**3GPP TSG-SA5 Meeting #142-e *S5-22xxxx***

**e-meeting, 4th –12th April 2022** Revision of S5-20xxxx

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **32.254** | **CR** | **0** | **rev** | **-** | **Current version:** | **17.0.0** |  |
|  | | | | | | | | |
| *For* [***HELP***](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:*** | Addition of the 5G VN group management Charging | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei | | | | | | | | | |
| ***Source to TSG:*** | S5 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | 5GLAN\_CH | | | | |  | ***Date:*** | | | 2022-02-15 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | B |  | | | | | ***Release:*** | | | Rel-17 |
|  | *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 can be 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)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | For the support of 5G LAN service charging, the general description about 5G VN group management and communication charging is introduced. The detailed 5G LAN service membership charging is required. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Add the description for the support of 5G LAN service membership charging | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The support of the 5G LAN is incomplete. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | Annex X (New) | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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** |

Annex X (normative):  
Suppot 5G VN group management charging

X.1 General

This Annex describes the NEF and CEF (with UDM) support the 5G VN group management charging which specified in clause 6.2 TS 32.240[1].

X.2 Charging Architecture for 5G VN group management charging

### X.2.1 General

The 5G VN group management converged charging architecture including CEF based charging specified in the following clause X.2.1.1 and the NEF based charging specified in the clause 4.4.

#### X.2.1.1 Logical Charging architecture - CEF based charging

The logical ubiquitous charging architecture and the reference points for 5G VN group management with the CEF architecture is shown in figure X.2.1-1.





NOTE: The charging architecture is logical ubiquitous and not related to the deployment.

Figure X.2.1.1-1: Logical ubiquitous charging architecture and reference points for 5G VN group management with the CEF architecture

### X.2.3 Charging principles and scenarios

#### X.2.3.1 Basic principles

5G VN group management charging is performed by the NEF or CEF interacting with CHF using Nchf specified in TS 32.290 [57] and TS 32.291 [58]. In order to provide the data required for the charging management activities, the converged charging can be performed for each of the following:

- The CEF are able to get the 5G VN group management information (e.g. GroupIdentifiers) fromUDM via Nudm\_SubscriberDataManagement service, specified in the TS 23.502 [214] and TS 29.503[x]. The Charging Data Request and Charging Data Response are exchanged between the CEF and the CHF, based on PEC scenarios specified in TS 32.290 [50]. The Charging Data Request is issued by the CEF towards the CHF when certain conditions (chargeable events) are met.

NOTE: In the release, the CEF uses the GET operation of Nudm\_SubscriberDataManagement service to obtain the 5G VN group information.

- The NEF are able to report the 5G VN group modification information (e.g. add/delete 5G VN Group members) based on the API invocation and API notification chargeable events. The interaction between NEF and CHF are specified in the TS 32.254[14] clause 5.4.

In order to avoid the duplicate charging, the NEF based and CEF based 5G VN group management charging will not be invoked at the same time, which depend on the implementation based on the operator policy.

The 5G VN group management charging information is collected per VN group. The message contents and purpose of each charging event that triggers interaction with CHF, as well as the chargeable events that trigger them, are described in following clauses.

A detailed formal description of the converged charging parameters to CHF defined in the present document can be found in TS 32.291 [58].

A detailed formal description of the CDR parameters defined in the present document can be found in TS 32.298 [51].

#### X.2.3.2 Applicable triggers in 5G VN group management charging

##### X.2.3.2.1 5G VN group management charging via UDM

A set of trigger conditions are defined for the CEF to invoke a Charging Data Request [Event] towards the CHF.

Table X.2.3.2.1-1 summarizes the set of default trigger conditions and their category which shall be supported by the CEF.

Table X.2.3.2.1-1: Default Trigger conditions in CEF

| Trigger Conditions | Trigger level | Default category | CHF allowed to change category | CHF allowed to enable and disable | Message when "immediate reporting" category |
| --- | --- | --- | --- | --- | --- |
| Receive the 5G VN group information from UDM | - | Immediate | Not Applicable | Not Applicable | Charging Data Request [Event] |

##### X.2.3.2.2 5G VN group management charging via NEF

API invocation (i.e. 5GLANParameterProvision API) is used for the NEF to invoke a Charging Data Request [Event] towards the CHF.

When the NEF performs 5G LAN group management charging, the NEF reports 5G VN group management API charging to the CHF after receiving a 5G VN group service invocation message. The CHF performs 5G VN group management charging based on the reporting.

#### X.2.3.3 Message flows

##### X.2.3.3.1 5G VN group management charging via UDM

The following message flow specifies the interaction between the CEF and the CHF for 5G VN group management charging. This interaction is based on Charging Data Request /Response specified in TS 32.290 [57].



Figure X.2.3.3.1-1: Message flow for CEF interation for 5G VN group charging---PEC

1. The CEF decides to get the 5G VN group management information based on the charging requirement.

2. The CEF sends the 5G VN group management information Request to the UDM via Nudm\_SubscriberDataManagement service.

3. The UDM sends the 5G VN group management information successful Response to the CEF, including current VN group information, e.g. the Internal Group ID, External Group ID, and UE Id List.

