3GPP TSG SA WG5 Meeting 135-e TDoc S5-211291

electronic meeting, online, 25 January - 3 February 2021

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
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|  |  | **CR** |  | **rev** | **1** | **Current version:** |  |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

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| ***Title:***  | Correction on missing NS charging NF Consumers  |
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| ***Source to WG:*** |  |
| ***Source to TSG:*** | S5 |
|  |  |
| ***Work item code:*** | 5GS\_NSMCH |  | ***Date:*** |  |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** |  |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
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| ***Reason for change:*** | In Rel-16 new NF Consumers of Nchf\_ConvergedCharging service were introduced for Network slice management charging and Network slice performance and analytics charging, and they are missing. |
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| ***Summary of change:*** | Add missing NF Consumers of Nchf\_ConvergedCharging service for Network slice management charging and Network slice performance and analytics charging Add Tenant Identifier Correct style in 6.1  |
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| ***Consequences if not approved:*** | New NF Consumers for Network slice related charging are unknown  |
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| ***Clauses affected:*** | 3.3, 6.1, 6.2.1, 6.2.2, 7 |
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|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

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| **First change** |

## 3.3 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [100] 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 [100].

5GC 5G Core Network

5GS 5G System

AMF Access and Mobility Management Function

CCS Converged Charging System

CEF Charging Enablement Function

CHF Charging Function

IEC Immediate Event Charging

MnS Management Service

NF Network Function

PCF Policy Control Function

SBI Service based Interface

SMSF Short Message Service Function

SMF Session Management Function

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| **Next change** |

## 6.1 NF service framework

5G Charging Function supports to interact with NRF, as specified in clause 7.1 of TS 23.501 [201] and clauses 4.17 and 5.2.7 of TS 23.502 [202] to enable following functionalities:

- CHF registration.

- CHF update.

- CHF deregistration.

- CHF discovery by CHF service consumer.

The services specified in clause 7.2.6 TS 23.501 [201] may be used and the interaction is described in TS 29.510 [300]:

- Nnrf\_NFManagement.

- Nnrf\_NFDiscovery.

- Nnrf\_AccessToken.

The Nnrf\_NFManagement\_NFRegister service invoked by CHF for CHF registration described in the TS 29.510 [300] may include in particular:

- Range(s) of SUPIs.

- Range(s) of GPSIs.

- Range(s) of PLMNs.

- CHF Group ID.

These parameters may also be used by CHF service consumer(s) invoking the Nnrf\_NFDiscovery service for the CHF discovery.

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| **Next change** |

### 6.2.1 General

**Service description:** The ConvergedCharging service provides charging for session and event based NF services. This ConvergedCharging service offers charging:

- With quota management (online; this includes support for both blocking mode and non-blocking mode)

- Without quota management (offline)

- Charging information record generation

The following table shows the CHF Services and CHF Service Operations.

Table 6.2.1-1: NF services provided by the CHF

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| --- | --- | --- | --- |
| Service Name | Service Operations | OperationSemantics | Example Consumer(s) |
| Nchf\_ConvergedCharging | Create | Request/Response | SMF, SMSF, AMF, PGW-C+SMF, NEF, CEF, MnS Producer  |
| Update | Request/Response | SMF, PGW-C+SMF |
| Release | Request/Response | SMF, SMSF, AMF, NEF, PGW-C+SMF |
| Notify | Notify | SMF, PGW-C+SMF |

The input and output parameters described in the clauses below are common to all NF Consumers. The usage of these common parameters and additional NF Consumer specific parameters are specified in dedicated charging specifications.

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| **Next change** |

### 6.2.2 Nchf\_ConvergedCharging\_Create service operation

**Service operation name:** Nchf\_ConvergedCharging\_Create

**Description:** Provides charging capabilities before service delivery, offers charging with and without quota management, as well as charging information record generation. It is used for both session and event based charging. Provides means for the NF Consumer to create the resource of the charging session. If it is used for session based charging the operation also makes an implicit subscribe to notification of events in CHF that requires re-authorization or abort.

The service operation may be used to request quota authorisation for service delivery and may open a CDR in the CHF, based on the information provided by the NF Consumer.

**Known NF Consumers:** SMF, SMSF, AMF, PGW-C+SMF, NEF, CEF, MnS Producer.

**Inputs, Required:** Subscriber identifier or Tenant Identifier, either service identification or rating group.

**Inputs, Optional:** Requested service units, one-time event, destination address, provider, location information, time and date.

