified attribute of type MultipleUnitUsage**

Attribute name	Data type	P	Cardinality	Description	Applicability
uPFID	NfInstanceld	O <sub>C</sub>	0..1	identifier of UPF	

## 6.1.6.2.2.4 Type MultipleUnitInformation

This clause is additional attributes of the type MultipleUnitInformation defined in clause 6.1.6.2.1.8 for 5G data connectivity charging described in 3GPP TS 32.255[30].

**Table 6.1.6.2.2.4-1: 5G Data Connectivity Specified attribute of type MultipleUnitInformation**

Attribute name	Data type	P	Cardinality	Description	Applicability
uPFID	NfInstanceld	O <sub>C</sub>	0..1	UPF id	

## 6.1.6.2.2.5 Type UsedUnitContainer

This clause is additional portion of the type UsedUnitContainer defined in clause 6.1.6.2.1.10 for 5G data connectivity charging described in 3GPP TS 32.255[30].

**Table 6.1.6.2.2.5-1: 5G Data Connectivity Specified portion of type UsedUnitContainer**

Attribute name	Data type	P	Cardinality	Description	Applicability
pDUContainerInformation	PDUContainerInformation	O <sub>C</sub>	0..1	the 5G data connectivity specific information	



## 6.1.6.2.2.6 Type PDUSessionChargingInformation

Table 6.1.6.2.2.6-1: Definition of type PDUSessionChargingInformation

Attribute name	Data type	P	Cardinality	Description	Applicability
chargingId	ChargingId	O <sub>M</sub>	0..1	Charging identifier for correlation between different records of a single PDU session	
homeProvidedChargingId	ChargingId	O <sub>C</sub>	0..1	Charging identifier for correlation between H-SMF and V-SMF.	
userInformation	UserInformation	O <sub>M</sub>	0..1	including information of user and user equipment,	
userLocationInfo	UserLocation	O <sub>C</sub>	0..1	provides information on the location	
presenceReportingAreaInformation	map(PresenceInfo)	O <sub>C</sub>	0..N	When the data type is present in response message, it includes the PRA information provisioned by the CHF, in which case the "presenceState" attribute within the PresenceInfo data type shall not be supplied. When the data type is present in request message, it's used to report user presence reporting area status. The prald attribute within the PresenceInfo data type shall be the key of the map.	
ueTimeZone	TimeZone	O <sub>C</sub>	0..1	the UE Timezone the UE is currently located	
pduSessionInformation	PDUSessionInformation	O <sub>C</sub>	0..1	PDU session level information, including PDU session ID, PDU type, SSC Mode, QoS, network slicing etc. It needs to be present in the request, but it is optional in the response.	
unitCountInactivityTimer	DurationSec	O <sub>C</sub>	0..1	threshold for the time period resource idle Upon the initial interaction with the CHF, the SMF use this attribute to provide pre-configured threshold to CHF. when present in response message, it contains the threshold supplied by CHF in response of initial request to override existing threshold in SMF. It's only present when unit count inactivity timer trigger is active.	
ranSecondaryRATUsageReport	RANSecondaryRATUsageReport	O <sub>C</sub>	0..1	Secondary RAT usage reported from RAN.	

## 6.1.6.2.2.7 Type UserInformation

**Table 6.1.6.2.2.7-1: Definition of type UserInformation**

Attribute name	Data type	P	Cardinality	Description	Applicability
servedGPSI	Gpsi	O <sub>C</sub>	0..1	the Generic Public Subscription Identifier (GPSI) of the served party, if available.	
servedPEI	Pei	O <sub>C</sub>	0..1	the identification of Permanent Equipment Identifier.	
unauthenticatedFlag	boolean	O <sub>C</sub>	0..1	indicates the served SUPI is not authenticated	
roamerInOut	RoamerInOut	O <sub>C</sub>	0..1	In-bound or Out-bound roamer	

## 6.1.6.2.2.8 Type PDUSessionInformation

**Table 6.1.6.2.2.8-1: Definition of type PDUSessionInformation**

Attribute name	Data type	P	Cardinality	Description	Applicability
networkSlicingInfo	NetworkSlicingInfo	O <sub>M</sub>	0..1	information of network slice serving the PDU session	
pduSessionID	PduSessionId	M	1		
pduType	PduSessionType	O <sub>M</sub>	0..1	type of the PDU session	
sscMode	SscMode	O <sub>C</sub>	0..1	information of SSC Mode type.	
hPlmnId	PlmnId	O <sub>C</sub>	0..1	PLMN identifier of the home network	
servingNetworkFunctionID	ServingNetworkFunctionID	O <sub>C</sub>	0..1	This field holds serving Network Function identifier.	
servingCNPlmnId	PlmnId	O <sub>C</sub>	0..1	Serving Core Network Operator PLMN ID selected by the UE in shared networks.	
ratType	RatType	O <sub>C</sub>	0..1	the RAT Type of the PDU session	
dnnId	Dnn	M	1	a Data Network Name	
dnnSelectionMode	DnnSelectionMode	O <sub>C</sub>	0..1	This field indicates how the DNN was selected.	
chargingCharacteristics	string	O <sub>C</sub>	0..1	the Charging Characteristics for this PDU session.	
chargingCharacteristicsSelectionMode	ChargingCharacteristicsSelectionMode	O <sub>C</sub>	0..1	information about how the "Charging Characteristics" was selected.	
startTime	DateTime	O <sub>C</sub>	0..1	the time in UTC format which represents the start of a PDU session at the SMF	
stopTime	DateTime	O <sub>C</sub>	0..1	the time in UTC format which represents the stop of a PDU session at the SMF	
3gppPSDataOffStatus	3GPPPSDataOffStatus	O <sub>C</sub>	0..1	This field holds the 3GPP Data off Status when UE's 3GPP Data Off status is Activated or Deactivated.	
sessionStopIndicator	boolean	O <sub>C</sub>	0..1	This field indicates to the CHF that the PDU session has been terminated.	
pduAddress	PDUAddress	O <sub>C</sub>	0..1	Group of user ip address/prefix	
diagnostics	Diagnostics	O <sub>C</sub>	0..1	provides a more detailed cause value from SMF.	
authorizedQoSInformation	AuthorizedDefaultQoS	O <sub>C</sub>	0..1	This field holds the authorized QoS applied to PDU session.	
subscribedQoSInformation	SubscribedDefaultQoS	O <sub>C</sub>	0..1	This field holds the subscribed Default QoS	
authorizedSessionAMBR	Ambr	O <sub>C</sub>	0..1	This field holds the authorized session-AMBR.	
subscribedSessionAMBR	Ambr	O <sub>C</sub>	0..1	This field holds the subscribed session-AMBR.	

## 6.1.6.2.2.9 Type PDUContainerInformation

Table 6.1.6.2.2.9-1: Definition of type PDUContainerInformation

Attribute name	Data type	P	Cardinality	Description	Applicability
timeofFirstUsage	DateTime	O <sub>C</sub>	0..1	the time stamp for the first IP packet to be transmitted and mapped to the reporting used unit.	
timeofLastUsage	DateTime	O <sub>C</sub>	0..1	the time stamp for the last IP packet to be transmitted and mapped to the reporting used unit.	
qoSInformation	QoSData	O <sub>C</sub>	0..1	the QoS applied for the reporting used unit. In case gbrUI or gbrDI are present for GBR flow, the GBR targets are "GUARANTEED", otherwise, are "NOT_GUARANTEED".	
qoSCharacteristics	QoSCharacteristics	O <sub>C</sub>	0..1	Map of QoS characteristics for non standard 5QIs and non-preconfigured 5QIs.	
afChargingIdentifier	ChargingId	O <sub>C</sub>	0..1	An identifier, provided from the AF, may be used to correlate the measurement for the Charging key/Service identifier values in this PCC rule with application level reports.	
userLocationInformation	UserLocation	O <sub>C</sub>	0..1	provides information on the location	
ueTimeZone	TimeZone	O <sub>C</sub>	0..1	the UE Time Zone during the used unit container interval.	
ratType	RatType	O <sub>C</sub>	0..1	the RAT Type of the used unit	
servingNodeID	array(ServingNetworkFunctionID)	O <sub>C</sub>	0..N	the list of serving node identifiers during the used unit container interval.	
presenceReportingAreaInformation	map(PresenceInfo)	O <sub>C</sub>	0..N	the Presence Reporting Area status of UE during the used unit container interval.	
3gppPSDataOffStatus	3GPPPSDataOffStatus	O <sub>C</sub>	0..1	the 3GPP Data off Status during the used unit container interval.	
sponsorIdentity	string	O <sub>C</sub>	0..1	an identifier of the sponsor.	
applicationServiceProviderIdentity	string	O <sub>C</sub>	0..1	an identifier of the application service provider	
chargingRuleBaseName	string	O <sub>C</sub>	0..1	the reference to group of PCC rules predefined at the SMF.	

## 6.1.6.2.2.10 Type NetworkSlicingInfo

Table 6.1.6.2.2.10-1: Definition of type NetworkSlicingInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
sNSSAI	Snssai	M	1	Single Network Slice Selection Assistance Information	

## 6.1.6.2.2.11 Type PDUAddress

**Table 6.1.6.2.2.11-1: Definition of type PDUAddress**

Attribute name	Data type	P	Cardinality	Description	Applicability
pduIPv4Address	IPv4Addr	O <sub>C</sub>	0..1	the IPv4 address of the served SUPI allocated for the PDU session	
pduIPv6Address withPrefix	IPv6Addr	O <sub>C</sub>	0..1	the IPv6 address with prefix of the served SUPI allocated for the PDU session	
pduAddressprefix length	integer	O <sub>C</sub>	0..1	PDU Address prefix length of an IPv6 typed Served PDU Address. The field needs not available for prefix length of 64 bits.	
IPv4dynamicAddressFlag	boolean	O <sub>C</sub>	0..1	This field indicates whether served IPv4 address is dynamically allocated. This field is missing if address is static.	
IPv6dynamicPrefixFlag	boolean	O <sub>C</sub>	0..1	This field indicates whether served IPv6 address prefix is dynamically allocated. This field is missing if address is static.	

## 6.1.6.2.2.12 Type ServingNetworkFunctionID

**Table 6.1.6.2.2.12-1: Definition of type ServingNetworkFunctionID**

Attribute name	Data type	P	Cardinality	Description	Applicability
servingNetworkFunctionInformation	NFIdentification	M	0..1	Serving Network Function information: i.e. AMF, I-SMF, SGW, or V-SMF. For V-SMF, the NFIdentification.nodeFunctionality shall have the value SMF.	
aMFId	AmfId	O <sub>C</sub>	0..1	AMF identifier	

## 6.1.6.2.2.13 Type RoamingQBCInformation

**Table 6.1.6.2.1.13-1: Definition of type RoamingQBCInformation**

Attribute name	Data type	P	Cardinality	Description	Applicability
multipleQFIcontainer	array(MultipleQFIcontainer)	O <sub>C</sub>	0..N	list of QFI containers	
uPFID	NfInstanceId	O <sub>C</sub>	0..1	identifier of UPF	
roamingChargingProfile	RoamingChargingProfile	O <sub>C</sub>	0..1	Roaming Charging Profile associated to the PDU session for roaming QBC.	

## 6.1.6.2.2.14 Type MultipleQFIcontainer

**Table 6.1.6.2.1.14-1: Definition of type MultipleQFIcontainer**

Attribute name	Data type	P	Cardinality	Description	Applicability
triggers	array (Trigger)	O <sub>C</sub>	0..N	This field holds reason for closing the QFI unit container.	
triggerTimestamp	DateTime	O <sub>C</sub>	0..1	This field holds the timestamp when the reporting trigger occur.	
time	Uint32	O <sub>C</sub>	0..1	This field holds the amount of time.	
totalVolume	Uint64	O <sub>C</sub>	0..1	This field holds the amount of volume in both uplink and downlink directions.	
uplinkVolume	Uint64	O <sub>C</sub>	0..1	This field holds the amount of volume in uplink direction.	
downlinkVolume	Uint64	O <sub>C</sub>	0..1	This field holds the amount of volume in downlink direction.	
localSequenceNumber	integer	M	1	QFI data container sequence number. It starts from 1 and increased by 1 for each container generation	
qFIContainerInformation	QFIContainerInformation	O <sub>C</sub>	0..1	This field holds the QFI data container information	

## 6.1.6.2.2.15 Type RoamingChargingProfile

**Table 6.1.6.2.1.15-1: Definition of type RoamingChargingProfile**

Attribute name	Data type	P	Cardinality	Description	Applicability
triggers	array(Trigger)	O <sub>C</sub>	0..N	Trigger for roaming QBC	
partialRecordMethod	PartialRecordMethod	O <sub>C</sub>	0..1	method uses for partial record closure	

## 6.1.6.2.2.16 Type QFIContainerInformation

Table 6.1.6.2.1.16-1: Definition of type QFIContainerInformation

Attribute name	Data type	P	Cardinality	Description	Applicability
qFI	Qfi	O <sub>M</sub>	0..1	QoS Flow Identifier (QFI)	
reportTime	DateTime	M	1	the time stamp when the QFI data container was closed	
timeofFirstUsage	DateTime	O <sub>C</sub>	0..1	the time stamp for the first IP packet to be transmitted and mapped to the QFI container	
timeofLastUsage	DateTime	O <sub>C</sub>	0..1	the time stamp for the last IP packet to be transmitted and mapped to the QFI container.	
qoSInformation	QoSData	O <sub>C</sub>	0..1	the QoS applied to QFI container. In case gbrUI or gbrDI are present for GBR QoS flow, the GBR targets are "GUARANTEED", otherwise, are "NOT_GUARANTEED".	
qoSCharacteristics	QoSCharacteristics	O <sub>C</sub>	0..1	Map of QoS characteristics for non standard 5QIs and non-preconfigured 5QIs.	
userLocationInformation	UserLocation	O <sub>C</sub>	0..1	provides information on the location	
ueTimeZone	TimeZone	O <sub>C</sub>	0..1	UE Time Zone the UE is currently located	
presenceReportingAreaInformation	map(PresenceInfo)	O <sub>C</sub>	0..N	the Presence Reporting Area status of UE during the used unit container interval.	
rATType	RatType	O <sub>C</sub>	0..1	the RAT Type of the used unit	
servingNetworkFunctionID	array(ServingNetworkFunctionID)	O <sub>C</sub>	0..N	the list of serving Node Identifiers during the used unit container interval.	
3gppPSDataOffStatus	3GPPPSDataOffStatus	O <sub>C</sub>	0..1	the 3GPP Data off Status during the used unit container interval.	
3gppChargingId	ChargingId	O <sub>C</sub>	0..1	IP-CAN bearer Charging identifier used to identify this IP-CAN bearer in different records created by PGW-C+SMF. Charging Id is generated by P-GW at IP-CAN bearer activation and is included in all containers in order to identify the containers which pertain to the IP-CAN bearer. Only applicable for 5GS and EPS interworking.	
diagnostics	Diagnostics	O <sub>C</sub>	0..1	provides a more detailed cause value for the release. Only applicable for 5GS and EPS interworking.	
enhancedDiagnostics	array(string)	O <sub>C</sub>	0..N	provides a set of causes for the release Only applicable for 5GS and EPS interworking.	

Editor's Note: the diagnostics for interworking is ffs.

## 6.1.6.2.2.17 Type RANSecondaryRATUsageReport

**Table 6.1.6.2.2.17-1: Definition of type RANSecondaryRATUsageReport**

Attribute name	Data type	P	Cardinality	Description	Applicability
rANSecondaryRATType	RatType	O <sub>M</sub>	0..1	RAT type associated to the reported usage on secondary RAT. The following values are applicable: - "NR" - "EUTRA"	
qosFlowsUsageReports	Array(QosFlowsUsageReport)	O <sub>M</sub>	0..N	list of containers per QFI with volumes reported.	

## 6.1.6.2.2.18 Type QosFlowsUsageReport

**Table 6.1.6.2.2.18-1: Definition of type QosFlowsUsageReport**

Attribute name	Data type	P	Cardinality	Description	Applicability
qfi	Qfi	O <sub>M</sub>	0..1	QoS Flow Identifier (QFI)	
startTimestamp	DateTime	O <sub>C</sub>	0..1	Start time of the reported usage	
endTimestamp	DateTime	O <sub>C</sub>	0..1	End time of the reported usage	
downlinkVolume	Uint64	O <sub>C</sub>	0..1	Amount of volume in downlink direction.	
uplinkVolume	Uint64	O <sub>C</sub>	0..1	Amount of volume in uplink direction.	

## 6.1.6.2.3 SMS Specified Data Type

## 6.1.6.2.3.1 Type ChargingDataRequest

This clause is additional attributes of the type ChargingDataRequest defined in clause 6.1.6.2.3.1 for SMS charging described in 3GPP TS 32.274[28].

**Table 6.1.6.2.3.1-1: SMS Specified attribute of type ChargingDataRequest**

Attribute name	Data type	P	Cardinality	Description	Applicability
smsChargingInformation	SMSChargingInformation	O <sub>M</sub>	0..1	This field holds the SMSspecific information.	