3ch-a. The CEF sends Charging Data Request [Event] to CHF for 5G VN group management information.

3ch-b. The CHF creates a CDR.

3ch-c. The CHF acknowledges by sending Charging Data Response [Event] to the CEF.

##### X.2.3.3.2 5G VN group management charging via NEF

The message flow specifies the interaction between the NEF and the CHF for 5G VN group management charging is the same with the figure 5.4.2.6 API Invocation - PEC and 5.4.2.7 API Notification – PEC in the TS 32.254[14].

The NEF reports the charging information about the 5GLANParameterProvision API invocation for the addition or deletion of the UE(s) from the 5G VN group. The CHF detectes the modification of the 5G VN group and performs the charging for 5G VN group management.

#### X.2.3.4 CDR generation

The CHF CDRs for 5G VN group management charging are generated by the CHF to collect charging information that they subsequently transfer to the Charging Gateway Function (CGF).

A 5G VN group management CHF CDR is used to capture charging information related to 5G VN group management chargeable events and is generated by the CHF for each received Charging Data Request [Event].

### X.2.4 Charging Information

#### X.2.4.1 Data description for 5G VN group management charging

The Charging Data Request and Charging Data Response are specified in subclause 5.1.2.2.1 of TS 32.290 [57].

Table X.2.4.1-1 describes the use of these messages for 5G VN group management charging.

Table X.2.4.1-1: 5G LAN VN group management messages reference table

|  |  |  |
| --- | --- | --- |
| **Message** | **Source** | **Destination** |
| Charging Data Request | CEF/NEF | CHF |
| Charging Data Response | CHF | CEF/NEF |

Table X.2.4.1-2 illustrates the basic structure of a Charging Data Request message from the CEF as used for 5G VN group management charging.

Table X.2.4.1-2: Charging Data Request message contents

| **Information Element** | **Category for converged charging** | **Description** |
| --- | --- | --- |
| Session Identifier | OC | Described in TS 32.290 [57] |
| Subscriber Identifier | - | This field is not applicable. |
| NF Consumer Identification | OC | Described in TS 32.290 [57] |
| Charging Identifier | - | This field is not applicable. |
| Invocation Timestamp | M | Described in TS 32.290 [57] |
| Invocation Sequence Number | M | Described in TS 32.290 [57] |
| One-time Event | OC | Described in TS 32.290 [57] |
| One-time Event Type | OC | Described in TS 32.290 [57] |
| Retransmission Indicator | OC | Described in TS 32.290 [57] |
| Notify URI | - | This field is not applicable. |
| Supported Features | OC | Described in TS 32.290 [57] |
| Service Specification Information | OC | Described in TS 32.290 [57] |
| Triggers | - | This field is not applicable. |
| Multiple Unit Usage | - | This field is not applicable. |
| 5G VN Group Management Charging Information | OM | This field holds 5G VN group management specific information described in clause X.2.4.2. |

Table X.2.4.1-3 illustrates the basic structure of a Charging Data Response message from the CHF to CEF as used for 5G VN group management charging.

Table X.2.4.1-3: Charging Data Response message contents

| **Information Element** | **Category for converged charging** | **Description** |
| --- | --- | --- |
| Session Identifier | OC | Described in TS 32.290 [57] |
| Invocation Timestamp | M | Described in TS 32.290 [57] |
| Invocation Result | OC | Described in TS 32.290 [57] |
| Invocation Sequence Number | M | Described in TS 32.290 [57] |
| Session Failover | - | This field is not applicable. |
| Supported Features | OC | Described in TS 32.290 [57] |
| Triggers | - | This field is not applicable. |
| Multiple Unit Information | - | This field is not applicable. |

Details of the Ga message contents are specified in TS 32.295 [54].

The following table X.2.4.1-4 provide a brief description of each CDR parameter. The category in the tables is used according to the charging data configuration defined in clause 5.4. Full definitions of the CDR parameters, sorted by the name in alphabetical order, are provided in TS 32.298 [51].

Table X.2.4.1-4 5G VN group management charging CHF record data

| Field | Category | Description |
| --- | --- | --- |
| Record Type | M | CHF record. |
| Recording Network Function ID | OM | This field holds the name of the recording entity, i.e. the CHF id. |
| Subscriber Identifier | - | This field is not applicable. |
| NF Consumer Information | M | This field holds the information of the entity that used the charging service (i.e. Service Producer (CTF), CEF). |
| NF Functionality | M | This field contains the function of the entity: Service Producer (CTF) or CEF |
| NF Name | OC | This field holds the name of the entity. |
| NF Address | OC | This field holds the IP Address of the entity |
| NF PLMN ID | Oc | This field holds the PLMN identifier (MCC MNC) of the entity. |
| Record Opening Time | M | Described in TS 32.298 [57] |
| Duration | M | Described in TS 32.298 [57] |
| Record Sequence Number | C | Described in TS 32.298 [57] |
| Cause for Record Closing | M | Described in TS 32.298 [57] |
| Diagnostics | OM | Described in TS 32.298 [57] |
| Local Record Sequence Number | OM | Described in TS 32.298 [57] |
| Record Extensions | OC | Described in TS 32.298 [57] |
| 5G VN group Management Charging Information | OM | This field holds the 5G VN group management charging information defined in clause X.2.4.2. |

The Charging Data Request message from the NEF, Charging Data Response to NEF and the CHF record data used for 5G VN group managememt charging is NEF Converged charging information specified in the clause 6.2a. The 5G VN Group Management Charging information is included in the "NEF API Charging Information", specified in the clause 6.3.