**Outputs, Required:** Result indication.

**Outputs, Optional:** Granted service units, validity time, triggers.

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| **Next change** |

# 7 Message contents

Converged charging or offline only charging is performed by NF (CTF) consuming service operations exposed by CHF, achieved using Charging Data Request and Charging Data Response.

The information structure used for these services operations is composed of two parts:

- Common structures specified in the present document.

- NF (CTF) consumer specific structures specified in the middle tier TSs.

Table 7.1 describes the data structure which is common to operations in request semantics.

Table 7.1: Common Data structure of Charging Data Request

| **Information Element** | **Converged Charging****Category** | **Offline Only Charging Category** | **Description** |
| --- | --- | --- | --- |
| Session Identifier | OC | OC | This field identifies the charging session. |
| Subscriber Identifier | OM | OM | This field contains the identification of the individual subscriber that uses the requested service. |
| Tenant Identifier | OM | - | This field contains the identification of the tenant or enterprise having a subscription with Operator. |
| NF Consumer Identification | M | M | This is a grouped field which contains a set of information identifying the NF consumer of the charging service. |
| NF Functionality | M | M | This field contains the function of the node.  |
| NF Name | OC | OC | This fields holds the name (i.e. UUID) of the NF consumer. At least one of the NF Address or NF Name shall be present.  |
| NF Address | OC | OC | This field holds the address (i.e. IP address and/or FQDN) of NF consumer. At least one of the NF Address or NF Name shall be present.  |
| NF PLMN ID | OC | OC | This field holds the PLMN ID of the network the NF consumer belongs to. |
| Charging Identifier | OM | - | This field contains the charging identifier allowing correlation of charging information. Only applicable if not provided in the NF (CTF) consumer specific structure. |
| Invocation Timestamp | M | M | This field holds the timestamp of the charging service invocation by the NF consumer |
| Invocation Sequence Number | M | M | This field contains the sequence number of the charging service invocation by the NF consumer in a charging session. |
| Retransmission Indicator | OC | OC | This field indicates if included, this is a retransmitted request message. |
| One-time Event | OC | - | This field indicates, if included, that this is event based charging and whether this is a one-time event in that there will be no update or termination. |
| One-time Event Type | OC | - | This field indicated the type of the one time event, i.e. Immediate or Post event charging. |
| Notify URI | OC | - | This field contains URI to which notifications are sent by the CHF. The latest received value shall always be used at notifications. |
| Service Specification Information | OC | - | This field identifies the technical specification for the service (e.g. TS 32.255) and release version (e.g. Release 16) that applies to the request. It is for information. |
| Triggers | OC | OC | This field identifies the event(s) triggering the request and is common to all Multiple Unit Usage occurrences. |
| Multiple Unit Usage  | OC | OC | This field contains the parameters for the quota management request and/or usage reporting. It may have multiple occurrences. |
| Rating Group | M | M | This field holds the identifier of a rating group. |
| Requested Unit | OC | - | This field indicates, if included, that quota management is required. It may additionally contain the amount of requested service units for a particular category. |
| Time | OC | - | This field holds the amount of requested time. |
| Total Volume | OC | - | This field holds the amount of requested volume in both uplink and downlink directions. |
| Uplink Volume | OC | - | This field holds the amount of requested volume in uplink direction. |
| Downlink Volume | OC | - | This field holds the amount of requested volume in downlink direction. |
| Service Specific Units | OC | - | This field holds the amount of requested service specific units. |
| Used Unit Container | OC | OC | This field contains the amount of used non-monetary service units measured. up to the triggers and trigger timestamp. It may have multiple occurrences. |
| Service Identifier | OC | OC | This field holds the Service Identifier. |
| Quota management Indicator | OC | - | This field holds an indicator on whether the reported used units are with quota management control, without quota management control or with quota management control temporary suspended. If the field is not present, it indicates the used unit is without quota management applied.  |
| Triggers | OC | Oc | This field holds reason for charging information reporting or closing for the used unit container. |
| Trigger Timestamp | OC | OC | This field holds the timestamp of the trigger. |
| Time | OC | OC | This field holds the amount of used time. |
| Total Volume | OC | OC | This field holds the amount of used volume in both uplink and downlink directions. |
| Uplink Volume | OC | OC | This field holds the amount of used volume in uplink direction. |
| Downlink Volume | OC | OC | This field holds the amount of used volume in downlink direction. |
| Service Specific Unit | OC | OC | This field holds the amount of used service specific units. |
| Event Time Stamps | OC | OC | This field holds the timestamps of the event reported in the Service Specific Units, if the reported units are event based.  |
| Local Sequence Number  | OM | OM | This field holds the container sequence number. |

Table 7.2 describes the data structure which is common to operations in response semantics.