6.1.6.2.3.2 Type SMSChargingInformation

**Table 6.1.6.2.3-2: Definition of type SMSChargingInformation**

Attribute name	Data type	P	Cardinality	Description	Applicability
originatorInfo	OriginatorInfo	O <sub>M</sub>	0..1	originator of the SM	
recipientInfo	Array(RecipientInfo)	O <sub>C</sub>	0..N	recipient information for the SM	
userEquipmentInfo	Pei	O <sub>C</sub>	0..1	the identification of the terminal	
userLocationInfo	UserLocation	O <sub>C</sub>	0..1	provides information on the location	
uetimeZone	TimeZone	O <sub>C</sub>	0..1	the UE Time Zone the UE is currently located	
rATType	RatType	O <sub>C</sub>	0..1	The identification of the RAT type.	
sMSCAddress	string	O <sub>M</sub>	0..1	the address (e.g. E.164) of the SMS-service centre sending the Charging Data Request used for producing the record. (SMSC Address)	
sMDataCodingScheme	integer	O <sub>M</sub>	0..1	the data coding scheme used within the SM. The information to populate this field is obtained from TP-DCS header.	
sMMessageType	SMmessageType	O <sub>M</sub>	0..1	identifies the message that triggered the generation of charging information.	
sMReplyPathRequested	ReplyPathRequested	O <sub>C</sub>	0..1	an indication of whether a reply SM to an original SM was requested to follow the same path as identified by the TP-Reply-Path (TP-RP) flag.	
sMUserDataHeader	string	O <sub>C</sub>	0..1	carries the user data header extracted from the user data of the SM. The user data header (TP-UDH) is specified in TS 23.040 [x].	
sMStatus	string	O <sub>C</sub>	0..1	the information from the TP-Status field in a Status-Report TPDU	
sMDischargeTime	DateTime	O <sub>C</sub>	0..1	the time associated with the event being reported in the SM Status field. This information is only applicable to delivery report charging procedures.	
numberOfMessagesSent	Uint32	O <sub>C</sub>	0..1	the number of SMSs sent by the IMS application or the total number of short messages when this SM is part of concatenated short message, if applicable.	
sMServiceType	SMSserviceType	O <sub>C</sub>	0..1	the type of SM service that caused the charging interaction. It is only applicable for SM supplementary service procedures.	
sMSequenceNumber	Uint32	O <sub>C</sub>	0..1	the sequence number of this SM within the concatenated short message	
sMResult	Uint32	C	0..1	the result of the attempted SM transaction, if unsuccessful. This field is only for offline charging.	
submissionTime	DateTime	O <sub>C</sub>	0..1	the timestamp of when the submitted SM arrived at the originating SMS Node	

sMpriority	SMPriority	O <sub>C</sub>	0..1	any priority information associated with an SM	
messageReference	string	O <sub>M</sub>	0..1	the identity used to identify an SM in the SMS node associated with entity that submitted it	
messageSize	Uint32	O <sub>M</sub>	0..1	the total number of short messages when this SM is part of concatenated short message	
messageClass	MessageClass	O <sub>M</sub>	0..1	implementation dependent the value selected for a specific transaction.	
deliveryReportRequested	DeliveryReportRequested	O <sub>C</sub>	0..1	indicates whether a delivery report is requested by the SM originator	

## 6.1.6.2.3.3 Type OriginatorInfo

**Table 6.1.6.2.3.3-1: Definition of type OriginatorInfo**

Attribute name	Data type	P	Cardinality	Description	Applicability
originatorSUPI	supi	O <sub>M</sub>	0..1	SUPI of the originator of the SMS	
originatorGPSI	gpsi	O <sub>C</sub>	0..1	GPSI of the originator of the SMS	
originatorOtherAddress	SMAddressInfo	O <sub>M</sub>	0..1	the address of the recipient of the SM, when different from SUPI and GPSI	
originatorReceivedAddress	SMAddressInfo	O <sub>C</sub>	0..1	original, unmodified address of the originator of the SM, as received by the SMS node, in case address manipulation (such as number plan corrections) have been applied in the SMS node.	
originatorSCCPAddress	string	O <sub>C</sub>	0..1	SCCP calling address used to receive the SM at the SMS node	
sMOriginatorInterface	Interface	O <sub>M</sub>	0..1	Provide the information describing the interface on which the SM was received by the SMS node.	
sMOriginatorProtocolId	string	O <sub>C</sub>	0..1	the protocol used for the SM by originator	

## 6.1.6.2.3.4 Type RecipientInfo

**Table 6.1.6.2.3.4-1: Definition of type RecipientInfo**

Attribute name	Data type	P	Cardinality	Description	Applicability
recipientSUPI	supi	O <sub>M</sub>	0..1	SUPI of the recipient of the SM, as received by the SMS Node	
recipientGPSI	gpsi	O <sub>C</sub>	0..1	GPSI of the recipient of the SM, as received by the SMS Node	
recipientOtherAddress	Array(recipientAddress)	O <sub>C</sub>	0..N	the address of the recipient of the SM, as received by the SMS Node, when different from SUPI and GPSI	
recipientReceivedAddress	Array(SMAddressInfo)	O <sub>C</sub>	0..N	original, unmodified address of the recipient of the SM, as received by the SMS node, in case address manipulation (such as number plan corrections) have been applied in the SMS node.	
recipientSCCPAddress	string	O <sub>C</sub>	0..1	SCCP called address used by the SMS node to onward deliver the SM	
sMDestinationInterface	SMInterface	O <sub>M</sub>	0..1	containing information describing the interface on which the SM was requested to be delivered	
sMRecipientProtocolId	string	O <sub>C</sub>	0..1	holds the TP-PROTOCOL-ID (TP-PID)	

## 6.1.6.2.3.5 Type SMAddressInfo

**Table 6.1.6.2.3.5-1: Definition of type SMAddressInfo**

Attribute name	Data type	P	Cardinality	Description	Applicability
sMAddressType	SMAddressType	O <sub>C</sub>	0..1	the type of address carried	
sMAddressData	string	O <sub>C</sub>	0..1	the address information and formatted according type of address	
sMAddressDomain	SMAddressDomain	O <sub>C</sub>	0..1	the domain/network to which the associated address resides	

## 6.1.6.2.3.6 Type RecipientAddress

**Table 6.1.6.2.3.6-1: Definition of type RecipientAddress**

Attribute name	Data type	P	Cardinality	Description	Applicability
recipientAddressInfo	SMAddressInfo	O <sub>C</sub>	0..1	indicates the type of address carried	
sMAddresseeType	SMAddresseeType	O <sub>C</sub>	0..1	identifies the how the recipient is addressed in the header of an MM	

## 6.1.6.2.3.7 Type MessageClass

**Table 6.1.6.2.3.7-1: Definition of type MessageClass**

Attribute name	Data type	P	Cardinality	Description	Applicability
classIdentifier	ClassIdentifier	O <sub>c</sub>	0..1	indicate the class identifier	
tokenText	string	O <sub>c</sub>	0..1	contains extension information	

## 6.1.6.2.3.8 Type SMAddressDomain

**Table 6.1.6.2.3.8-1: Definition of type SMAddressDomain**

Attribute name	Data type	P	Cardinality	Description	Applicability
domainName	string	O <sub>c</sub>	0..1	represents a fully qualified domain name (FQDN).	
3GPPIMSIMCCMNC	string	O <sub>c</sub>	0..1	MCC and MNC extracted from the user's IMSI (first 5 or 6 digits, as applicable from the presented IMSI).	

## 6.1.6.2.3.9 Type SMInterface

**Table 6.1.6.2.3.9-1: Definition of type SMInterface**

Attribute name	Data type	P	Cardinality	Description	Applicability
interfaceId	string	O <sub>c</sub>	0..1	the interface identification provided by the messaging node (originator/destination).	
interfaceText	string	O <sub>c</sub>	0..1	It is the consolidation information about the application associated with the charging event	
interfacePort	string	O <sub>c</sub>	0..1	the port-identification or contains information about the transport layer port used by the application associated with the charging event	
interfaceType	InterfaceType	O <sub>c</sub>	0..1	type of interface / nature of the transaction in the messaging node for which the charging event occurs	

## 6.1.6.2.4 5G connection and mobility Specified Data Type

## 6.1.6.2.4.1 Type ChargingDataRequest

This clause specifies additional attributes of the type ChargingDataRequest defined in clause 6.1.6.2.1.1 for 5G connection and mobility described in 3GPP TS 32.256 [31].

**Table 6.1.6.2.4.1-1: 5G connection and mobility Specified attribute of type ChargingDataRequest**

Attribute name	Data type	P	Cardinality	Description	Applicability
registrationChargingInformation	RegistrationChargingInformation	O <sub>M</sub>	0..1	This field holds the 5G registration specific information.	
n2ConnectionChargingInformation	N2ConnectionChargingInformation	O <sub>M</sub>	0..1	This field holds the 5G N2 connection specific information.	
locationReportingChargingInformation	LocationReportingChargingInformation	O <sub>M</sub>	0..1	This field holds the 5G Location reporting specific information.	

#### 6.1.6.2.4.2 Type ChargingDataResponse

This clause specifies additional attributes of the type ChargingDataResponse defined in clause 6.1.6.2.1.2 for 5G connection and mobility described in 3GPP TS 32.256 [31].

**Table 6.1.6.2.4.2-1: 5G connection and mobility Specified attribute of type ChargingDataResponse**

Attribute name	Data type	P	Cardinality	Description	Applicability

#### 6.1.6.2.4.3 Type RegistrationChargingInformation

**Table 6.1.6.2.4.3-1: Definition of type RegistrationChargingInformation**

Attribute name	Data type	P	Cardinality	Description	Applicability
registrationMessageType	RegistrationMessageType	M	1	Message type received by the AMF: registration (initial, initial, mobility, periodic, emergency), deregistration.	
userInformation	UserInformation	O <sub>M</sub>	0..1	Includes information of user and user equipment	
userLocationInfo	UserLocation	O <sub>C</sub>	0..1	Information on the location and location time	
ueTimeZone	TimeZone	O <sub>C</sub>	0..1	UE Timezone the UE is currently located	
ratType	RatType	O <sub>C</sub>	0..1	RAT Type of the registration	
5gMMCapability	Bytes	O <sub>C</sub>	0..1	5GMM capability IE as specified in clause 9.11.3.1 of 3GPP TS 24.501 [303]	
micoModelIndication	MICOModelIndication	O <sub>C</sub>	0..1	Indicates whether the requested use of MICO mode is accepted or not by the network	
smsIndication	SmsIndication	O <sub>C</sub>	0..1	Indicates whether the SMS delivery over NAS is supported	
taList	array(Tai)	O <sub>C</sub>	0..N	An array of TAIs representing the set of tracking areas composing the Registration Area.	
serviceAreaRestriction	ServiceAreaRestriction	O <sub>C</sub>	0..1	Service Area Restriction for the UE.	
requestedNSSAI	array(Snssai)	O <sub>C</sub>	0..N	Requested NSSAI.	
allowedNssai	array(Snssai)	O <sub>C</sub>	0..N	Allowed NSSAI.	
rejectedNSSAI	array(Snssai)	O <sub>C</sub>	0..N	Rejected NSSAI.	

## 6.1.6.2.4.4 Type N2ConnectionChargingInformation

**Table 6.1.6.2.4.4-1: Definition of type N2ConnectionChargingInformation**

Attribute name	Data type	P	Cardinality	Description	Applicability
n2ConnectionMessageType	N2ConnectionMessageType	M	1	N2 message type received by the AMF specified in clause 9.7 3GPP TS 24.501 [303]	
userInformation	UserInformation	O <sub>M</sub>	0..1	Includes information of user and user equipment	
userLocationInfo	UserLocation	O <sub>C</sub>	0..1	Information on the location and location time	
ueTimeZone	TimeZone	O <sub>C</sub>	0..1	UE Timezone the UE is currently located	
rATType	RatType	O <sub>C</sub>	0..1	RAT Type of the registration	
amfUeNgapId	integer	O <sub>M</sub>	0..1	UE association over the N2 interface within the AMF.	
ranUeNgapId	integer	O <sub>M</sub>	0..1	RAN UE NGAP ID over N2 interface	
ranNodeId	GlobalRanNodeId	O <sub>C</sub>	0..1	Identity of the RAN node.	
restrictedRatList	array(RatType)	O <sub>C</sub>	0..N	List of RAT types that are restricted for the UE	
forbiddenAreaList	array(Area)	O <sub>C</sub>	0..N	List of forbidden areas for the UE	
serviceAreaRestriction	ServiceAreaRestriction	O <sub>C</sub>	0..1	Service Area Restriction for the UE.	
restrictedCnList	array(CoreNetworkType)	O <sub>C</sub>	0..N	List of Core Network Types that are restricted for the UE	
allowedNssai	array(Snssai)	O <sub>C</sub>	0..N	Allowed NSSAI.	
rrcEstCause	string	O <sub>C</sub>	0..1	RRC Establishment Cause, if received from the 5G-AN, specified in TS 38.413 [304], clause 9.3.1.111. It carries the value in hexadecimal representation Pattern: '^([0-9a-fA-F])+\$'	

## 6.1.6.2.4.5 Type LocationReportingChargingInformation

**Table 6.1.6.2.4.5-1: Definition of type LocationReportingChargingInformation**

Attribute name	Data type	P	Cardinality	Description	Applicability
locationReportingMessageType	LocationReportingMessageType	M	1	Includes Location reporting message type	
userInformation	UserInformation	O <sub>M</sub>	0..1	Includes information of user and user equipment	
userLocationInfo	UserLocation	O <sub>M</sub>	0..1	Information on the location and location time	
ueTimeZone	TimeZone	O <sub>C</sub>	0..1	UE Timezone the UE is currently located	
presenceReportingAreaInformation	map(PresenceInfo)	O <sub>C</sub>	0..N	The Presence Reporting Area(s) and status of UE presence.	
rATType	RatType	O <sub>C</sub>	0..1	RAT Type of the registration	

### 6.1.6.2.5 Exposure Function Northbound API Specified Data Type

#### 6.1.6.2.5.1 Type ChargingDataRequest

This clause is additional attributes of the type ChargingDataRequest defined in clause 6.1.6.2.1.1 for Exposure Function Northbound API charging described in 3GPP TS 32.254[14].

**Table 6.1.6.2.5.1-1: Exposure Function Northbound API Specified attribute of type ChargingDataRequest**

Attribute name	Data type	P	Cardinality	Description	Applicability
nEFChargingInformation	NEFChargingInformation	O <sub>M</sub>	0..1	This field holds the Exposure Function Northbound API specific information.	

#### 6.1.6.2.5.1a Type ChargingDataResponse

This clause specifies additional attributes of the type ChargingDataResponse defined in clause 6.1.6.2.1.2 for Exposure Function Northbound API charging described in 3GPP TS 32.254[14].

**Table 6.1.6.2.5.2-1: Exposure Function Northbound API Specified attribute of type ChargingDataResponse**

Attribute name	Data type	P	Cardinality	Description	Applicability

#### 6.1.6.2.5.2 Type NEFChargingInformation

**Table 6.1.6.2.5.3-2: Definition of type NEFChargingInformation**

Attribute name	Data type	P	Cardinality	Description	Applicability
groupIdentifier	GroupId	O <sub>C</sub>	0..N	The Identifier identifying the served group associated to the SUPI or GPSI.	
aPIDirection	APIDirection	M	1	The direction to indicate if it is an API invocation from an AF or notification to an AF.	
aPITargetNetworkFunction	NfInstanceId	O <sub>C</sub>	0..1	The identifier of the network function that either is the destination of the API invocation or triggers the notification.	
aPIResultCode	Uint32	O <sub>C</sub>	0..1	The result of API Invocation.	
aPIName	string	M	1	The name of the API invoked.	
aPIReference	Uri	O <sub>C</sub>	0..1	The reference to the definition of the format of the API invocation.	
aPIContent	string	O <sub>C</sub>	0..1	The actual content of the API invocation, in the format described by the aPIReference.	

### 6.1.6.3 Simple data types and enumerations

#### 6.1.6.3.1 Introduction

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



## 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
Diagnostics	integer	A more detailed cause value from SMF	
IPFilterRule	string	Filter rules corresponding to services	
N2ConnectionMessageType	integer	N2 message type received by the AMF	
LocationReportingMessageType	integer	Location reporting message type	

## 6.1.6.3.3 Enumeration: NotificationType

**Table 6.1.6.3.3-1: Enumeration NotificationType**

Enumeration value	Description	Applicability
REAUTHORIZATION	This value is used to indicate re-authorization.	
ABORT_CHARGING	This value is used to indicate termination of charging for PDU session.	

## 6.1.6.3.4 Enumeration: NodeFunctionality

**Table 6.1.6.3.4-1: Enumeration NodeFunctionality**

Enumeration value	Description	Applicability
SMF	This field identifies that NF is a SMF.	
AMF	This field identifies that NF is a AMF.	
SMSF	This field identifies that NF service consumer is a SMSF.	
SGW	This field identifies that node is an SGW, only applicable for interworking with EPC.	
I_SMF	This field identifies that node is an I-SMF, only applicable for PDU session served by SMF + I-SMF.	

## 6.1.6.3.5 Enumeration: ChargingCharacteristicsSelectionMode

**Table 6.1.6.3.5-1: Enumeration ChargingCharacteristicsSelectionMode**

Enumeration value	Description	Applicability
HOME_DEFAULT	the subscriber belongs to the same PLMN as the SMF	
ROAMING_DEFAULT	the subscriber belongs to same PLMN and the AMF belongs to a different PLMN	
VISITING_DEFAULT	the subscriber belongs to a different PLMN	

6.1.6.3.6 Enumeration: TriggerType

**Table 6.1.6.3.6-1: Enumeration TriggerType**

Enumeration value	Description	Applicability
QUOTA_THRESHOLD	the quota threshold has been reached	
QHT	the quota holding time specified in a previous response has been hit (i.e. the quota has been unused for that period of time)	
FINAL	a service termination has happened	
QUOTA_EXHAUSTED	the quota has been exhausted	
VALIDITY_TIME	the credit authorization lifetime provided from CHF has expired	
OTHER_QUOTA_TYPE	usage reporting of the particular quota type indicated in the used unit container where it appears is that, for a multi-dimensional quota, one reached a trigger condition and the other quota is being reported.	
FORCED_REAUTHORISATION	a Server initiated re-authorization procedure, i.e. receipt of notify service operation	
UNIT_COUNT_INACTIVITY_TIMER	the unit count inactivity timer has expired	
ABNORMAL_RELEASE	PDU session has abnormal released.	
QOS_CHANGE	In request message, this value is used to indicate that QoS change has happened. Any of elements of QoSData may result in QoS change. In response message, this value is used to indicate that a change of authorized QoS shall cause the service consumer to ask for a re-authorization of the associated quota.	
VOLUME_LIMIT	Volume limit has been reached.	
TIME_LIMIT	Time limit has been reached	
EVENT_LIMIT	Event limit has been reached	
PLMN_CHANGE	PLMN has been changed.	
USER_LOCATION_CHANGE	In request message, this value is used to indicate that User location has been changed. In response message, this value is used to indicate that a change in the end user location shall cause the service consumer to ask for a re-authorization of the associated quota	
RAT_CHANGE	In request message, this value is used to indicate that RAT type has been changed. In response message, this value is used to indicate that a change in the radio access technology shall cause the service consumer to ask for a re-authorization of the associated quota	
SESSION_AMBR_CHANGE	In request message, this value is used to indicate that Session AMBR has been changed. In response message, this value is used to indicate that a change in the session AMBR shall cause the service consumer to ask for a re-authorization of the associated quota.	
GBR_GUARANTEED_STATUS_CHANGE	this value is used to indicate that GBR targets for the indicated SDFs are changed ("NOT_GUARANTEED" or "GUARANTEED" again).	
UE_TIMEZONE_CHANGE	In request message, this value is used to indicate that UE timezone has been changed. In response message, this value is used to indicate that a change in the time zone where the end user is located shall cause the service consumer to ask for a re-authorization of the associated quota.	
TARIFF_TIME_CHANGE	Tariff time change has happened.	
MAX_NUMBER_OF_CHANGES_IN_CHARGING_CONDITIONS	Max number of change has been reached	
MANAGEMENT_INTERVENTION	Management intervention	

CHANGE_OF_UE_PRESENCE_IN_PRESENCE_REPORTING_AREA	In request message, this value is used to indicate that Change of UE presence in PRA has happened. In response message, this value is used to indicate a request of reporting the event that the user enters/leaves the area(s) as indicated in the presenceReportingArea Attribute	
CHANGE_OF_3GPP_PS_DATA_OFF_STATUS	In request message, this value is used to indicate that Change of 3GPP PS Data off status has happened. In response message, this value is used to indicate that a change in the 3GPP PS Data off status shall cause the service consumer to ask for a re-authorization of the associated quota	
SERVING_NODE_CHANGE	A serving node (e.g., AMF) change in the NF Consumer	
REMOVAL_OF_UPF	A used UPF is removed	
ADDITION_OF_UPF	A new UPF is added.	
INSERTION_OF_ISMF	A new I-SMF is inserted	
REMOVAL_OF_ISMF	A used I-SMF is removed	
CHANGE_OF_ISMF	A used I-SMF is removed, and a new I-SMF is inserted	
START_OF_SERVICE_DATA_FLOW	A Service Data Flow has started	
HANDOVER_CANCEL	The handover is canceled.	
HANDOVER_START	The handover is start.	
HANDOVER_COMPLETE	The handover is completed.	
ECGI_CHANGE	In request message, this value is used to indicate that ECGI has been changed. In response message, this value is used to indicate that a change in the end user location shall cause the service consumer to ask for a re-authorization of the associated quota	
TAI_CHANGE	In request message, this value is used to indicate that TAI has been changed. In response message, this value is used to indicate that a change in the end user location shall cause the service consumer to ask for a re-authorization of the associated quota	

## 6.1.6.3.7 Enumeration: FinalUnitAction

Table 6.1.6.3.7-1: Enumeration FinalUnitAction

Enumeration value	Description	Applicability
TERMINATE	The service consumer should terminate the service session.	
REDIRECT	The service consumer should redirect the user to the address specified in the redirectServerAddress attribute.	
RESTRICT_ACCESS	The service consumer should restrict the user access according to the IP packet filters defined in the restrictionFilterRule attribute or according to the IP packet filters identified by the filterId attribute.	