#### X.2.4.2 Definition of 5G VN group management charging information

Specific charging information used for 5G VN group management is provided within the 5G LAN Charging Information.

The detailed structure of the 5G VN group membership Charging Information can be found in table X.2.4.2-1.

Table X.2.4.2-1: Structure of 5G VN group management charging Information

| Information Element | Category | Description |
| --- | --- | --- |
| External Group Identifier | OC | This field contains the External Group ID associated to the provided Internal Group ID |
| Internal Group Identifier | OC | This field contain the Internal Group ID associated to the provided External Group ID. |
| 5G VN Group Members Number | OC | This field contain the number of the UE identifiers that belong to the provided Internal/External Group ID if they are required. |
| 5G VN Group Data | OC | This field holds the data of the 5G VN group when configuration. |
| Single Nssai | OC | This field holds Single Nssai |
| DNN | OC | This field holds Data Network Name with Network Identifier only. |
| PDU Session Types | OC | This field holds the llowed session types. |

Table X.2.4.2-2: Structure of NEF API Charging Information for 5G VN group management

| NEF API Charging Information | 5G VN Group Management | Description |
| --- | --- | --- |
| External Group Identifier | External Group Identifier | This field contains the External Group ID associated to the provided Internal Group ID |
| Internal Group Identifier | Internal Group Identifier | This field contain the Internal Group ID associated to the provided External Group ID. |
| External Individual Identifier | 5G VN Group Members Number | The list of the UE identifier in the 5G VN group. |
| API Direction | - | Described in the Table Table 6.3.1.4.1. |
| API Target Network Function | - | Described in the Table Table 6.3.1.4.1. |
| API Result Code | - | Described in the Table Table 6.3.1.4.1. |
| API Name | - | Described in the Table Table 6.3.1.4.1. |
| API Reference | - | Described in the Table Table 6.3.1.4.1. |
| API Content | 5G VN Group Data | The API content includes the 5G VN group data, including the Single Nssai  DNN and PDU Session Types. |

#### X.2.4.3 Detailed message format for converged charging

The following clause specifies per Operation Type the charging data that are sent by CEF for 5G VN group management converged charging.

The Operation Types are listed in the following order: I (Initial)/T (Termination)/E (Event). Therefore, when all Operation Types are possible it is marked as ITE. If only some Operation Types are allowed for a node, only the appropriate letters are used (i.e. IT or E) as indicated in the table heading. The omission of an Operation Type for a particular field is marked with "-" (i.e. I-E). Also, when an entire field is not allowed in a node the entire cell is marked as "-".

Table X.2.4.3-1 defines the basic structure of the supported fields in the *Charging Data Request* message for CEF converged charging.

Table X.2.4.3-1: Supported fields in *Charging Data Request* message

| Information Element | Analytics and Performance | CEF |
| --- | --- | --- |
| Supported Operation Types | E |
| Session Identifier | | E |
| Subscriber Identifier | | - |
| NF Consumer Identification | | E |
| Charging Identifier | | - |
| Invocation Timestamp | | E |
| Invocation Sequence Number | | E |
| One-time Event | | E |
| One-time Event Type | | E |
| Retransmission Indicator | | E |
| Notify URI | | - |
| Supported Features | | E |
| Service Specification Information | | E |
| Triggers | | - |
| Multiple Unit Usage | | - |
| 5G VN Group Management Charging Information | | E |

Table X.2.4.3-2 defines the basic structure of the supported fields in the *Charging Data Response* message for CEF converged charging.

Table X.2.4.3-2: Supported fields in *Charging Data Response* message

| Information Element | **Analytics and Performance** | CEF |
| --- | --- | --- |
| Supported Operation Types | E |
| Session Identifier | | E |
| Invocation Timestamp | | E |
| Invocation Result | | E |
| Invocation Sequence Number | | E |
| Session Failover | | - |
| Supported Features | | E |
| Triggers | | - |
| Multiple Unit information | | - |

The clause 6.3.4 specifies per Operation Type the charging data that are sent by NEF is also applicable for 5G VN group management converged charging.

### X.2.5 Bindings for 5G VN group management converged charging

This mapping between the Information Elements, resource attributes and CHF CDR parameters for 5G VN group management and communication converged charging is described in clause 7 of TS 32.291 [51].

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| **End of change** |