Table 7.2: Common Data structure of Charging Data Response

| **Information Element** | **Converged Charging****Category** | **Offline Only Charging Category** | **Description** |
| --- | --- | --- | --- |
| Session Identifier | OC | OC | This field identifies the charging session. |
| Invocation Timestamp | M | M | This field holds the timestamp of the charging service response from the CHF. |
| Invocation Result | OC | OC | This field holds the failure handling and in case of unsuccessful result of the charging service invocation by the NF consumer the result code. |
| Invocation Result Code | OC | OC | This field contains the result code in case of failure. |
| Failed parameter | OC | OC | This field holds missing and/or unsupported parameter that caused the failure. |
| Failure Handling | OC | OC | This field holds the failure handling to be performed by the NF consumer when failure. |
| Invocation Sequence Number | M | M | This field holds the sequence number of the charging service invocation by the NF consumer. |
| Session Failover | OC | OC | This field indicates whether alternative CHF is supported for ongoing charging service failover handling by NF consumer.  |
| Triggers  | OC | OC | This field holds the triggers supplied from the CHF for the charging session that are independent of rating group for quota management and without quota management. |
| Multiple Unit Information | OC | - | This field holds the parameters for the quota management and/or usage reporting information. It may have multiple occurrences. |
| Result Code | OC | - | This field contains the result of the Rating Group quota allocation. |
| Rating Group | OM | - | The identifier of a rating group. |
| Granted Unit | OC | - | This field holds the granted quota. |
| Tariff Time Change | OC | - | This field contains the switch time when the tariff will be changed. |
| Time | OC | - | This field holds the amount of granted time. |
| Total Volume | OC | - | This field holds the amount of granted volume in both uplink and downlink directions. |
| Uplink Volume | OC | - | This field holds the amount of granted volume in uplink direction. |
| Downlink Volume | OC | - | This field holds the amount of granted volume in downlink direction.  |
| Service Specific Units | OC | - | This field holds the amount of granted requested service specific units. |
| Validity Time | OC | - | This field defines the time in order to limit the validity of the granted quota for a given category instance. |
| Final Unit Indication | OC | - | This field indicates the granted final units for the service. |
| Time Quota Threshold  | OC | - | This field indicates the threshold in seconds when the granted quota is time |
| Volume Quota Threshold  | OC | - | This field indicates the threshold in octets when the granted quota is volume |
| Unit Quota Threshold  | OC | - | This field indicates the threshold in service specific units, that are defined in the service specific documents, when the granted quota is service specific |
| Quota Holding Time | OC | - | This field holds the quota holding time in seconds. |
| Triggers | OC | OC | This field holds triggers for usage reporting associated to the rating group, which is supplied from the CHF. |

The CTF NF consumer specific structures which are specified in the middle tier TSs, are defined as extensions of:

- common part structure of Charging Data Request and Charging Data Response.

- structure of Multiple Unit Usage.

- structure of Multiple Unit Information.

Table 7.3 describes the data structure which is common to Charging Notify Request.

Table 7.3: Common Data structure of Charging Notify Request

| Information Element | Converged ChargingCategory | Description |
| --- | --- | --- |
| Notify URI | M | This field holds the URI previously supplied by the CHF for notifications associated to the charging session.  |
| Notification type | M | This field holds the type of notification indicating re-authorization or termination. |
| Reauthorization Details | OC | This field holds the details of re-authorization.It’s only present when type of notification is re-authorization.If not present and type of notification is re-authorization, the re-authorization notification applies to all units. |
| Service Identifier | OC | This field holds the Service Identifier to which re-authorization notification applies. If present, the rating group shall also be present. If not present the re-authorization notification applies to all service identifiers.  |
| Rating Group | OC | This field holds the rating group to which re-authorization notification applies. If not present the re-authorization notification applies to all rating groups.  |
| Quota management Indicator | OC | This field holds an indicator on whether the re-authorization notification is for quota management control or not. If not present the re-authorization notification applies to both units with and without quota management.  |

Table 7.4 describes the data structure which is common to Charging Notify Response.

Table 7.4: Common Data structure of Charging Notify Response

| Information Element | Category | Description |
| --- | --- | --- |
| Invocation Result | OC | This field holds the result code in case of unsuccessful result of the charging notify request. |
| Invocation Result Code | OC | This field contains the result code in case of failure. |
| Failed parameter | OC | This field holds missing and/or unsupported parameter that caused the failure. |

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| **End of changes** |