## 6.1.6.3.8 Enumeration: RedirectAddressType

**Table 6.1.6.3.8-1: Enumeration RedirectAddressType**

Enumeration value	Description	Applicability
IPV4	the redirect server address is IPV4.	
IPV6	the redirect server address is IPV6.	
URL	the redirect server address is URL.	

## 6.1.6.3.9 Enumeration: TriggerCategory

**Table 6.1.6.3.9-1: Enumeration TriggerCategory**

Enumeration value	Description	Applicability
IMMEDIATE_REPORT	chargeable events for which, when occurring, the charging data generated by the NF Consumer triggers a Charging Event towards the CHF.	
DEFERRED_REPORT	chargeable events for which, when occurring, the charging data generated by the NF Consumer, does not trigger a Charging Event towards the CHF .	

## 6.1.6.3.10 Enumeration: QuotaManagementIndicator

**Table 6.1.6.3.10-1: Enumeration QuotaManagementIndicator**

Enumeration value	Description	Applicability
ONLINE_CHARGING	quota management control	
OFFLINE_CHARGING	without quota management control	

## 6.1.6.3.11 Enumeration: FailureHandling

**Table 6.1.6.3.11-1: Enumeration FailureHandling**

Enumeration value	Description	Applicability
TERMINATE	the service shall only be granted for as long as there is a connection between NF consumer and the CHF.	
CONTINUE	the NF consumer should re-send and continue the request to an alternative server in the case of transport temporary failures, provided that a failover procedure is supported in the CHF and the NF consumer, and that an alternative server is available. Otherwise, the service SHOULD be granted, even if charging data request can't be delivered.	
RETRY_AND_TERMINATE	the NF consumer should re-send the request to an alternative server in the case of transport temporary failures, provided that a failover procedure is supported in the CHF and NF consumer, and that an alternative server is available. Otherwise, the service should not be granted when the charging data request can't be delivered.	

## 6.1.6.3.12 Enumeration: SessionFailover

**Table 6.1.6.3.12-1: Enumeration SessionFailover**

Enumeration value	Description	Applicability
FAILOVER_NOT_SUPPORTED	The Nchf_ConvergedCharging messages could not be moved to an alternative destination in the case of communication failure. This is the default behaviour if the attribute is not present in the response.	
FAILOVER_SUPPORTED	The Nchf_ConvergedCharging messages should be moved to an alternative destination in the case of communication failure.	

## 6.1.6.3.13 Enumeration: 3GPPPSDataOffStatus

**Table 6.1.6.3.13-1: Enumeration 3GPPPSDataOffStatus**

Enumeration value	Description	Applicability
ACTIVE	3GPP PS data off status is active.	
INACTIVE	3GPP PS data off status is inactive.	

## 6.1.6.3.14 Enumeration: ResultCode

Table 6.1.6.3.14-1: Enumeration ResultCode

Enumeration value	Description	Applicability
SUCCESS	The CHF grants the service to the end-user. This applies to the rating group.	
END_USER_SERVICE_DENIED	The CHF denies the service request due to end-user service restrictions or limitations related to the end-user. If the request contained used units they shall be deducted, if applicable. This applies to the rating group.	
QUOTA_MANAGEMENT_NOT_APPLICABLE	The CHF determines that the service can be granted to the end user without quota management, and used units shall be reported. This applies to the rating group.	
QUOTA_LIMIT_REACHED	The CHF denies the service request since the end user's account could not cover the requested service. If the request contained used units they shall be deducted, if applicable. This applies to the rating group.	
END_USER_SERVICE_REJECTED	The CHF denies the service request in order to terminate the service for which credit is requested. This applies to the rating group.	
RATING_FAILED	The CHF determines that the service cannot be rated due to insufficient rating input, incorrect parameter combination or unrecognized parameter, or parameter value. This applies to the rating group.	

## 6.1.6.3.15 Enumeration: PartialRecordMethod

**Table 6.1.6.3.15-1: Enumeration PartialRecordMethod**

Enumeration value	Description	Applicability
DEFAULT	Default method used for partial records	
INDIVIDUAL	Individual methods used for partial records	

## 6.1.6.3.16 Enumeration: RoamerInOut

The enumeration RoamerInOut indicates whether the user is an in-bound or out-bound roamer.

**Table 6.1.6.3.16-1: Enumeration RoamerInOut**

Enumeration value	Description	Applicability
IN_BOUND	In-bound roamer.	
OUT_BOUND	Out-bound roamer.	

## 6.1.6.3.17 Void

## 6.1.6.3.18 Enumeration: SMMessageType

**Table 6.1.6.3.18-1: Enumeration SMMessageType**

Enumeration value	Description	Applicability
SUBMISSION	The SMS message type is submission.	
DELIVERY_REPORT	The SMS message type is delivery report.	
SM_SERVICE_REQUEST	The SMS message type is SMS service request.	

## 6.1.6.3.19 Enumeration: SMPriority

**Table 6.1.6.3.19-1: Enumeration SMPriority**

Enumeration value	Description	Applicability
LOW	low priority	
NORMAL	normal priority	
HIGH	high priority	

## 6.1.6.3.20 Enumeration: DeliveryReportRequested

**Table 6.1.6.3.20-1: Enumeration DeliveryReportRequested**

Enumeration value	Description	Applicability
YES	Delivey report is requested.	
NO	The delivery report is not requested.	



## 6.1.6.3.21 Enumeration: InterfaceType

**Table 6.1.6.3.21-1: Enumeration InterfaceType**

Enumeration value	Description	Applicability
UNKNOWN	Interface type is unknown.	
MOBILE_ORIGINATING	Interface type is mobile originated.	
MOBILE_TERMINATING	Interface type is mobile terminated.	
APPLICATION_ORIGINATING	Interface type is application originated.	
APPLICATION_TERMINATION	Interface type is application terminated.	

## 6.1.6.3.22 Enumeration: ClassIdentifier

**Table 6.1.6.3.22-1: Enumeration ClassIdentifier**

Enumeration value	Description	Applicability
PERSONAL	The class identifier is personal.	
ADVERTISEMENT	The class identifier is advertisement.	
INFORMATIONAL	The class identifier is informational.	
AUTO	The class identifier is auto.	

## 6.1.6.3.23 Enumeration: SMAddressType

**Table 6.1.6.3.23-1: Enumeration SMAddressType**

Enumeration value	Description	Applicability
EMAIL_ADDRESS	The carried address type is EMAIL.	
MSISDN	The carried address type is MSISDN.	
IPV4_ADDRESS	The carried address type is IPv4.	
IPV6_ADDRESS	The carried address type is IPv6.	
NUMERIC_SHORTCODE	The carried address type is numeric shortcode.	
ALPHANUMERIC_SHORTCODE	The carried address type is alphanumeric shortcode.	
OTHER	The carried address type is other.	
IMSI	The carried address type is IMSI	

## 6.1.6.3.24 Enumeration: SMAddresseeType

**Table 6.1.6.3.24-1: Enumeration SMAddresseeType**

Enumeration value	Description	Applicability
TO	The addressee type is TO.	
CC	The addressee type is CC.	
BCC	The addressee type is BCC.	

## 6.1.6.3.25 Enumeration: SMSServiceType

**Table 6.1.6.3.25-1: Enumeration SMSServiceType**

Enumeration value	Description	Applicability
VAS4SMS_SHORT_MESSAGE_CONTENT_PROCESSING	The type of SM service is VAS4SMS short message content processing.	
VAS4SMS_SHORT_MESSAGE_FORWARDING	The type of SM service is VAS4SMS short message forwarding.	
VAS4SMS_SHORT_MESSAGE_FORWARDING_MULTIPLE_SUBSCRIPTIONS	The type of SM service is VAS4SMS short message forwarding multiple subscriptions.	
VAS4SMS_SHORT_MESSAGE_FILTERING	The type of SM service is VAS4SMS short message filtering.	
VAS4SMS_SHORT_MESSAGE_RECEIPT	The type of SM service is VAS4SMS short message receipt.	
VAS4SMS_SHORT_MESSAGE_NETWORK_STORAGE	The type of SM service is VAS4SMS short message network storage.	
VAS4SMS_SHORT_MESSAGE_TO_MULTIPLE_DESTINATIONS	The type of SM service is VAS4SMS short message to multiple destinations.	
VAS4SMS_SHORT_MESSAGE_VIRTUAL_PRIVATE_NETWORK(VPN)	The type of SM service is VAS4SMS short message virtual private network.	
VAS4SMS_SHORT_MESSAGE_AUTO_REPLY	The type of SM service is VAS4SMS short message auto reply.	
VAS4SMS_SHORT_MESSAGE_PERSONAL_SIGNATURE	The type of SM service is VAS4SMS short message personal signature.	
VAS4SMS_SHORT_MESSAGE_DEFERRED_DELIVERY	The type of SM service is VAS4SMS short message deferred delivery.	

## 6.1.6.3.26 Enumeration: ReplyPathRequested

**Table 6.1.6.3.26-1: Enumeration ReplyPathRequested**

Enumeration value	Description	Applicability
NO_REPLY_PATH_SET	The reply SM to an original SM was requested to follow the same path.	
REPLY_PATH_SET	The reply SM to an original SM was not requested to follow the same path.	

## 6.1.6.3.27 Enumeration: DnnSelectionMode

**Table 6.1.6.3.27-1: Enumeration DnnSelectionMode**

Enumeration value	Description
"VERIFIED"	UE or network provided DNN, subscription verified
"UE_DNN_NOT_VERIFIED"	UE provided DNN, subscription not verified
"NW_DNN_NOT_VERIFIED"	Network provided DNN, subscription not verified

## 6.1.6.3.28 Enumeration: EventType

**Table 6.1.6.3.28-1: Enumeration EventType**

Enumeration value	Description	Applicability
IEC	This value is used to indicate immediate event charging.	
PEC	This value is used to indicate post event charging.	

## 6.1.6.3.29 Enumeration: MICOModeIndication

**Table 6.1.6.3.29-1: Enumeration MICOModeIndication**

Enumeration value	Description	Applicability
"MICO_MODE"	MICO Mode used	
"NO_MICO_MODE"	MICO Mode not used	

## 6.1.6.3.30 Enumeration: RegistrationMessageType

**Table 6.1.6.3.30-1: Enumeration RegistrationMessageType**

Enumeration value	Description	Applicability
"INITIAL"	Initial registration	
"MOBILITY"	Mobility registration update	
"PERIODIC"	Periodic registration update	
"EMERGENCY"	Emergency registration	
"DEREGISTRATION"	Deregistration	

## 6.1.6.3.31 Enumeration: SmsIndication

**Table 6.1.6.3.31-1: Enumeration SmsIndication**

Enumeration value	Description	Applicability
"SMS_SUPPORTED"	SMS over NAS is supported	
"SMS_NOT_SUPPORTED"	SMS over NAS is Not supported	

## 6.1.6.3.32 Enumeration: APIDirection

**Table 6.1.6.3.32-1: Enumeration APIDirection**

Enumeration value	Description	Applicability
INVOCATION	Indicates an API invocation from an AF.	
NOTIFICATION	Indicates a notification to an AF.	

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

None.

## 6.1.6.5 Binary data

None.

## 6.1.7 Error handling

## 6.1.7.1 General

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

For the Nchf\_ConvergedCharging API, HTTP error responses shall be supported as specified in subclause 4.8 of 3GPP TS 29.501 [2]. 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 subclauses shall apply.

### 6.1.7.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the Nchf\_ConvergedCharging API compared to the Protocol Error Handling specified in subclause 5.2.7.2 of 3GPP TS 29.500 [7].

### 6.1.7.3 Application errors

The application errors defined for the Nchf\_ConvergedCharging API are listed in table 6.1.7.3-1. The CHF shall include in the HTTP status code a "ProblemDetails" data structure with the "cause" attribute indicating the application error as listed in table 6.1.7.3-1. The common application errors defined in the Table 5.2.7.2-1 in 3GPP TS 29.500 [7] may also be used for the Nchf\_ConvergedCharging service.

**Table 6.1.7.3-1: Application errors**

Application Error	HTTP status code	Description
CHARGING_FAILED	400 Bad Request	The HTTP request is rejected because the set of session or subscriber information needed by the CHF for charging or CDR creation is incomplete or erroneous or not available. (E.g. Rating Group, subscriber information)
RE_AUTHORIZATION_FAILED	400 Bad Request	The HTTP request is rejected because the set of information needed by the NF Consumer (CTF) to report the usage is incomplete or erroneous or not available.
CHARGING_NOT_APPLICABLE	403 Forbidden	The HTTP request is rejected by the CHF since it has been determined that the service can be allowed to the end user without any charging or CDR creation.
USER_UNKNOWN	404 Not Found	The HTTP request is rejected because the end user specified in the request cannot be served by the CHF.
END_USER_REQUEST_DENIED	403 Forbidden	The HTTP request denied by the CHF due to restrictions or limitations related to the end-user.
QUOTA_LIMIT_REACHED	403 Forbidden	The HTTP request denied by the CHF because the end user's account could not cover the requested service. If the request contained used units they are deducted, if applicable.
END_USER_REQUEST_REJECTED	403 Forbidden	The HTTP request rejected by the CHF due to end-user restrictions or limitations.

### 6.1.8 Feature negotiation

The optional features in table 6.1.8-1 are defined for the Nchf\_ConvergedCharging API. They shall be negotiated using the extensibility mechanism defined in subclause 6.6 of 3GPP TS 29.500 [299].

**Table 6.1.8-1: Supported Features**

Feature number	Feature Name	Description
1	CHFCQM	CHF-controlled quota management i.e. support for temporary offline

## 6.2 Nchf\_OfflineOnlyCharging Service API

### 6.2.1 Introduction

The APIs defined in this clause implement the service operation defined in clause 5.3.2.

The Nchf\_OfflineOnlyCharging service shall use the Nchf\_OfflineOnlyCharging API.

The request URI used in each HTTP request from the NF service consumer towards the CHF 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:

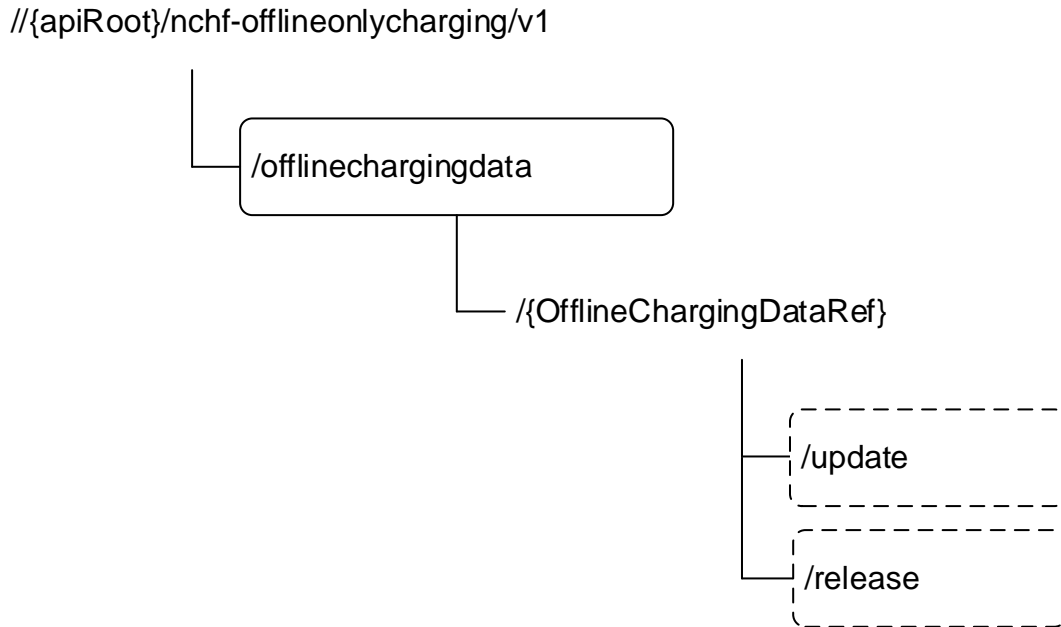
- The {apiRoot} shall be set as described in 3GPP TS 29.501 [5].
- The {apiName} shall be "Nchf\_OfflineOnlyCharging".
- The {apiVersion} shall be "v1".
- The {apiSpecificResourceUriPart} shall be set as described in clause 6.2.3.

## 6.2.2 Usage of HTTP

See clause 6.1.2 in this document.

## 6.2.3 Resources

### 6.2.3.1 Overview



**Figure 6.2.3.1-1: Resource URI structure of the Nchf\_OfflineOnlyCharging API**

*Editor’s note: Resource name in Figure 6.2.3.1-1 needs to be aligned with resource name in definition.*

Offline Only Charging Data Ref is a unique identifier for an offline only charging data resource in a PLMN. It’s created in CHF when CHF receives a Nchf\_OfflineOnlyCharging\_Create request and provided to NF (CTF) in the Location header field in the Nchf\_OfflineOnlyCharging\_Create response. The NF (CTF) shall use the Offline Only Charging Data Ref received in subsequent requests to the CHF for the same charging data resource.

Table 6.2.3.1-1 provides an overview of the resources and applicable HTTP methods.

**Table 6.2.3.1-1: Resources and methods overview**

Resource name	Resource URI	HTTP method or custom operation	Description	Corresponding service operation
Offline Only Charging Data	{apiRoot}/nchf-offlineonlycharging/v1/offlinechargingdata/	POST	Create a new Offline Only Charging Data resource	Nchf_OfflineOnlyCharging_Create
Individual Offline Only Charging Data	{apiRoot}/nchf-offlineonlycharging/v1/offlinechargingdata/{OfflineChargingDataRef}/update	update (POST)	Update an existing Offline Only Charging Data resource.	Nchf_OfflineOnlyCharging_Update
	{apiRoot}/nchf-offlineonlycharging/v1/offlinechargingdata/{OfflineChargingDataRef}/release	release (POST)	Update and release an existing Offline Only Charging Data resource.	Nchf_OfflineOnlyCharging_Release

## 6.2.3.2 Resource: Charging Data

### 6.2.3.2.1 Description

Offline Only Charging Data resource represents a collection of the different offline only charging data resources created by the CHF for offline only charging as defined in 3GPP TS 32.290 [58].

### 6.2.3.2.2 Resource Definition

Resource URI: **{apiRoot}/nchf-offlineonlycharging/v1/offlinechargingdata**

This resource shall support the resource URI variables defined in table 6.2.3.2.2-1.

**Table 6.2.3.2.2-1: Resource URI variables for this resource**

Name	Definition
apiRoot	See clause 6.2.1

### 6.2.3.2.3 Resource Standard Methods

#### 6.2.3.2.3.1 POST

This method shall support the URI query parameters specified in table 6.2.3.2.3.1-1.

**Table 6.2.3.2.3.1-1: URI query parameters supported by the POST method on this resource**

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 6.2.3.2.3.1-2 and the response data structures and response codes specified in table 6.2.3.2.3.1-3.

**Table 6.2.3.2.3.1-2: Data structures supported by the POST Request Body on this resource**

Data type	P	Cardinality	Description
ChargingDataRequest	M	1	Parameters to create a new Offline Only Charging Data resource.

**Table 6.2.3.2.3.1-3: Data structures supported by the POST Response Body on this resource**

Data type	P	Cardinality	Response codes	Description
ChargingDataResponse	M	1	201 Created	The creation of an Offline Only Charging Data resource is confirmed and a representation of that resource is returned. The Offline Only Charging Data resource which is created and returned successfully. The representation of created resource is identified via Location header field in the 201 response.
			307 Temporary Redirect	(NOTE 2)
ChargingDataResponse	M	1	400 Bad Request	(NOTE 2)
ChargingDataResponse	M	1	403 Forbidden	(NOTE 2)
ChargingDataResponse	M	1	404 Not Found	(NOTE 2)
	M	1	405 Method Not Allowed	(NOTE 2)
	M	1	408 Request Timeout	(NOTE 2)
	M	1	500 Internal Server Error	(NOTE 2)
	M	1	503 Service Unavailable	(NOTE 2)
	M	1	508 Gateway Timeout	(NOTE 2)
NOTE 1: In addition, the HTTP status codes which are specified as mandatory in table 5.2.7.1-1 of 3GPP TS 29.500 [299] for the POST method also apply.				
NOTE 2: Failure cases are described in clause 6.2.7.				

#### 6.2.3.2.4 Resource Custom Operations

None.

### 6.2.3.3 Resource: Individual Offline Only Charging Data

#### 6.2.3.3.1 Description

Individual Offline Only Charging Data resource represents an offline only charging data resource created in the CHF.



### 6.2.3.3.2 Resource Definition

Resource URI: **{apiRoot}/nchf-offlineonlycharging/v1/offlinechargingdata/{OfflineChargingDataRef}**

This resource shall support the resource URI variables defined in table 6.2.3.3.2-1.

**Table 6.2.3.3.2-1: Resource URI variables for this resource**

Name	Definition
apiRoot	See clause 6.2.1
OfflineChargingDataRef	Offline only charging data resource reference assigned by the CHF during the Nchf_OfflineOnlyCharging_Create operation,

### 6.2.3.3.3 Resource Standard Methods

None.

### 6.2.3.3.4 Resource Custom Operations

#### 6.2.3.3.4.1 Overview

**Table 6.2.3.3.4.1-1: Custom operations**

Custom operation URI	Mapped HTTP method	Description
{apiRoot}/nchf-offlineonlycharging/v1/offlinechargingdata/{OfflineChargingDataRef}/update	POST	Update an existing Offline Only Charging Data resource.
{apiRoot}/nchf-offlinecharging/v1/offlinechargingdata/{OfflineChargingDataRef}/release	POST	Update and release an existing Offline Only Charging Data resource.

#### 6.2.3.3.4.2 Operation: update

##### 6.2.3.3.4.2.1 Description

This operation updates an existing Offline Only Charging Data resource.

##### 6.2.3.3.4.2.2 Operation Definition

This operation shall support the request data structures specified in table 6.2.3.3.4.2.2-1 and the response data structures and response codes specified in table 6.2.3.3.4.2.2-2.

**Table 6.2.3.3.4.2.2-1: Data structures supported by the POST Request Body on this resource**

Data type	P	Cardinality	Description
ChargingDataRequest	M	1	Parameters to modify an existing Offline Only Charging Data resource matching the OfflineChargingDataRef according to the representation in the OfflineChargingData. The request URI is the representation in the Location header field in the 201 response of resource creation.

**Table 6.2.3.3.4.2.2-2: Data structures supported by the POST Response Body on this resource**

Data type	P	Cardinality	Response codes	Description
ChargingDataResponse	M	1	200 OK	The modification of an Offline Only Charging Data resource is confirmed and a representation of that resource is returned. The Offline Only Charging Data resource which is modified and returned successfully.
			307 Temporary Redirect	(NOTE 2)
ChargingDataResponse	M	1	400 Bad Request	(NOTE 2)
ChargingDataResponse	M	1	403 Forbidden	(NOTE 2)
ChargingDataResponse	M	1	404 Not Found	(NOTE 2)
	M	1	405 Method Not Allowed	(NOTE 2)
	M	1	408 Request Timeout	(NOTE 2)
	M	1	500 Internal Server Error	(NOTE 2)
	M	1	503 Service Unavailable	(NOTE 2)
	M	1	508 Gateway Timeout	(NOTE 2)
NOTE 1: In addition, the HTTP status codes which are specified as mandatory in table 5.2.7.1-1 of 3GPP TS 29.500 [299] for the POST method also apply.				
NOTE 2: Failure cases are described in clause 6.2.7.				

6.2.3.3.4.3            Operation: release

6.2.3.3.4.3.1        Description

This operation update and release an existing charging session

## 6.2.3.3.4.3.2 Operation Definition

This operation shall support the request data structures specified in table 6.2.3.3.4.3.2-1 and the response data structures and response codes specified in table 6.2.3.3.4.3.2-2.

**Table 6.2.3.3.4.3.2-1: Data structures supported by the POST Request Body on this resource**

Data type	P	Cardinality	Description
ChargingDataRequest	M	1	Parameters to modify and then release the Offline Only Charging Data resource matching the OfflineChargingDataRef according to the representation in the OfflineChargingData. The request URI is the representation in the Location header field in the 201 response of resource creation.

**Table 6.2.3.3.4.3.2-2: Data structures supported by the POST Response Body on this resource**

Data type	P	Cardinality	Response codes	Description
n/a	M	1	204 No Content	Successful case: The Offline Only Charging Data resource matching the OfflineChargingDataRef is modified and then released.
ChargingDataResponse	M	1	404 Not Found	(NOTE 2)
NOTE 1: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply.				
NOTE 2: Failure cases are described in clause 6.2.7.				

## 6.2.4 Custom Operations without associated resources

None.

## 6.2.5 Data Model

## 6.2.5.1 General

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

The Nchf\_OfflineOnlyCharging Service API allows the NF consumer to consume the offline only charging service from the CHF as defined in 3GPP TS 32.290 [58].

Table 6.2.5.1-1 specifies the data types defined for the OfflineOnlyCharging service based interface protocol.

**Table 6.2.5.1-1: Nchf\_ OfflineOnlyCharging specific Data Types**

Data type	Clause defined	Description	Applicability
ChargingDataRequest	6.2.5.2.1.1 6.2.5.2.2.1	Describes the attributes of Charging Data Request to CHF for initial, update and termination of the charging session.	
ChargingDataResponse	6.2.5.2.1.2 6.2.5.2.2.2	Describes the attributes of Charging Data Response from CHF on charging session initial, update and termination.	

The data types specified in Table 6.1.6.1-2 of this document are applied and re-used by the Nchf\_OfflineOnlyCharging service based interface protocol.

## 6.2.5.2 Structured data types

## 6.2.5.2.1 Common Data Type

## 6.2.5.2.1.1 Type ChargingDataRequest

**Table 6.2.5.2.1.1-1: Definition of type ChargingDataRequest**

Attribute name	Data type	P	Cardinality	Description	Applicability
subscriberIdentifier	SubscriberIdentifier	O <sub>M</sub>	0..1	Identifier of the subscriber that uses the requested service.	
nfConsumerIdentification	NFConsumerIdentification	M	1	This is a grouped field which contains a set of information identifying the NF consumer of the charging service.	
invocationTimeStamp	DateTime	M	1	The time at which the request is send	
invocationSequenceNumber	Uint32	M	1	This field contains the sequence number of the charging service invocation by the NF consumer.	
serviceSpecificationInformation	String	O <sub>C</sub>	0..1	Identifies service specific document that applies to the request, e.g. the service specific document ('middle tier' TS) and 3GPP release the service specific document is based upon.	
multipleUnitUsage	array(MultipleUnitUsage)	O <sub>C</sub>	0..N	This field contains the parameters for usage reporting.	
triggers	array(Trigger)	O <sub>C</sub>	0..N	This field identifies the event(s) triggering the request.	

## 6.2.5.2.1.2 Type ChargingDataResponse

**Table 6.2.5.2.1.2-1: Definition of type ChargingDataResponse**

Attribute name	Data type	P	Cardinality	Description	Applicability
invocationTimestamp	DateTime	M	1	This field holds the timestamp of the charging service response from the CHF.	
invocationResult	InvocationResult	O <sub>C</sub>	1	This field holds the result code in case of unsuccessful charging service invocation by the NF consumer	
invocationSequenceNumber	UInt32	M	1	This field contains the sequence number of the charging service invocation by the NF consumer.	
sessionFailover	SessionFailover	O <sub>C</sub>	0..1	This field indicates whether alternative CHF is supported for ongoing charging service failover handling by NF consumer.	
triggers	array(Trigger)	O <sub>C</sub>	0..N	This field identifies the chargeable event(s) supplied by CHF to override/activate the existing chargeable event(s) in NF consumer. The presence of the triggers attribute without any triggerType is used by CHF to disable all the triggers.	

## 6.2.5.2.1.3 Type MultipleUnitUsage

**Table 6.2.5.2.1.3-1: Definition of type MultipleUnitUsage**

Attribute name	Data type	P	Cardinality	Description	Applicability
ratingGroup	RatingGroup	M	1	The identifier of a rating group.	
usedUnitContainer	array(UsedUnitContainer)	O <sub>C</sub>	0..N	This field contains the amount of used non-monetary service units measured.	

## 6.2.5.2.1.4 Type UsedUnitContainer

**Table 6.2.5.2.1.4-1: Definition of type UsedUnitContainer**

Attribute name	Data type	P	Cardinality	Description	Applicability
serviceld	Serviceld	O <sub>C</sub>	0..1	This field identity of the used service	
triggers	array (Trigger)	O <sub>C</sub>	0..N	This field specifies the reason for usage reporting for one or more types of unit associated to the rating group.	
triggerTimestamp	DateTime	O <sub>C</sub>	0..1	This field holds the timestamp when the reporting trigger occur.	
time	Uint32	O <sub>C</sub>	0..1	This field holds the amount of requested time.	
totalVolume	Uint64	O <sub>C</sub>	0..1	This field holds the amount of requested volume in both uplink and downlink directions.	
uplinkVolume	Uint64	O <sub>C</sub>	0..1	This field holds the amount of requested volume in uplink direction.	
downlinkVolume	Uint64	O <sub>C</sub>	0..1	This field holds the amount of requested volume in downlink direction.	
eventTimeStamps	DateTime	O <sub>C</sub>	0..1	This field holds the timestamps of the event reported in the Service Specific Unit s, if the reported units are event based	
localSequenceNumber	integer	M	1	holds the Used Unit sequence number, i.e. the order when charging event occurs. It increased by 1 for each Used Unit generation.	

## 6.2.5.2.1.5 Type Trigger

**Table 6.2.5.2.1.5-1: Definition of type Trigger**

Attribute name	Data type	P	Cardinality	Description	Applicability
triggerType	TriggerType	O <sub>C</sub>	0..1	the events whose occurrence lead to charging event is issued towards the CHF	
triggerCategory	TriggerCategory	M	1	This field indicates whether the charging data generated by the NF consumer for the trigger lead to a Charging Event towards the CHF immediately or not.	
volumeLimit64	Uint64	O <sub>C</sub>	0..1	Volume limit if trigger type is "Expiry of data volume limit".	
maxNumberOfccc	Uint32	O <sub>C</sub>	0..1	Maximum number if trigger type is "Max nb of number of charging condition changes"	

## 6.2.5.2.2 5G Data Connectivity Specified Data Type

## 6.2.5.2.2.1 Type ChargingDataRequest

The additional attributes of the type ChargingDataRequest defined in clause 6.2.5.2.1.1 for 5G data connectivity charging see table 6.1.6.2.2.1-1.

#### 6.2.5.2.2.2 Type ChargingDataResponse

The additional attributes of the type ChargingDataResponse defined in clause 6.2.5.2.1.2 for 5G data connectivity charging see table 6.1.6.2.2.2-1.

#### 6.2.5.2.2.3 Type MultipleUnitUsage

The additional attributes of the type MultipleUnitUsage defined in clause 6.2.5.2.1.3 for 5G data connectivity charging see table 6.1.6.2.2.3-1.

#### 6.2.5.2.2.4 Type UsedUnitContainer

The additional attributes of the type UsedUnitContainer defined in clause 6.2.5.2.1.4 for 5G data connectivity charging see table 6.1.6.2.2.5-1.

#### 6.2.5.2.2.5 Type PDUSessionChargingInformation

The additional attributes of the Type PDUSessionChargingInformation for 5G data connectivity charging see table 6.1.6.2.2.6-1.

#### 6.2.5.2.2.6 Type UserInformation

The additional attributes of the Type UserInformation for 5G data connectivity charging see table 6.1.6.2.2.7-1.

#### 6.2.5.2.2.7 Type PDUSessionInformation

The additional attributes of the Type PDUSessionInformation for 5G data connectivity charging see table 6.1.6.2.2.8-1.

#### 6.2.5.2.2.8 Type PDUContainerInformation

The additional attributes of the Type PDUContainerInformation for 5G data connectivity charging see table 6.1.6.2.2.9-1.

#### 6.2.5.2.2.9 Type NetworkSlicingInfo

The additional attributes of the Type NetworkSlicingInfo for 5G data connectivity charging see table 6.1.6.2.2.10-1.

#### 6.2.5.2.2.10 Type PDUAddress

The additional attributes of the Type PDUAddress for 5G data connectivity charging see table 6.1.6.2.2.11-1.

#### 6.2.5.2.2.11 Type ServingNetworkFunctionID

The additional attributes of the Type ServingNetworkFunctionID for 5G data connectivity charging see table 6.1.6.2.2.12-1.

#### 6.2.5.2.2.12 Type RoamingQBCInformation

The additional attributes of the Type RoamingQBCInformation for 5G data connectivity charging see table 6.1.6.2.2.13-1.

#### 6.2.5.2.2.13 Type MultipleQFIcontainer

The additional attributes of the Type MultipleQFIcontainer for 5G data connectivity charging see table 6.1.6.2.2.14-1.

#### 6.2.5.2.2.14 Type RoamingChargingProfile

The additional attributes of the Type RoamingChargingProfile for 5G data connectivity charging see table 6.1.6.2.2.15-1.

#### 6.2.5.2.2.15 Type QFIContainerInformation

The additional attributes of the Type QFIContainerInformation for 5G data connectivity charging see table 6.1.6.2.2.16-1.

#### 6.2.5.2.2.16 Type RANSecondaryRATUsageReport

The additional attributes of the Type RANSecondaryRATUsageReport for 5G data connectivity charging see table 6.1.6.2.2.17-1.

#### 6.2.5.2.2.17 Type QosFlowsUsageReport

The additional attributes of the Type QosFlowsUsageReport for 5G data connectivity charging see table 6.1.6.2.2.18-1.

### 6.2.5.3 Simple data types and enumerations

#### 6.2.5.3.1 Introduction

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

#### 6.2.5.3.2 Simple data types

The simple data types are the same as definitions in table 6.1.6.3.2-1.

#### 6.2.5.3.3 Enumeration: ChargingCharacteristicsSelectionMode

The Enumeration ChargingCharacteristicsSelectionMode is the same as definition in table 6.1.6.3.5-1.

#### 6.2.5.3.4 Enumeration: NodeFunctionality

**Table 6.2.5.3.4-1: Enumeration NodeFunctionality**

Enumeration value	Description	Applicability
SMF	This field identifies that NF is a SMF.	
I_SMF	This field identifies that node is an I-SMF, only applicable for PDU session served by SMF + I-SMF.	



## 6.2.5.3.5 Enumeration: TriggerType

Table 6.2.5.3.5-1: Enumeration TriggerType

Enumeration value	Description	Applicability
FINAL	a service termination has happened	
ABNORMAL_RELEASE	PDU session has abnormal released.	
QOS_CHANGE	In request message, this value is used to indicate that QoS change has happened. Any of elements of QoSData may result in QoS change.	
VOLUME_LIMIT	Volume limit has been reached.	
TIME_LIMIT	Time limit has been reached	
EVENT_LIMIT	Event limit has been reached	
PLMN_CHANGE	PLMN has been changed.	
USER_LOCATION_CHANGE	In request message, this value is used to indicate that User location has been changed.	
RAT_CHANGE	In request message, this value is used to indicate that RAT type has been changed.	
SESSION_AMBR_CHANGE	In request message, this value is used to indicate that Session AMBR has been changed.	
UE_TIMEZONE_CHANGE	In request message, this value is used to indicate that UE timezone has been changed.	
TARIFF_TIME_CHANGE	Tariff time change has happened.	
MAX_NUMBER_OF_CHANGES_IN_CHARGING_CONDITIONS	Max number of change has been reached	
MANAGEMENT_INTERVENTION	Management intervention	
CHANGE_OF_UE_PRESENCE_IN_PRESENCE_REPORTING_AREA	In request message, this value is used to indicate that Change of UE presence in PRA has happened. In response message, this value is used to indicate a request of reporting the event that the user enters/leaves the area(s) as indicated in the presenceReportingArea Attribute	
CHANGE_OF_3GPP_PS_DATA_OFF_STATUS	In request message, this value is used to indicate that Change of 3GPP PS Data off status has happened.	
SERVING_NODE_CHANGE	A serving node (e.g., AMF) change in the NF Consumer	
REMOVAL_OF_UPF	A used UPF is removed	
ADDITION_OF_UPF	A new UPF is added.	
INSERTION_OF_ISMF	A new I-SMF is inserted	
REMOVAL_OF_ISMF	A used I-SMF is removed	
CHANGE_OF_ISMF	A used I-SMF is removed, and a new I-SMF is inserted	
HANDOVER_CANCEL	The handover is cancelled.	
HANDOVER_START	The handover is started.	
HANDOVER_COMPLETE	The handover is complete.	

## 6.2.5.3.6 Enumeration: ResultCode

Table 6.2.5.3.6-1: Enumeration ResultCode

Enumeration value	Description	Applicability
SUCCESS	The CHF opens or updates CDR.	

## 6.2.5.3.7 Enumeration: 3GPPPSDataOffStatus

The Enumeration ChargingCharacteristicsSelectionMode is the same as definition in table 6.1.6.3.13-1.

### 6.2.5.3.8 Enumeration: PartialRecordMethod

The Enumeration PartialRecordMethod is the same as definition in table 6.1.6.3.15-1.

### 6.2.5.3.9 Enumeration: RoamerInOut

The Enumeration PartialRecordMethod is the same as definition in table 6.1.6.3.16-1.

### 6.2.5.3.10 Enumeration: SubscriberIdentityType

The Enumeration PartialRecordMethod is the same as definition in table 6.1.6.3.17-1.

## 6.2.6 Error handling

### 6.2.6.1 General

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

For the Nchf\_OfflineOnlyCharging API, HTTP error responses shall be supported as specified in clause 4.8 of 3GPP TS 29.501 [2]. 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 shall apply.

### 6.2.6.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the Nchf\_OfflineOnlyCharging API compared to the Protocol Error Handling specified in clause 5.2.7.2 of 3GPP TS 29.500 [7].

### 6.2.6.3 Application errors

The application errors defined for the Nchf\_OfflineOnlyCharging API are listed in table 6.2.6.3-1. The CHF shall include in the HTTP status code a "ProblemDetails" data structure with the "cause" attribute indicating the application error as listed in table 6.2.6.3-1. The common application errors defined in the Table 5.2.7.2-1 in 3GPP TS 29.500 [7] may also be used for the Nchf\_OfflineOnlyCharging service.

**Table 6.1.7.3-1: Application errors**

Application Error	HTTP status code	Description
CHARGING_FAILED	400 Bad Request	The HTTP request is rejected because the set of session or subscriber information needed by the CHF for charging or CDR creation is incomplete, erroneous, or not available. (E.g. Rating Group, subscriber information)

## 6.2.7 Feature negotiation

The optional features in table 6.2.7-1 are defined for the Nchf\_OfflineOnlyCharging API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [299].

**Table 6.2.7-1: Supported Features**

Feature number	Feature Name	Description

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## 7 Bindings of CDR field, Information Element and Resource Attribute

### 7.0 General

This clause aims to describe the mapping between the Service Charging Information element, Resource Attribute and CDR field for 5G charging.

Table 7.1-1 and 7.2-1 describes the mapping of the Information Element, Resource Attribute and CDR field of CHF-CDR for 5G charging.

## 7.1 Bindings of common CDR field, Information Element and Resource Attribute

**Table 7.1-1: Bindings of common CDR field, Information Element and Resource Attribute**

Information Element	CDR Field	Resource Attribute
Session Identifier	Charging Session Identifier	/{ChargingDataRef }/ or /{OfflineChargingDataRef}/
		<b>ChargingDataRequest</b>
Subscriber Identifier	Subscriber Identifier	/subscriberIdentifier
Invocation Timestamp	-	/invocationTimeStamp
Invocation Sequence Number	-	/invocationSequenceNumber
Retransmission Indicator	-	/retransmissionIndicator
One-time Event	-	/oneTimeEvent
NF Consumer Identification	NF Information	/nfConsumerIdentification
NF Name	NF Name	/nfConsumerIdentification/nFName
NF Address	NF Address	/nfConsumerIdentification/nFIPv4Address /nfConsumerIdentification/nFIPv6Address /nfConsumerIdentification/nFFqdn
NF PLMN ID	NF PLMN ID	/nfConsumerIdentification/nFPLMNID
NF Functionality	Record Type	/nfConsumerIdentification/nodeFunctionality
Notify URI		/notifyUri
Service Specification Information	Service Specification Information	/serviceSpecificationInfo
Multiple Unit Usage	List of Multiple Unit Usage	/multipleUnitUsage
Rating Group	Rating Group	/multipleUnitUsage/ratingGroup
Requested Unit	-	/multipleUnitUsage/requestedUnit
Time	-	/multipleUnitUsage/requestedUnit/time
Total Volume	-	/multipleUnitUsage/requestedUnit/totalVolume
Uplink Volume	-	/multipleUnitUsage/requestedUnit/uplinkVolume
Downlink Volume	-	/multipleUnitUsage/requestedUnit/downlinkVolume
Service Specific Units	-	/multipleUnitUsage/requestedUnit/serviceSpecificUnits
Used Unit Container	Used Unit Container	/multipleUnitUsage/usedUnitContainer
Service Identifier	Service Identifier	/multipleUnitUsage/usedUnitContainer/serviceId
Quota management Indicator	Quota management Indicator	/multipleUnitUsage/usedUnitContainer/quotaManagementIndicator
Triggers	Triggers	/multipleUnitUsage/usedUnitContainer/triggers
Trigger Timestamp	Trigger Timestamp	/multipleUnitUsage/usedUnitContainer/triggerTimestamp
Time	Time	/multipleUnitUsage/usedUnitContainer/time
Total Volume	Total Volume	/multipleUnitUsage/usedUnitContainer/totalVolume
Uplink Volume	Uplink Volume	/multipleUnitUsage/usedUnitContainer/uplinkVolume
Downlink Volume	Downlink Volume	/multipleUnitUsage/usedUnitContainer/downlinkVolume
Service Specific Unit	Service Specific Unit	/multipleUnitUsage/usedUnitContainer/serviceSpecificUnits
Event Time Stamps	Event Time Stamps	/multipleUnitUsage/usedUnitContainer/eventTimeStamps
Local Sequence Number	Local Sequence Number	/multipleUnitUsage/usedUnitContainer/localSequenceNumber
Triggers	Triggers	/triggers
		<b>ChargingDataResponse</b>
Invocation Timestamp		/invocationTimeStamp
Invocation Sequence Number		/invocationSequenceNumber
Session Failover	-	/sessionFailover
Triggers	-	/triggers
Multiple Unit Information	-	/multipleUnitInformation
Result Code	-	/multipleUnitInformation
Rating Group	-	/multipleUnitInformation/ratingGroup
Granted Unit	-	/multipleUnitInformation/grantedUnit
Tariff Time Change	-	/multipleUnitInformation/grantedUnit/tariffTimeChange
Time	-	/multipleUnitInformation/grantedUnit/time
Total Volume	-	/multipleUnitInformation/grantedUnit/totalVolume

Uplink Volume	-	/multipleUnitInformation/grantedUnit/uplinkVolume
Downlink Volume	-	/multipleUnitInformation/grantedUnit/downlinkVolume
Service Specific Units	-	/multipleUnitInformation/grantedUnit/serviceSpecificUnits
Triggers	-	/multipleUnitInformation/triggers
Validity Time	-	/multipleUnitInformation/validityTime
Quota Holding Time	-	/multipleUnitInformation/quotaHoldingTime
Final Unit Indication	-	/multipleUnitInformation/finalUnitIndication
Time Quota Threshold	-	/multipleUnitInformation/timeQuotaThreshold
Volume Quota Threshold	-	/multipleUnitInformation/volumeQuotaThreshold
Unit Quota Threshold	-	/multipleUnitInformation/unitQuotaThreshold
Invocation Result	-	/invocationResult
Invocation Result code	-	/invocationResult/error/cause
Failed parameter	-	/invocationResult/error/invalidParams
Failure Handling	-	/invocationResult/failureHandling

## 7.2 Bindings for 5G data connectivity

**Table 7.2-1: Bindings of 5G data connectivity CDR field, Information Element and Resource Attribute**

Information Element	CDR Field	Resource Attribute
		<b>ChargingDataRequest</b>
Multiple Unit Usage	List of Multiple Unit Usage	/multipleUnitUsage
UPF ID	UPF ID	/multipleUnitUsage/upfID
Used Unit Container	Used Unit Container	/multipleUnitUsage/usedUnitContainer
PDU Container Information	PDU Container Information	/multipleUnitUsage/usedUnitContainer/pDUContainerInformation
Time of First Usage	Time of First Usage	/multipleUnitUsage/usedUnitContainer/pDUContainerInformation/timeofFirstUsage
Time of Last Usage	Time of Last Usage	/multipleUnitUsage/usedUnitContainer/pDUContainerInformation/timeofLastUsage
QoS Information	QoS Information	/multipleUnitUsage/usedUnitContainer/pDUContainerInformation/qoSInformation
QoS Characteristics	QoS Characteristics	/multipleUnitUsage/usedUnitContainer/pDUContainerInformation/qoSCharacteristics
AF Charging Identifier	AF Charging Identifier	/multipleUnitUsage/usedUnitContainer/pDUContainerInformation/afChargingIdentifier
User Location Information	User Location Information	/multipleUnitUsage/usedUnitContainer/pDUContainerInformation/userLocationInformation
UE Time Zone	UE Time Zone	/multipleUnitUsage/usedUnitContainer/pDUContainerInformation/ueTimeZone
RAT Type	RAT Type	/multipleUnitUsage/usedUnitContainer/pDUContainerInformation/rATType
Serving Network Function ID	Serving Network Function ID	/multipleUnitUsage/usedUnitContainer/pDUContainerInformation/servingNodeID
Presence Reporting Area Information	Presence Reporting Area Information	/multipleUnitUsage/usedUnitContainer/pDUContainerInformation/presenceReportingAreaInformation
3GPP PS Data Off Status	3GPP PS Data Off Status	/multipleUnitUsage/usedUnitContainer/pDUContainerInformation/3gppPSDataOffStatus
Sponsor Identity	Sponsor Identity	/multipleUnitUsage/usedUnitContainer/pDUContainerInformation/sponsorIdentity
Application Service Provider Identity	Application Service Provider Identity	/multipleUnitUsage/usedUnitContainer/pDUContainerInformation/applicationServiceProviderIdentity
Charging Rule Base Name	Charging Rule Base Name	/multipleUnitUsage/usedUnitContainer/pDUContainerInformation/chargingRuleBaseName
PDU Session Charging Information	PDU Session Charging Information	/pDUSessionChargingInformation
Charging Id	Charging Id	/pDUSessionChargingInformation/chargingId
Home Provided ChargingId	Home Provided ChargingId	/pDUSessionChargingInformation/homeProvidedChargingId
User Information	User Information	/pDUSessionChargingInformation/userInformation
User Identifier	User Identifier	/pDUSessionChargingInformation/userInformation/servedGPSI
User Equipment Info	User Equipment Info	/pDUSessionChargingInformation/userInformation/servedPEI
Unauthenticated Flag	Unauthenticated Flag	/pDUSessionChargingInformation/userInformation/unauthenticatedFlag
Roamer In Out	Roamer In Out	/pDUSessionChargingInformation/userInformation/roamerInOut
User Location Info	User Location Info	/pDUSessionChargingInformation/userLocationInfo
UE Time Zone	UE Time Zone	/pDUSessionChargingInformation/ueTimeZone
Presence Reporting Area Information	Presence Reporting Area Information	/pDUSessionChargingInformation/presenceReportingAreaInformation
PDU Session Information	PDU Session Information	/pDUSessionChargingInformation/pduSessionInformation
PDU Session ID	PDU Session ID	/pDUSessionChargingInformation/pduSessionInformation/pduSessionID
Network Slice Instance Identifier	Network Slice Instance Identifier	/pDUSessionChargingInformation/pduSessionInformation/networkSlicingInfo
PDU Type	PDU Type	/pDUSessionChargingInformation/pduSessionInformation/pduType



PDU Address	PDU Address	/pDUSessionChargingInformation/pduSessionInformation/pduAddress
PDU IPv4 Address	PDU IPv4 Address	/pDUSessionChargingInformation/pduSessionInformation/pduAddress/pduIPv4Address
PDU IPv6 Address with prefix	PDU IPv6 Address with prefix	/pDUSessionChargingInformation/pduSessionInformation/pduAddress/pduIPv6Addresswithprefix
PDU Address prefix length	PDU Address prefix length	/pDUSessionChargingInformation/pduSessionInformation/pduAddress/pduAddressprefixlength
IPv4 Dynamic Address Flag	IPv4 Dynamic Address Flag	/pDUSessionChargingInformation/pduSessionInformation/pduAddress/IPv4dynamicAddressFlag
IPv6 Dynamic Address Flag	IPv6 Dynamic Address Flag	/pDUSessionChargingInformation/pduSessionInformation/pduAddress/IPv6dynamicAddressFlag
SSC Mode	SSC Mode	/pDUSessionChargingInformation/pduSessionInformation/sscMode
SUPI PLMN ID	SUPI PLMN ID	/pDUSessionChargingInformation/pduSessionInformation/hPlmnId
Serving Network Function ID	Serving Network Function ID	/pDUSessionChargingInformation/pduSessionInformation/servingNetworkFunctionID
Serving CN PLMN ID	Serving CN PLMN ID	/pDUSessionChargingInformation/pduSessionInformation/servingCNPlmnId
RAT Type	RAT Type	/pDUSessionChargingInformation/pduSessionInformation/ratType
Data Network Name Identifier	Data Network Name Identifier	/pDUSessionChargingInformation/pduSessionInformation/dnnid
DNN Selection Mode	DNN Selection Mode	/pDUSessionChargingInformation/pduSessionInformation/dnnselectionMode
Authorized QoS information	Authorized QoS Information	/pDUSessionChargingInformation/pduSessionInformation/authorizedqoSInformation
Subscribed QoS Information	Subscribed QoS Information	/pDUSessionChargingInformation/pduSessionInformation/subscribedQoSInformation
Authorized Session-AMBR	Authorized Session-AMBR	/pDUSessionChargingInformation/pduSessionInformation/authorizedSessionAMBR
Subscribed Session-AMBR	Subscribed Session-AMBR	/pDUSessionChargingInformation/pduSessionInformation/subscribedSessionAMBR
Charging Characteristics	Charging Characteristics	/pDUSessionChargingInformation/pduSessionInformation/chargingCharacteristics
Charging Characteristics Selection Mode	Charging Characteristics Selection Mode	/pDUSessionChargingInformation/pduSessionInformation/chargingCharacteristicsSelectionMode
PDU session start Time	PDU session start Time	/pDUSessionChargingInformation/pduSessionInformation/startTime
PDU session stop Time	PDU session stop Time	/pDUSessionChargingInformation/pduSessionInformation/stopTime
Diagnostics	Diagnostics	/pDUSessionChargingInformation/pduSessionInformation/diagnostics
3GPP PS Data Off Status	3GPP PS Data Off Status	/pDUSessionChargingInformation/pduSessionInformation/3gppPSDataOffStatus
Session Stop Indicator	Session Stop Indicator	/pDUSessionChargingInformation/pduSessionInformation/sessionStopIndicator
Unit Count Inactivity Timer	-	/pDUSessionChargingInformation/unitCountInactivityTimer
RAN Secondary RAT Usage Report	RAN Secondary RAT Usage Report	/pDUSessionChargingInformation/rANSecondaryRATUsageReport
NG RAN Secondary RAT Type	NG RAN Secondary RAT Type	/pDUSessionChargingInformation/rANSecondaryRATUsageReport/rANSecondaryRATType

Qos Flows Usage Reports	Qos Flows Usage Reports	/pDUsessionChargingInformation/rANSecondaryRATUsageReport/qosFlowsUsageReports
Roaming QBC information	Roaming QBC information	/roamingQBCInformation
Multiple QFI container	Multiple QFI container	/roamingQBCInformation/multipleQFIcontainer
Triggers	Triggers	/roamingQBCInformation/multipleQFIcontainer/triggers
Trigger Timestamp	Trigger Timestamp	/roamingQBCInformation/multipleQFIcontainer/triggerTimestamp
Time	Time	/roamingQBCInformation/multipleQFIcontainer/time
Total Volume	Total Volume	/roamingQBCInformation/multipleQFIcontainer/totalVolume
Uplink Volume	Uplink Volume	/roamingQBCInformation/multipleQFIcontainer/uplinkVolume
Downlink Volume	Downlink Volume	/roamingQBCInformation/multipleQFIcontainer/downlinkVolume
Local Sequence Number	Local Sequence Number	/roamingQBCInformation/multipleQFIcontainer/localSequenceNumber
QFI Container information	QFI Container information	/roamingQBCInformation/multipleQFIcontainer/qFIContainerInformation
QoS Flow Id	QoS Flow Id	/roamingQBCInformation/multipleQFIcontainer/qFIContainerInformation/qFI
Time of First Usage	Time of First Usage	/roamingQBCInformation/multipleQFIcontainer/qFIContainerInformation/timeofFirstUsage
Time of Last Usage	Time of Last Usage	/roamingQBCInformation/multipleQFIcontainer/qFIContainerInformation/timeofLastUsage
QoS Information	QoS Information	/roamingQBCInformation/multipleQFIcontainer/qFIContainerInformation/qoSInformation
QoS Characteristics	QoS Characteristics	/roamingQBCInformation/multipleQFIcontainer/qFIContainerInformation/qoSCharacteristics
User Location Information	User Location Information	/roamingQBCInformation/multipleQFIcontainer/qFIContainerInformation/userLocationInformation
UE Time Zone	UE Time Zone	/roamingQBCInformation/multipleQFIcontainer/qFIContainerInformation/ueTimeZone
Presence Reporting Area Information	Presence Reporting Area Information	/roamingQBCInformation/multipleQFIcontainer/qFIContainerInformation/presenceReportingAreaInformation
RAT Type	RAT Type	/roamingQBCInformation/multipleQFIcontainer/qFIContainerInformation/rATType
Report Time	Report Time	/roamingQBCInformation/multipleQFIcontainer/qFIContainerInformation/reportTime
Serving Network Function ID	Serving Network Function ID	/roamingQBCInformation/multipleQFIcontainer/qFIContainerInformation/servingNetworkFunctionID
3GPP PS Data Off Status	3GPP PS Data Off Status	/roamingQBCInformation/multipleQFIcontainer/qFIContainerInformation/3gppPSDataOffStatus
UPF ID	UPF ID	/roamingQBCInformation/upFID
Roaming Charging Profile	Roaming Charging Profile	/roamingQBCInformation/roamingChargingProfile
Trigger	Trigger	/roamingQBCInformation/roamingChargingProfile/trigger
Partial record method	Partial record method	/roamingQBCInformation/roamingChargingProfile/partialRecordMethod
		<b>ChargingDataResponse</b>
Multiple Unit information	-	/multipleUnitInformation
UPF ID	-	/multipleUnitInformation/upFID

## 7.3 Bindings for SMS charging

**Table 7.3-1: Bindings of CDR field, Information Element and Resource Attribute for SMS charging**

Information Element	CDR Field	Resource Attribute
		<b>ChargingDataRequest</b>
SMS Charging Information	SMS Charging Information	/sMSChargingInformation
Originator Info	Originator Info	/sMSChargingInformation/originatorInfo
Originator SUPI	Originator SUPI	/sMSChargingInformation/originatorInfo/originatorSUPI
Originator GPSI	Originator GPSI	/sMSChargingInformation/originatorInfo/originatorGPSI
Originator Other Address	Originator Other Address	/sMSChargingInformation/originatorInfo/originatorOtherAddress
Originator Received Address	Originator Received Address	/sMSChargingInformation/originatorInfo/originatorReceivedAddress
Originator SCCP Address	Originator SCCP Address	/sMSChargingInformation/originatorInfo/originatorSCCPAddress
SM Originator Interface	SM Originator Interface	/sMSChargingInformation/originatorInfo/sMOriginatorInterface
SM Originator Protocol Id	SM Originator Protocol Id	/sMSChargingInformation/originatorInfo/sMOriginatorProtocolId
Recipient Info	Recipient Info	/sMSChargingInformation/recipientInfo
Recipient SUPI	Recipient SUPI	/sMSChargingInformation/recipientInfo/recipientSUPI
Recipient GPSI	Recipient GPSI	/sMSChargingInformation/recipientInfo/recipientGPSI
Recipient Other Address	Recipient Other Address	/sMSChargingInformation/recipientInfo/recipientOtherAddress
Recipient Received Address	Recipient Received Address	/sMSChargingInformation/recipientInfo/recipientReceivedAddress
Recipient SCCP Address	Recipient SCCP Address	/sMSChargingInformation/recipientInfo/recipientSCCPAddress
SM Destination Interface	SM Destination Interface	/sMSChargingInformation/recipientInfo/sMDestinationInterface
SM Recipient Protocol Id	SM Recipient Protocol Id	/sMSChargingInformation/recipientInfo/sMRecipientProtocolId
User Equipment Info	User Equipment Info	/sMSChargingInformation/userEquipmentInfo
User Location Info	User Location Info	/sMSChargingInformation/userLocationInfo
UE Time Zone	UE Time Zone	/sMSChargingInformation/ueTimeZone
RAT Type	RAT Type	/sMSChargingInformation/rATType
SMSC Address	SMSC Address	/sMSChargingInformation/sMSCAddress
SM Data Coding Scheme	SM Data Coding Scheme	/sMSChargingInformation/sMDataCodingScheme
SM Message Type	SM Message Type	/sMSChargingInformation/sMMessageType
SM Reply Path Requested	SM Reply Path Requested	/sMSChargingInformation/sMReplyPathRequested
SM User Data Header	SM User Data Header	/sMSChargingInformation/sMUserDataHeader
SM Status	SM Status	/sMSChargingInformation/sMStatus
SM Discharge Time	SM Discharge Time	/sMSChargingInformation/sMDischargeTime
Number of Messages Sent	Number of Messages Sent	/sMSChargingInformation/numberOfMessagesSent
SM Service Type	SM Service Type	/sMSChargingInformation/sMServiceType
SM Sequence Number	SM Sequence Number	/sMSChargingInformation/sMSequenceNumber
SMS result	SMS result	/sMSChargingInformation/sMSresult
Submission Time	Submission Time	/sMSChargingInformation/submissionTime
SM Priority	SM Priority	/sMSChargingInformation/sMPriority
Message Reference	Message Reference	/sMSChargingInformation/messageReference
Message Size	Message Size	/sMSChargingInformation/messageSize
Message Class	Message Class	/sMSChargingInformation/messageClass
Delivery Report Requested	Delivery Report Requested	/sMSChargingInformation/deliveryReportRequested
		<b>ChargingDataResponse</b>
-	-	-

## 7.4 Bindings for 5G connection and mobility

**Table 7.4-1: Bindings of 5G 5G connection and mobility CDR field, Information Element and Resource Attribute**

Information Element	CDR Field	Resource Attribute
		<b>ChargingDataRequest</b>
Registration Charging Information	Registration Charging Information	/registrationChargingInformation
Registration message type	Registration message type	/registrationChargingInformation/registrationMessage type
User Information	User Information	/registrationChargingInformation/userInformation
User Identifier	User Identifier	/registrationChargingInformation/userInformation/servedGPSI
User Equipment Info	User Equipment Info	/registrationChargingInformation/userInformation/servedPEI
unauthenticatedFlag	unauthenticatedFlag	/registrationChargingInformation/userInformation/unauthenticatedFlag
User Location Information	User Location Information	/registrationChargingInformation/userLocationinfo
UE Time Zone	UE Time Zone	/registrationChargingInformation/uetimeZone
RAT Type	RAT Type	/registrationChargingInformation/rATType
5GMM Capability	5GMM Capability	/registrationChargingInformation/5gMMCapability
MICO Mode Indication	MICO Mode Indication	/registrationChargingInformation/mICOModeIndication
SMS Supported Indication	SMS Supported Indication	/registrationChargingInformation/smsIndication
TAI List	TAI List	/registrationChargingInformation/taiList
Service Area Restrictions	Service Area Restrictions	/registrationChargingInformation/serviceAreaRestriction
Requested NSSAI	Requested NSSAI	/registrationChargingInformation/requestedNSSAI
Allowed NSSAI	Allowed NSSAI	/registrationChargingInformation/allowedNssai
Rejected NSSAI	Rejected NSSAI	/registrationChargingInformation/rejectedNSSAI
N2 Connection Charging Information	N2 Connection Charging Information	/n2ConnectionChargingInformation
N2 Connection message type	N2 Connection message type	/n2ConnectionChargingInformation/n2ConnectionMessageType
User Information	User Information	/registrationChargingInformation/userInformation
User Identifier	User Identifier	/n2ConnectionChargingInformation/userInformation/servedGPSI
User Equipment Info	User Equipment Info	/n2ConnectionChargingInformation/userInformation/servedPEI
unauthenticatedFlag	unauthenticatedFlag	/n2ConnectionChargingInformation/userInformation/unauthenticatedFlag
User Location Information	User Location Information	/n2ConnectionChargingInformation/userLocationinfo
UE Time Zone	UE Time Zone	/n2ConnectionChargingInformation/uetimeZone
RAT Type	RAT Type	/n2ConnectionChargingInformation/rATType
AMF UE NGAP ID	AMF UE NGAP ID	/n2ConnectionChargingInformation/amfUeNgapId
RAN UE NGAP ID	RAN UE NGAP ID	/n2ConnectionChargingInformation/ranUeNgapId
RAN Node Id	RAN Node Id	/n2ConnectionChargingInformation/ranNodeId
Mobility Restrictions	Mobility Restrictions	/n2ConnectionChargingInformation/restrictedRatList /n2ConnectionChargingInformation/forbiddenAreaList /n2ConnectionChargingInformation/serviceAreaRestriction /n2ConnectionChargingInformation/restrictedCnList
Allowed NSSAI	Allowed NSSAI	/n2ConnectionChargingInformation/allowedNssai
RRC Establishment Cause	RRC Establishment Cause	/n2ConnectionChargingInformation/rrcEstCause
Location Reporting Charging Information	Location Reporting Charging Information	/locationReportingChargingInformation

N2 Connection message type	N2 Connection message type	/locationReportingChargingInformation/n2ConnectionMessageType
User Information	User Information	/locationReportingChargingInformation/userInformation
User Identifier	User Identifier	/locationReportingChargingInformation/userInformation/servedGPSI
User Equipment Info	User Equipment Info	/locationReportingChargingInformation/userInformation/servedPEI
unauthenticatedFlag	unauthenticatedFlag	/locationReportingChargingInformation/userInformation/unauthenticatedFlag
User Location Information	User Location Information	/locationReportingChargingInformation/userLocationInfo
UE Time Zone	UE Time Zone	/locationReportingChargingInformation/ueTimeZone
Presence Reporting Area Information	Presence Reporting Area Information	/locationReportingChargingInformation/presenceReportingAreaInformation
RAT Type	RAT Type	/n2ConnectionChargingInformation/rATType
		<b>ChargingDataResponse</b>
-	-	-

## 7.5 Bindings for Exposure Function Northbound API charging

**Table 7.5-1: Bindings of CDR field, Information Element and Resource Attribute for Exposure Function Northbound API charging**

Information Element	CDR Field	Resource Attribute
		<b>ChargingDataRequest</b>
Exposure Function API Information	Exposure Function API Information	/nEFChargingInformation
External Identifier	Group Identifier	/nEFChargingInformation/groupIdentifier
API Direction	API Direction	/nEFChargingInformation/aPIDirection
API Target Network Function	API Target Network Function	/nEFChargingInformation/aPITargetNetworkFunction
API Result Code	API Result Code	/nEFChargingInformation/aPIResultCode
API Name	API Name	/nEFChargingInformation/aPIName
API Reference	API Reference	/nEFChargingInformation/aPIReference
API Content	API Content	/nEFChargingInformation/aPIContent
		<b>ChargingDataResponse</b>
-	-	-

## 8 Security

Security aspects for service based interface shall be supported as specified in subclause 13 of 3GPP TS 33.501 [390].

# Annex A (normative): OpenAPI specification

## A.1 General

The present Annex contains two OpenAPIs [500] specification of HTTP messages and content bodies used by the Nchf\_ConvergedCharging API and Nchf\_OfflineOnlyCharging API.

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 document are available on a Git-based repository hosted in ETSI Forge, that uses the GitLab software version control system (see clause 5B of the 3GPP TR 21.900 [101] for further information).

## A.2 Nchf\_ConvergedCharging API

```

openapi: 3.0.0
info:
  title: Nchf_ConvergedCharging
  version: 3.0.0.alpha-4
  description: |
    ConvergedCharging Service © 2019, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI,
    TSDSI, TTA, TTC).
    All rights reserved.
externalDocs:
  description: >
    3GPP TS 32.291 V16.4.0: Telecommunication management; Charging management;
    5G system, charging service; Stage 3.
  url: 'http://www.3gpp.org/ftp/Specs/archive/32_series/32.291/'
servers:
- url: '{apiRoot}/nchf-convergedcharging/v3'
  variables:
    apiRoot:
      default: https://example.com
      description: apiRoot as defined in subclause 4.4 of 3GPP TS 29.501.
paths:
  /chargingdata:
    post:
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/ChargingDataRequest'
      responses:
        '201':
          description: Created
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/ChargingDataResponse'
        '400':
          description: Bad request
          content:
            application/problem+json:
              schema:
                $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
        '403':
          description: Forbidden
          content:
            application/problem+json:
              schema:
                $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
        '404':

```



```

description: Not Found
content:
  application/problem+json:
    schema:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
'401':
  $ref: 'TS29571_CommonData.yaml#/components/responses/401'
'410':
  $ref: 'TS29571_CommonData.yaml#/components/responses/410'
'411':
  $ref: 'TS29571_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29571_CommonData.yaml#/components/responses/413'
'500':
  $ref: 'TS29571_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29571_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29571_CommonData.yaml#/components/responses/default'
callbacks:
  chargingNotification:
    '{$request.body#/notifyUri}':
      post:
        requestBody:
          required: true
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/ChargingNotifyRequest'
        responses:
          '204':
            description: 'No Content, Notification was succesfull'
          '400':
            description: Bad request
            content:
              application/problem+json:
                schema:
                  $ref: >-
                    TS29571_CommonData.yaml#/components/schemas/ProblemDetails
            default:
              $ref: 'TS29571_CommonData.yaml#/components/responses/default'
'/chargingdata/{ChargingDataRef}/update':
  post:
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/ChargingDataRequest'
  parameters:
    - name: ChargingDataRef
      in: path
      description: a unique identifier for a charging data resource in a PLMN
      required: true
      schema:
        type: string
  responses:
    '200':
      description: OK. Updated Charging Data resource is returned
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/ChargingDataResponse'
    '400':
      description: Bad request
      content:
        application/problem+json:
          schema:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
    '403':
      description: Forbidden
      content:
        application/problem+json:
          schema:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
    '404':
      description: Not Found
      content:

```

```

    application/problem+json:
      schema:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
  '401':
    $ref: 'TS29571_CommonData.yaml#/components/responses/401'
  '410':
    $ref: 'TS29571_CommonData.yaml#/components/responses/410'
  '411':
    $ref: 'TS29571_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29571_CommonData.yaml#/components/responses/413'
  '500':
    $ref: 'TS29571_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29571_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29571_CommonData.yaml#/components/responses/default'
'/chargingdata/{ChargingDataRef}/release':
  post:
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/ChargingDataRequest'
    parameters:
      - name: ChargingDataRef
        in: path
        description: a unique identifier for a charging data resource in a PLMN
        required: true
        schema:
          type: string
    responses:
      '204':
        description: No Content.
      '404':
        description: Not Found
        content:
          application/problem+json:
            schema:
              $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
      '401':
        $ref: 'TS29571_CommonData.yaml#/components/responses/401'
      '410':
        $ref: 'TS29571_CommonData.yaml#/components/responses/410'
      '411':
        $ref: 'TS29571_CommonData.yaml#/components/responses/411'
      '413':
        $ref: 'TS29571_CommonData.yaml#/components/responses/413'
      '500':
        $ref: 'TS29571_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29571_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29571_CommonData.yaml#/components/responses/default'
components:
  schemas:
    ChargingDataRequest:
      type: object
      properties:
        subscriberIdentifier:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Supi'
        nfConsumerIdentification:
          $ref: '#/components/schemas/NFIdentification'
        invocationTimeStamp:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
        invocationSequenceNumber:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/UInt32'
        retransmissionIndicator:
          type: boolean
        oneTimeEvent:
          type: boolean
        oneTimeEventType:
          $ref: '#/components/schemas/oneTimeEventType'
        notifyUri:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
        supportedFeatures:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'

```

```

serviceSpecificationInfo:
  type: string
multipleUnitUsage:
  type: array
  items:
    $ref: '#/components/schemas/MultipleUnitUsage'
  minItems: 0
triggers:
  type: array
  items:
    $ref: '#/components/schemas/Trigger'
  minItems: 0
pDUSSessionChargingInformation:
  $ref: '#/components/schemas/PDUSSessionChargingInformation'
roamingQBCInformation:
  $ref: '#/components/schemas/RoamingQBCInformation'
SMSChargingInformation:
  $ref: '#/components/schemas/SMSChargingInformation'
NEFChargingInformation:
  $ref: '#/components/schemas/NEFChargingInformation'
registrationChargingInformation:
  $ref: '#/components/schemas/RegistrationChargingInformation'
n2ConnectionChargingInformation:
  $ref: '#/components/schemas/N2ConnectionChargingInformation'
locationReportingChargingInformation:
  $ref: '#/components/schemas/LocationReportingChargingInformation'
required:
  - nfConsumerIdentification
  - invocationTimeStamp
  - invocationSequenceNumber
ChargingDataResponse:
  type: object
  properties:
    invocationTimeStamp:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    invocationSequenceNumber:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
    invocationResult:
      $ref: '#/components/schemas/InvocationResult'
    sessionFailover:
      $ref: '#/components/schemas/SessionFailover'
    supportedFeatures:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    multipleUnitInformation:
      type: array
      items:
        $ref: '#/components/schemas/MultipleUnitInformation'
      minItems: 0
    triggers:
      type: array
      items:
        $ref: '#/components/schemas/Trigger'
      minItems: 0
    pDUSSessionChargingInformation:
      $ref: '#/components/schemas/PDUSSessionChargingInformation'
    roamingQBCInformation:
      $ref: '#/components/schemas/RoamingQBCInformation'
  required:
    - invocationTimeStamp
    - invocationSequenceNumber
ChargingNotifyRequest:
  type: object
  properties:
    notificationType:
      $ref: '#/components/schemas/NotificationType'
    reauthorizationDetails:
      type: array
      items:
        $ref: '#/components/schemas/ReauthorizationDetails'
      minItems: 0
  required:
    - notificationType
ChargingNotifyResponse:
  type: object
  properties:
    invocationResult:
      $ref: '#/components/schemas/InvocationResult'
NFIdentification:

```

```

type: object
properties:
  nFName:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
  nFIPv4Address:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv4Addr'
  nFIPv6Address:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Addr'
  nFPLMNID:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnId'
  nodeFunctionality:
    $ref: '#/components/schemas/NodeFunctionality'
  nFFqdn:
    type: string
required:
  - nodeFunctionality
MultipleUnitUsage:
type: object
properties:
  ratingGroup:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/RatingGroup'
  requestedUnit:
    $ref: '#/components/schemas/RequestedUnit'
  usedUnitContainer:
    type: array
    items:
      $ref: '#/components/schemas/UsedUnitContainer'
    minItems: 0
  uPFID:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
required:
  - ratingGroup
InvocationResult:
type: object
properties:
  error:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
  failureHandling:
    $ref: '#/components/schemas/FailureHandling'
Trigger:
type: object
properties:
  triggerType:
    $ref: '#/components/schemas/TriggerType'
  triggerCategory:
    $ref: '#/components/schemas/TriggerCategory'
  timeLimit:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
  volumeLimit:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
  volumeLimit64:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
  maxNumberOfccc:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
required:
  - triggerType
  - triggerCategory
MultipleUnitInformation:
type: object
properties:
  resultCode:
    $ref: '#/components/schemas/ResultCode'
  ratingGroup:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/RatingGroup'
  grantedUnit:
    $ref: '#/components/schemas/GrantedUnit'
  triggers:
    type: array
    items:
      $ref: '#/components/schemas/Trigger'
    minItems: 0
  validityTime:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
  quotaHoldingTime:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
  finalUnitIndication:
    $ref: '#/components/schemas/FinalUnitIndication'
  timeQuotaThreshold:

```

```

    type: integer
  volumeQuotaThreshold:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
  unitQuotaThreshold:
    type: integer
  uPFID:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
  required:
  - ratingGroup
RequestedUnit:
  type: object
  properties:
    time:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
    totalVolume:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
    uplinkVolume:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
    downlinkVolume:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
    serviceSpecificUnits:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
UsedUnitContainer:
  type: object
  properties:
    serviceId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/ServiceId'
    quotaManagementIndicator:
      $ref: '#/components/schemas/QuotaManagementIndicator'
    triggers:
      type: array
      items:
        $ref: '#/components/schemas/Trigger'
      minItems: 0
    triggerTimestamp:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    time:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
    totalVolume:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
    uplinkVolume:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
    downlinkVolume:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
    serviceSpecificUnits:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
    eventTimeStamps:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    localSequenceNumber:
      type: integer
    pduContainerInformation:
      $ref: '#/components/schemas/PDUContainerInformation'
  required:
  - localSequenceNumber
GrantedUnit:
  type: object
  properties:
    tariffTimeChange:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    time:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
    totalVolume:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
    uplinkVolume:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
    downlinkVolume:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
    serviceSpecificUnits:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
FinalUnitIndication:
  type: object
  properties:
    finalUnitAction:
      $ref: '#/components/schemas/FinalUnitAction'
    restrictionFilterRule:
      $ref: '#/components/schemas/IPFilterRule'
    filterId:
      type: string

```

```

    redirectServer:
      $ref: '#/components/schemas/RedirectServer'
    required:
      - finalUnitAction
  RedirectServer:
    type: object
    properties:
      redirectAddressType:
        $ref: '#/components/schemas/RedirectAddressType'
      redirectServerAddress:
        type: string
    required:
      - redirectAddressType
      - redirectServerAddress
  ReauthorizationDetails:
    type: object
    properties:
      serviceId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ServiceId'
      ratingGroup:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/RatingGroup'
      quotaManagementIndicator:
        $ref: '#/components/schemas/QuotaManagementIndicator'
  PDUSessionChargingInformation:
    type: object
    properties:
      chargingId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ChargingId'
      homeProvidedChargingId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ChargingId'
      userInformation:
        $ref: '#/components/schemas/UserInformation'
      userLocationInfo:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
      presenceReportingAreaInformation:
        type: object
        additionalProperties:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/PresenceInfo'
        minProperties: 0
      ueTimeZone:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/TimeZone'
      pduSessionInformation:
        $ref: '#/components/schemas/PDUSessionInformation'
      unitCountInactivityTimer:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
      rANSecondaryRATUsageReport:
        $ref: '#/components/schemas/RANSecondaryRATUsageReport'
  UserInformation:
    type: object
    properties:
      servedGPSI:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
      servedPEI:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Pei'
      unauthenticatedFlag:
        type: boolean
      roamerInOut:
        $ref: '#/components/schemas/RoamerInOut'
  PDUSessionInformation:
    type: object
    properties:
      networkSlicingInfo:
        $ref: '#/components/schemas/NetworkSlicingInfo'
      pduSessionID:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/PduSessionId'
      pduType:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/PduSessionType'
      sscMode:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ScsMode'
      hPlmnId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnId'
      servingNetworkFunctionID:
        $ref: '#/components/schemas/ServingNetworkFunctionID'
      ratType:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
      dnnId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
      dnnSelectionMode:

```

```

    $ref: '#/components/schemas/dnnSelectionMode'
  chargingCharacteristics:
    type: string
  chargingCharacteristicsSelectionMode:
    $ref: '#/components/schemas/ChargingCharacteristicsSelectionMode'
  startTime:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
  stopTime:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
  3gppPSDataOffStatus:
    $ref: '#/components/schemas/3GPPPSDataOffStatus'
  sessionStopIndicator:
    type: boolean
  pduAddress:
    $ref: '#/components/schemas/PDUAddress'
  diagnostics:
    $ref: '#/components/schemas/Diagnostics'
  authorizedQoSInformation:
    $ref: 'TS29512_Npcf_SMPolicyControl.yaml#/components/schemas/AuthorizedDefaultQos'
  subscribedQoSInformation:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/SubscribedDefaultQos'
  authorizedSessionAMBR:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Ambr'
  subscribedSessionAMBR:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Ambr'
  servingCNPlmnId:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnId'
  required:
    - pduSessionID
    - dnnId
PDUContainerInformation:
  type: object
  properties:
    timeOfFirstUsage:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    timeOfLastUsage:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    qosInformation:
      $ref: 'TS29512_Npcf_SMPolicyControl.yaml#/components/schemas/QosData'
    qosCharacteristics:
      $ref: 'TS29512_Npcf_SMPolicyControl.yaml#/components/schemas/QosCharacteristics'
    afChargingIdentifier:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/ChargingId'
    userLocationInformation:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
    ueTimeZone:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/TimeZone'
    rATType:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
    servingNodeID:
      type: array
      items:
        $ref: '#/components/schemas/ServingNetworkFunctionID'
      minItems: 0
    presenceReportingAreaInformation:
      type: object
      additionalProperties:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/PresenceInfo'
      minProperties: 0
    3gppPSDataOffStatus:
      $ref: '#/components/schemas/3GPPPSDataOffStatus'
    sponsorIdentity:
      type: string
    applicationServiceProviderIdentity:
      type: string
    chargingRuleBaseName:
      type: string
NetworkSlicingInfo:
  type: object
  properties:
    sNSSAI:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
  required:
    - sNSSAI
PDUAddress:
  type: object
  properties:
    pduIPv4Address:

```

```

    $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv4Addr'
  pduIPv6AddresswithPrefix:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Addr'
  pduAddressprefixlength:
    type: integer
  ipv4dynamicAddressFlag:
    type: boolean
  ipv6dynamicPrefixFlag:
    type: boolean
  ServingNetworkFunctionID:
    type: object
  properties:

    servingNetworkFunctionInformation:
      $ref: '#/components/schemas/NFIdentification'
    amFid:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/AmfId'
  required:
    - servingNetworkFunctionInformation
RoamingQBCInformation:
  type: object
  properties:
    multipleQFIcontainer:
      type: array
      items:
        $ref: '#/components/schemas/MultipleQFIcontainer'
      minItems: 0
    uPFID:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
    roamingChargingProfile:
      $ref: '#/components/schemas/RoamingChargingProfile'
MultipleQFIcontainer:
  type: object
  properties:
    triggers:
      type: array
      items:
        $ref: '#/components/schemas/Trigger'
      minItems: 0
    triggerTimestamp:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    time:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
    totalVolume:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
    uplinkVolume:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
    downlinkVolume:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
    localSequenceNumber:
      type: integer
    qFIContainerInformation:
      $ref: '#/components/schemas/QFIContainerInformation'
  required:
    - localSequenceNumber
QFIContainerInformation:
  type: object
  properties:
    qFI:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Qfi'
    reportTime:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    timeofFirstUsage:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    timeofLastUsage:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    qosInformation:
      $ref: 'TS29512_Npcf_SMPolicyControl.yaml#/components/schemas/QosData'
    qosCharacteristics:
      $ref: 'TS29512_Npcf_SMPolicyControl.yaml#/components/schemas/QosCharacteristics'
    userLocationInformation:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
    uetimeZone:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/TimeZone'
    presenceReportingAreaInformation:
      type: object
    additionalProperties:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PresenceInfo'

```



```

    minProperties: 0
  rATType:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
  servingNetworkFunctionID:
    type: array
    items:
      $ref: '#/components/schemas/ServingNetworkFunctionID'
    minItems: 0
  3gppPSDataOffStatus:
    $ref: '#/components/schemas/3GPPPSDataOffStatus'
  3gppChargingId:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/ChargingId'
  diagnostics:
    $ref: '#/components/schemas/Diagnostics'
  enhancedDiagnostics:
    type: array
    items:
      type: string
  required:
    - reportTime
  RoamingChargingProfile:
    type: object
    properties:
      triggers:
        type: array
        items:
          $ref: '#/components/schemas/Trigger'
        minItems: 0
      partialRecordMethod:
        $ref: '#/components/schemas/PartialRecordMethod'
  SMSChargingInformation:
    type: object
    properties:
      originatorInfo:
        $ref: '#/components/schemas/OriginatorInfo'
      recipientInfo:
        type: array
        items:
          $ref: '#/components/schemas/RecipientInfo'
        minItems: 0
      userEquipmentInfo:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Pei'
      userLocationInfo:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
      ueTimeZone:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/TimeZone'
      rATType:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
      SMSCAddress:
        type: string
      SMDataCodingScheme:
        type: integer
      SMMessageType:
        $ref: '#/components/schemas/SMMMessageType'
      SMReplyPathRequested:
        $ref: '#/components/schemas/ReplyPathRequested'
      SMUserDataHeader:
        type: string
      SMStatus:
        type: string
      SMDischargeTime:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
      numberOfMessagesSent:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
      SMSServiceType:
        $ref: '#/components/schemas/SMSServiceType'
      SMSequenceNumber:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
      SMSresult:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
      submissionTime:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
      SMPriority:
        $ref: '#/components/schemas/SMPriority'
      messageReference:
        type: string
      messageSize:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'

```

```

    messageClass:
      $ref: '#/components/schemas/MessageClass'
    deliveryReportRequested:
      $ref: '#/components/schemas/DeliveryReportRequested'
  OriginatorInfo:
    type: object
    properties:
      originatorSUPI:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Supi'
      originatorGPSI:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
      originatorOtherAddress:
        $ref: '#/components/schemas/SMAddressInfo'
      originatorReceivedAddress:
        $ref: '#/components/schemas/SMAddressInfo'
      originatorSCCPAddress:
        type: string
      SMOriginatorInterface:
        $ref: '#/components/schemas/SMInterface'
      SMOriginatorProtocolId:
        type: string
  RecipientInfo:
    type: object
    properties:
      recipientSUPI:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Supi'
      recipientGPSI:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
      recipientOtherAddress:
        $ref: '#/components/schemas/SMAddressInfo'
      recipientReceivedAddress:
        $ref: '#/components/schemas/SMAddressInfo'
      recipientSCCPAddress:
        type: string
      SMDestinationInterface:
        $ref: '#/components/schemas/SMInterface'
      SMRecipientProtocolId:
        type: string
  SMAddressInfo:
    type: object
    properties:
      SMAddressType:
        $ref: '#/components/schemas/SMAddressType'
      SMAddressData:
        type: string
      SMAddressDomain:
        $ref: '#/components/schemas/SMAddressDomain'
  RecipientAddress:
    type: object
    properties:
      recipientAddressInfo:
        $ref: '#/components/schemas/SMAddressInfo'
      SMAddresseeType:
        $ref: '#/components/schemas/SMAddresseeType'
  MessageClass:
    type: object
    properties:
      classIdentifier:
        $ref: '#/components/schemas/ClassIdentifier'
      tokenText:
        type: string
  SMAddressDomain:
    type: object
    properties:
      domainName:
        type: string
      3GPPIMSIMCCMNC:
        type: string
  SMInterface:
    type: object
    properties:
      interfaceId:
        type: string
      interfaceText:
        type: string
      interfacePort:
        type: string
      interfaceType:

```

```

    $ref: '#/components/schemas/InterfaceType'
RANSecondaryRATUsageReport:
  type: object
  properties:
    rANSecondaryRATType:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
    qosFlowsUsageReports:
      type: array
      items:
        $ref: '#/components/schemas/QosFlowsUsageReport'
Diagnostics:
  type: integer
IPFilterRule:
  type: string
QosFlowsUsageReport:
  type: object
  properties:
    qFI:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Qfi'
    startTimestamp:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    endTimestamp:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    uplinkVolume:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInt64'
    downlinkVolume:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInt64'
NEFChargingInformation:
  type: object
  properties:
    groupIdentifier:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/GroupId'
    apiDirection:
      $ref: '#/components/schemas/APIDirection'
    apiTargetNetworkFunction:
      $ref: '#/components/schemas/NFIdentification'
    apiResultCode:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInt32'
    apiName:
      type: string
    apiReference:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
    apiContent:
      type: string
  required:
    - apiName
RegistrationChargingInformation:
  type: object
  properties:
    registrationMessagetype:
      $ref: '#/components/schemas/RegistrationMessageType'
    userInformation:
      $ref: '#/components/schemas/UserInformation'
    userLocationInfo:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
    ueTimeZone:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/TimeZone'
    rATType:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
    5GMMCapability:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Bytes'
    miCOModeIndication:
      $ref: '#/components/schemas/MICOModeIndication'
    smsIndication:
      $ref: '#/components/schemas/SmsIndication'
    tailList:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Tai'
      minItems: 0
    serviceAreaRestriction:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ServiceAreaRestriction'
      minItems: 0
    requestedNSSAI:
      type: array
      items:

```

```

    $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
    minItems: 0
  allowedNSSAI:
    type: array
    items:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
    minItems: 0
  rejectedNSSAI:
    type: array
    items:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
    minItems: 0
  required:
  - registrationMessagetype
N2ConnectionChargingInformation:
  type: object
  properties:
    n2ConnectionMessageType:
      $ref: '#/components/schemas/N2ConnectionMessageType'
    userInformation:
      $ref: '#/components/schemas/UserInformation'
    userLocationInfo:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
    ueTimeZone:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/TimeZone'
    ratType:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
    amfUeNgapId:
      type: integer
    ranUeNgapId:
      type: integer
    ranNodeId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/GlobalRanNodeId'
    restrictedRatList:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
      minItems: 0
    forbiddenAreaList:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Area'
      minItems: 0
    serviceAreaRestriction:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ServiceAreaRestriction'
      minItems: 0
    restrictedCnList:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/CoreNetworkType'
      minItems: 0
    allowedNSSAI:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
      minItems: 0
    rrcEstCause:
      type: string
      pattern: '^([0-9a-fA-F])+$'
  required:
  - n2ConnectionMessageType
LocationReportingChargingInformation:
  type: object
  properties:
    locationReportingMessageType:
      $ref: '#/components/schemas/LocationReportingMessageType'
    userInformation:
      $ref: '#/components/schemas/UserInformation'
    userLocationInfo:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
    ueTimeZone:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/TimeZone'
    ratType:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
    presenceReportingAreaInformation:
      type: object

```

```

    additionalProperties:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PresenceInfo'
    minProperties: 0
  required:
    - locationReportingMessageType
N2ConnectionMessageType:
  type: integer
LocationReportingMessageType:
  type: integer
NotificationType:
  anyOf:
    - type: string
      enum:
        - REAUTHORIZATION
        - ABORT_CHARGING
    - type: string
NodeFunctionality:
  anyOf:
    - type: string
      enum:
        - AMF
        - SMF
        - SMSF
        - SGW
        - I_SMF
    - type: string
ChargingCharacteristicsSelectionMode:
  anyOf:
    - type: string
      enum:
        - HOME_DEFAULT
        - ROAMING_DEFAULT
        - VISITING_DEFAULT
    - type: string
TriggerType:
  anyOf:
    - type: string
      enum:
        - QUOTA_THRESHOLD
        - QHT
        - FINAL
        - QUOTA_EXHAUSTED
        - VALIDITY_TIME
        - OTHER_QUOTA_TYPE
        - FORCED_REAUTHORISATION
        - UNUSED_QUOTA_TIMER # Included for backwards compatibility, shall not be used
        - UNIT_COUNT_INACTIVITY_TIMER
        - ABNORMAL_RELEASE
        - QOS_CHANGE
        - VOLUME_LIMIT
        - TIME_LIMIT
        - EVENT_LIMIT
        - PLMN_CHANGE
        - USER_LOCATION_CHANGE
        - RAT_CHANGE
        - SESSION_AMBR_CHANGE
        - UE_TIMEZONE_CHANGE
        - TARIFF_TIME_CHANGE
        - MAX_NUMBER_OF_CHANGES_IN_CHARGING_CONDITIONS
        - MANAGEMENT_INTERVENTION
        - CHANGE_OF_UE_PRESENCE_IN_PRESENCE_REPORTING_AREA
        - CHANGE_OF_3GPP_PS_DATA_OFF_STATUS
        - SERVING_NODE_CHANGE
        - REMOVAL_OF_UPF
        - ADDITION_OF_UPF
        - INSERTION_OF_ISMF
        - REMOVAL_OF_ISMF
        - CHANGE_OF_ISMF
        - START_OF_SERVICE_DATA_FLOW
        - ECGI_CHANGE
        - TAI_CHANGE
        - HANDOVER_CANCEL
        - HANDOVER_START
        - HANDOVER_COMPLETE
        - GFBR_GUARANTEED_STATUS_CHANGE
    - type: string
FinalUnitAction:
  anyOf:

```

```
- type: string
  enum:
    - TERMINATE
    - REDIRECT
    - RESTRICT_ACCESS
- type: string
RedirectAddressType:
  anyOf:
    - type: string
      enum:
        - IPV4
        - IPV6
        - URL
    - type: string
TriggerCategory:
  anyOf:
    - type: string
      enum:
        - IMMEDIATE_REPORT
        - DEFERRED_REPORT
    - type: string
QuotaManagementIndicator:
  anyOf:
    - type: string
      enum:
        - ONLINE_CHARGING
        - OFFLINE_CHARGING
    - type: string
FailureHandling:
  anyOf:
    - type: string
      enum:
        - TERMINATE
        - CONTINUE
        - RETRY_AND_TERMINATE
    - type: string
SessionFailover:
  anyOf:
    - type: string
      enum:
        - FAILOVER_NOT_SUPPORTED
        - FAILOVER_SUPPORTED
    - type: string
3GPPPSDataOffStatus:
  anyOf:
    - type: string
      enum:
        - ACTIVE
        - INACTIVE
    - type: string
ResultCode:
  anyOf:
    - type: string
      enum:
        - SUCCESS
        - END_USER_SERVICE_DENIED
        - QUOTA_MANAGEMENT_NOT_APPLICABLE
        - QUOTA_LIMIT_REACHED
        - END_USER_SERVICE_REJECTED
        - USER_UNKNOWN
        - RATING_FAILED
    - type: string
PartialRecordMethod:
  anyOf:
    - type: string
      enum:
        - DEFAULT
        - INDIVIDUAL
    - type: string
RoamerInOut:
  anyOf:
    - type: string
      enum:
        - IN_BOUND
        - OUT_BOUND
    - type: string
SMMessageType:
  anyOf:
```

```

- type: string
  enum:
    - SUBMISSION
    - DELIVERY_REPORT
    - SM_SERVICE_REQUEST
- type: string
SMPriority:
  anyOf:
    - type: string
      enum:
        - LOW
        - NORMAL
        - HIGH
    - type: string
DeliveryReportRequested:
  anyOf:
    - type: string
      enum:
        - YES
        - NO
    - type: string
InterfaceType:
  anyOf:
    - type: string
      enum:
        - UNKNOWN
        - MOBILE_ORIGINATING
        - MOBILE_TERMINATING
        - APPLICATION_ORIGINATING
        - APPLICATION_TERMINATING
    - type: string
ClassIdentifier:
  anyOf:
    - type: string
      enum:
        - PERSONAL
        - ADVERTISEMENT
        - INFORMATIONAL
        - AUTO
    - type: string
SMAddressType:
  anyOf:
    - type: string
      enum:
        - EMAIL_ADDRESS
        - MSISDN
        - IPV4_ADDRESS
        - IPV6_ADDRESS
        - NUMERIC_SHORTCODE
        - ALPHANUMERIC_SHORTCODE
        - OTHER
        - IMSI
    - type: string
SMAddresseeType:
  anyOf:
    - type: string
      enum:
        - TO
        - CC
        - BCC
    - type: string
SMServiceType:
  anyOf:
    - type: string
      enum:
        - VAS4SMS_SHORT_MESSAGE_CONTENT_PROCESSING
        - VAS4SMS_SHORT_MESSAGE_FORWARDING
        - VAS4SMS_SHORT_MESSAGE_FORWARDING_MULTIPLE_SUBSCRIPTIONS
        - VAS4SMS_SHORT_MESSAGE_FILTERING
        - VAS4SMS_SHORT_MESSAGE_RECEIPT
        - VAS4SMS_SHORT_MESSAGE_NETWORK_STORAGE
        - VAS4SMS_SHORT_MESSAGE_TO_MULTIPLE_DESTINATIONS
        - VAS4SMS_SHORT_MESSAGE_VIRTUAL_PRIVATE_NETWORK(VPN)
        - VAS4SMS_SHORT_MESSAGE_AUTO_REPLY
        - VAS4SMS_SHORT_MESSAGE_PERSONAL_SIGNATURE
        - VAS4SMS_SHORT_MESSAGE_DEFERRED_DELIVERY
    - type: string
ReplyPathRequested:

```

```

anyOf:
  - type: string
    enum:
      - NO_REPLY_PATH_SET
      - REPLY_PATH_SET
  - type: string
oneTimeEventType:
anyOf:
  - type: string
    enum:
      - IEC
      - PEC
  - type: string
dnnSelectionMode:
anyOf:
  - type: string
    enum:
      - VERIFIED
      - UE_DNN_NOT_VERIFIED
      - NW_DNN_NOT_VERIFIED
  - type: string
APIDirection:
anyOf:
  - type: string
    enum:
      - INVOCATION
      - NOTIFICATION
  - type: string
RegistrationMessageType:
anyOf:
  - type: string
    enum:
      - INITIAL
      - MOBILITY
      - PERIODIC
      - EMERGENCY
      - DEREGISTRATION
  - type: string
MICOModeIndication:
anyOf:
  - type: string
    enum:
      - MICO_MODE
      - NO_MICO_MODE
  - type: string
SmsIndication:
anyOf:
  - type: string
    enum:
      - SMS_SUPPORTED
      - SMS_NOT_SUPPORTED
  - type: string

```

## A.3 Nchf\_OfflineOnlyCharging API

```

openapi: 3.0.0
info:
  title: Nchf_OfflineOnlyCharging
  version: 1.0.0.alpha-4
  description: |
    OfflineOnlyCharging Service
    © 2019, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.
externalDocs:
  description: >
    3GPP TS 32.291 V16.4.0: Telecommunication management; Charging management;
    5G system, charging service; Stage 3.
  url: 'http://www.3gpp.org/ftp/Specs/archive/32_series/32.291/'
servers:
  - url: '{apiRoot}/nchf-offlineonlycharging/v1'
  variables:
    apiRoot:
      default: https://example.com
      description: apiRoot as defined in subclause 4.4 of 3GPP TS 29.501.

```



```

paths:
  /offlinechargingdata:
    post:
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/ChargingDataRequest'
      responses:
        '201':
          description: Created
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/ChargingDataResponse'
        '400':
          description: Bad request
          content:
            application/json:
              schema:
                $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
        '403':
          description: Forbidden
          content:
            application/json:
              schema:
                $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
        '404':
          description: Not Found
          content:
            application/json:
              schema:
                $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
        '401':
          $ref: 'TS29571_CommonData.yaml#/components/responses/401'
        '410':
          $ref: 'TS29571_CommonData.yaml#/components/responses/410'
        '411':
          $ref: 'TS29571_CommonData.yaml#/components/responses/411'
        '413':
          $ref: 'TS29571_CommonData.yaml#/components/responses/413'
        '500':
          $ref: 'TS29571_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29571_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29571_CommonData.yaml#/components/responses/default'
  '/offlinechargingdata/{OfflineChargingDataRef}/update':
    post:
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/ChargingDataRequest'
      parameters:
        - name: OfflineChargingDataRef
          in: path
          description: a unique identifier for a charging data resource in a PLMN
          required: true
          schema:
            type: string
      responses:
        '200':
          description: OK. Updated Charging Data resource is returned
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/ChargingDataResponse'
        '400':
          description: Bad request
          content:
            application/json:
              schema:
                $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
        '403':
          description: Forbidden

```

```

    content:
      application/json:
        schema:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
  '404':
    description: Not Found
    content:
      application/json:
        schema:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
  '401':
    $ref: 'TS29571_CommonData.yaml#/components/responses/401'
  '410':
    $ref: 'TS29571_CommonData.yaml#/components/responses/410'
  '411':
    $ref: 'TS29571_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29571_CommonData.yaml#/components/responses/413'
  '500':
    $ref: 'TS29571_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29571_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29571_CommonData.yaml#/components/responses/default'
'/offlinechargingdata/{OfflineChargingDataRef}/release':
  post:
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/ChargingDataRequest'
  parameters:
    - name: OfflineChargingDataRef
      in: path
      description: a unique identifier for a charging data resource in a PLMN
      required: true
      schema:
        type: string
  responses:
    '204':
      description: No Content.
    '404':
      description: Not Found
      content:
        application/json:
          schema:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
    '401':
      $ref: 'TS29571_CommonData.yaml#/components/responses/401'
    '410':
      $ref: 'TS29571_CommonData.yaml#/components/responses/410'
    '411':
      $ref: 'TS29571_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29571_CommonData.yaml#/components/responses/413'
    '500':
      $ref: 'TS29571_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29571_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29571_CommonData.yaml#/components/responses/default'
components:
  schemas:
    ChargingDataRequest:
      type: object
      properties:
        subscriberIdentifier:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Supi'
        nfConsumerIdentification:
          $ref: '#/components/schemas/NFIdentification'
        invocationTimeStamp:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
        invocationSequenceNumber:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
        retransmissionIndicator:
          type: boolean
        serviceSpecificationInfo:

```

```

    type: string
  multipleUnitUsage:
    type: array
    items:
      $ref: '#/components/schemas/MultipleUnitUsage'
    minItems: 0
  triggers:
    type: array
    items:
      $ref: '#/components/schemas/Trigger'
    minItems: 0
  pduSessionChargingInformation:
    $ref: '#/components/schemas/PDUSessionChargingInformation'
  roamingQBCInformation:
    $ref: '#/components/schemas/RoamingQBCInformation'
required:
  - nfConsumerIdentification
  - invocationTimeStamp
  - invocationSequenceNumber
ChargingDataResponse:
  type: object
  properties:
    invocationTimeStamp:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    invocationSequenceNumber:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
    invocationResult:
      $ref: '#/components/schemas/InvocationResult'
    sessionFailover:
      $ref: '#/components/schemas/SessionFailover'
  triggers:
    type: array
    items:
      $ref: '#/components/schemas/Trigger'
    minItems: 0
  pduSessionChargingInformation:
    $ref: '#/components/schemas/PDUSessionChargingInformation'
  roamingQBCInformation:
    $ref: '#/components/schemas/RoamingQBCInformation'
required:
  - invocationTimeStamp
  - invocationSequenceNumber
NFIdentification:
  type: object
  properties:
    nfName:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
    nfIPv4Address:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv4Addr'
    nfIPv6Address:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Addr'
    nfPLMNID:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnId'
    nodeFunctionality:
      $ref: '#/components/schemas/NodeFunctionality'
    nFQdn:
      type: string
  required:
    - nodeFunctionality
MultipleUnitUsage:
  type: object
  properties:
    ratingGroup:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/RatingGroup'
    usedUnitContainer:
      type: array
      items:
        $ref: '#/components/schemas/UsedUnitContainer'
      minItems: 0
    uPFID:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
  required:
    - ratingGroup
InvocationResult:
  type: object
  properties:
    error:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'

```

```

    failureHandling:
      $ref: '#/components/schemas/FailureHandling'
Trigger:
  type: object
  properties:
    triggerType:
      $ref: '#/components/schemas/TriggerType'
    triggerCategory:
      $ref: '#/components/schemas/TriggerCategory'
    timeLimit:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
    volumeLimit:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
    volumeLimit64:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
    maxNumberOfccc:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
  required:
    - triggerType
    - triggerCategory
UsedUnitContainer:
  type: object
  properties:
    serviceId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/ServiceId'
    triggers:
      type: array
      items:
        $ref: '#/components/schemas/Trigger'
      minItems: 0
    triggerTimestamp:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    time:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
    totalVolume:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
    uplinkVolume:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
    downlinkVolume:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
    eventTimeStamps:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    localSequenceNumber:
      type: integer
    pduContainerInformation:
      $ref: '#/components/schemas/PDUContainerInformation'
  required:
    - localSequenceNumber
PDUSessionChargingInformation:
  type: object
  properties:
    chargingId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/ChargingId'
    userInformation:
      $ref: '#/components/schemas/UserInformation'
    userLocationInfo:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
    userLocationTime:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    presenceReportingAreaInformation:
      type: object
      additionalProperties:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/PresenceInfo'
      minProperties: 0
    ueTimeZone:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/TimeZone'
    pduSessionInformation:
      $ref: '#/components/schemas/PDUSessionInformation'
    unitCountInactivityTimer:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
    rANSecondaryRATUsageReport:
      $ref: '#/components/schemas/RANSecondaryRATUsageReport'
  required:
    - pduSessionInformation
UserInformation:
  type: object
  properties:
    servedGPSI:

```

```

    $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
  servedPEI:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Pei'
  unauthenticatedFlag:
    type: boolean
  roamerInOut:
    $ref: '#/components/schemas/RoamerInOut'
PDUSessionInformation:
  type: object
  properties:
    networkSlicingInfo:
      $ref: '#/components/schemas/NetworkSlicingInfo'
    pduSessionID:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PduSessionId'
    pduType:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PduSessionType'
    sscMode:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SscMode'
    hPlmnId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnId'
    servingNetworkFunctionID:
      $ref: '#/components/schemas/ServingNetworkFunctionID'
    ratType:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
    dnnId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
    chargingCharacteristics:
      type: string
    chargingCharacteristicsSelectionMode:
      $ref: '#/components/schemas/ChargingCharacteristicsSelectionMode'
    startTime:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    stopTime:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    3gppPSDataOffStatus:
      $ref: '#/components/schemas/3GPPPSDataOffStatus'
    sessionStopIndicator:
      type: boolean
    pduAddress:
      $ref: '#/components/schemas/PDUAddress'
    diagnostics:
      $ref: '#/components/schemas/Diagnostics'
    authorizedQoSInformation:
      $ref: 'TS29512_Npcf_SMPolicyControl.yaml#/components/schemas/AuthorizedDefaultQos'
    subscribedQoSInformation:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SubscribedDefaultQos'
    authorizedSessionAMBR:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Ambr'
    subscribedSessionAMBR:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Ambr'
    servingCNPlmnId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnId'
  required:
    - pduSessionID
    - dnnId
PDUContainerInformation:
  type: object
  properties:
    timeOfFirstUsage:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    timeOfLastUsage:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    qosInformation:
      $ref: 'TS29512_Npcf_SMPolicyControl.yaml#/components/schemas/QosData'
    qosCharacteristics:
      $ref: 'TS29512_Npcf_SMPolicyControl.yaml#/components/schemas/QosCharacteristics'
    afCorrelationInformation:
      type: string
    userLocationInformation:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
    ueTimeZone:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/TimeZone'
    rATType:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
    servingNodeID:
      type: array
      items:
        $ref: '#/components/schemas/ServingNetworkFunctionID'

```

```

    minItems: 0
    presenceReportingAreaInformation:
      type: object
      additionalProperties:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/PresenceInfo'
      minProperties: 0
    3gppPSDataOffStatus:
      $ref: '#/components/schemas/3GPPPSDataOffStatus'
    sponsorIdentity:
      type: string
    applicationserviceProviderIdentity:
      type: string
    chargingRuleBaseName:
      type: string
  NetworkSlicingInfo:
    type: object
    properties:
      sNSSAI:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
    required:
      - sNSSAI
  PDUAddress:
    type: object
    properties:
      pduIPv4Address:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv4Addr'
      pduIPv6AddresswithPrefix:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Addr'
      pduAddressprefixlength:
        type: integer
      ipv4dynamicAddressFlag:
        type: boolean
      ipv6dynamicPrefixFlag:
        type: boolean
  ServingNetworkFunctionID:
    type: object
    properties:
      servingNetworkFunctionInformation:
        $ref: '#/components/schemas/NFIdentification'
      amfId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/AmfId'
    required:
      - servingNetworkFunctionInformation
  RoamingQBCInformation:
    type: object
    properties:
      multipleQFIcontainer:
        type: array
        items:
          $ref: '#/components/schemas/MultipleQFIcontainer'
        minItems: 0
      uPFID:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
      roamingChargingProfile:
        $ref: '#/components/schemas/RoamingChargingProfile'
  MultipleQFIcontainer:
    type: object
    properties:
      triggers:
        type: array
        items:
          $ref: '#/components/schemas/Trigger'
        minItems: 0
      triggerTimestamp:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
      time:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
      totalVolume:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
      uplinkVolume:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
      localSequenceNumber:
        type: integer
      qFIContainerInformation:
        $ref: '#/components/schemas/QFIContainerInformation'
    required:
      - localSequenceNumber
  QFIContainerInformation:

```

```

type: object
properties:
  qFI:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Qfi'
  timeofFirstUsage:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
  timeofLastUsage:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
  qosInformation:
    $ref: 'TS29512_Npcf_SMPolicyControl.yaml#/components/schemas/QosData'
  qosCharacteristics:
    $ref: 'TS29512_Npcf_SMPolicyControl.yaml#/components/schemas/QosCharacteristics'
  userLocationInformation:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
  ueTimeZone:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/TimeZone'
  presenceReportingAreaInformation:
    type: object
    additionalProperties:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PresenceInfo'
    minProperties: 0
  rATType:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
  servingNetworkFunctionID:
    type: array
    items:
      $ref: '#/components/schemas/ServingNetworkFunctionID'
    minItems: 0
  3gppPSDataOffStatus:
    $ref: '#/components/schemas/3GPPPSDataOffStatus'
RoamingChargingProfile:
  type: object
  properties:
    triggers:
      type: array
      items:
        $ref: '#/components/schemas/Trigger'
      minItems: 0
    partialRecordMethod:
      $ref: '#/components/schemas/PartialRecordMethod'
RANSecondaryRATUsageReport:
  type: object
  properties:
    rANSecondaryRATType:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
    qosFlowsUsageReports:
      type: array
      items:
        $ref: '#/components/schemas/QosFlowsUsageReport'
Diagnostics:
  type: integer
IPFilterRule:
  type: string
QosFlowsUsageReport:
  type: object
  properties:
    qFI:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Qfi'
    startTimestamp:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    endTimestamp:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    uplinkVolume:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInt64'
    downlinkVolume:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInt64'
NodeFunctionality:
  anyOf:
    - type: string
      enum:
        - SMF
        - SMSF
    - type: string
ChargingCharacteristicsSelectionMode:
  anyOf:
    - type: string
      enum:
        - HOME_DEFAULT

```

```

    - ROAMING_DEFAULT
    - VISITING_DEFAULT
  - type: string
TriggerType:
  anyOf:
  - type: string
  enum:
    - FINAL
    - ABNORMAL_RELEASE
    - QOS_CHANGE
    - VOLUME_LIMIT
    - TIME_LIMIT
    - EVENT_LIMIT
    - PLMN_CHANGE
    - USER_LOCATION_CHANGE
    - RAT_CHANGE
    - SESSION_AMBR_CHANGE
    - UE_TIMEZONE_CHANGE
    - TARIFF_TIME_CHANGE
    - MAX_NUMBER_OF_CHANGES_IN_CHARGING_CONDITIONS
    - MANAGEMENT_INTERVENTION
    - CHANGE_OF_UE_PRESENCE_IN_PRESENCE_REPORTING_AREA
    - CHANGE_OF_3GPP_PS_DATA_OFF_STATUS
    - SERVING_NODE_CHANGE
    - REMOVAL_OF_UPF
    - ADDITION_OF_UPF
    - INSERTION_OF_ISMF
    - REMOVAL_OF_ISMF
    - CHANGE_OF_ISMF
    - START_OF_SERVICE_DATA_FLOW
    - GFBR_GUARANTEED_STATUS_CHANGE
  - type: string
TriggerCategory:
  anyOf:
  - type: string
  enum:
    - IMMEDIATE_REPORT
    - DEFERRED_REPORT
  - type: string
FailureHandling:
  anyOf:
  - type: string
  enum:
    - TERMINATE
    - CONTINUE
    - RETRY_AND_TERMINATE
  - type: string
SessionFailover:
  anyOf:
  - type: string
  enum:
    - FAILOVER_NOT_SUPPORTED
    - FAILOVER_SUPPORTED
  - type: string
3GPPPSDataOffStatus:
  anyOf:
  - type: string
  enum:
    - ACTIVE
    - INACTIVE
  - type: string
ResultCode:
  anyOf:
  - type: string
  enum:
    - SUCCESS
    - END_USER_SERVICE_DENIED
  - type: string
PartialRecordMethod:
  anyOf:
  - type: string
  enum:
    - DEFAULT
    - INDIVIDUAL
  - type: string
RoamerInOut:
  anyOf:
  - type: string

```



```
enum:  
  - IN_BOUND  
  - OUT_BOUND  
- type: string
```

## Annex B (informative): Change history

Change history							
Date	Meeting	TDoc	CR	Rev	Cat	Subject/Comment	New version
2018-09	SA#81					Upgrade to change control version	15.0.0
2018-12	SA#82	SP-181157	0001	1	F	Correction on the Reference and Resource name	15.1.0
2018-12	SA#82	SP-181157	0002	1	F	Editorial Correction	15.1.0
2018-12	SA#82	SP-181157	0003	1	F	Data Type Applicability Correction	15.1.0
2018-12	SA#82	SP-181059	0004	1	F	Serving Node ID Correction	15.1.0
2018-12	SA#82	SP-181059	0006	1	F	Correction of Common Data reference in Nchf_ConvergedCharging API	15.1.0
2018-12	SA#82	SP-181059	0007	1	F	Correction of references to TS 29.512, TS 29.514 and data types	15.1.0
2018-12	SA#82	SP-181059	0008	1	F	Clarification of requested units handling	15.1.0
2018-12	SA#82	SP-181059	0009	1	F	Remove of underscore in the API name	15.1.0
2018-12	SA#82	SP-181059	0010	1	F	Correction of data type for subscriber identifier	15.1.0
2018-12	SA#82	SP-181059	0011	-	F	Correction of response code in flow for Notify	15.1.0
2018-12	SA#82	SP-181059	0012	1	F	Allow updating of Notify URI	15.1.0
2018-12	SA#82	SP-181059	0013	1	F	Correction of overlapping results between Invocation result and Result code	15.1.0
2018-12	SA#82	SP-181059	0014	1	F	Correction of Invocation result at http ok	15.1.0
2018-12	SA#82	SP-181059	0015	1	F	Correction of Rating Group Id and Service Id to Uint32	15.1.0
2018-12	SA#82	SP-181059	0016	1	F	Correction of name for Multiple Unit Information	15.1.0
2018-12	SA#82	SP-181059	0018	1	F	Correction of name for Multiple Unit Information	15.1.0
2018-12	SA#82	SP-181059	0019	1	F	Correction of missing http status code	15.1.0
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2020-07	SA#88E					Adding the yaml file to the zip	16.4.1
2020-07	SA#88E					Addressing two implementation errors in the annex Nchf_ OfflineOnlyCharging API	16.4.2

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# History

<b>Document history</b>		
V16.4.2	August 2020	Publication