**3GPP TSG-SA5 Meeting #157 *S5-245880***

Hyderabad, India, 14 - 18 October 2024 Revision of S5-245566

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| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
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|  |  | **CR** | **560** | **rev** | **1** | **Current version:** | **.0** |  |
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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:***  | Rel-18 CR 32.255 Correction on N107 and N108 for MVNO Charging |
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| ***Source to WG:*** | Amdocs |
| ***Source to TSG:*** | SA5 |
|  |  |
| ***Work item code:*** | CHRACHF |  | ***Date:*** | 2024-10-17 |
|  |  |  |  |  |
| ***Category:*** | F |  | ***Release:*** | Rel-18 |
|  | *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-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19) Rel-20 (Release 20)* |
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| ***Reason for change:*** | The charging architecture for MVNO charging is missing |
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| ***Summary of change:*** | Add charging architecture for MVNO charging |
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| ***Consequences if not approved:*** | The charging specifications would be incomplete for MVNO Charging scenarios |
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| ***Clauses affected:*** | 4.2, 5.2.1.20 |
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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 32.256 CR 0043  |
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| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** | Revision of S5-245566 |

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| **First Change** |

## 4.2 5G data connectivity domain converged charging architecture

The SMF embedding the CTF, generates charging events towards the CHF for data connectivity converged charging or offline only charging.

As described in TS 32.240 [1], the CTF generates charging events towards to the CHF for converged online and offline charging processing. The CDRs generation is performed by the CHF acting as a CDF, which transfers them to the CGF.
Finally, the CGF creates CDR files and forwards them to the BD.

If the CGF is external, the CHF acting as a CDF, forwards the CDRs to the CGF across the Ga interface.
If the CGF is integrated, there is only one internal interface between the CHF and the CGF. In this case, the relationship between CHF and CGF is 1:1. An integrated CGF may support the Ga interface from other CDFs.

When an external CGF is used, this CGF may also be used by other, i.e. non-5GCS, network elements, according to network design and operator decision. It should be noted that the CGF may also be an integrated component of the BD – in this case, the Bd interface does not exist and is replaced by a proprietary solution internal to the BD.

Figure 4.2.1 depicts the architectural options for converged charging in service-based representation for CHF.



**Figure 4.2.1: 5G data connectivity converged charging architecture**

Architectural options of figure 4.2.1 apply to any 5G data connectivity converged charging architectures in the present clause.

Ga is described in clause 5.2.4 and Bd in clause 5.2.5. of the present document and Nchf is described in TS 32.290 [57]..

Figure 4.2.2 depicts the 5G data connectivity converged charging architecture in reference point representation for non-roaming:



Figure 4.2.2: 5G data connectivity converged charging architecture non-roaming reference point representation

Figure 4.2.3 depicts the 5G data connectivity converged charging architecture service-based representation for roaming Home Routed:



Figure 4.2.3: 5G data connectivity converged charging architecture roaming Home Routed service based representation

Figure 4.2.4 depicts the 5G data connectivity converged charging architecture for roaming Home Routed in reference point representation:



Figure 4.2.4: 5G data connectivity converged charging architecture in roaming Home Routed reference point representation

The N40 reference point is defined for the interactions between H-SMF and H-CHF and between V-SMF and V-CHF in the reference point representation.

Figure 4.2.5 depicts the 5G data connectivity converged charging architecture service-based representation for roaming Local Breakout:



Figure 4.2.5: 5G data connectivity converged charging architecture roaming Local Breakout scenario service based representation

Figure 4.2.6 depicts the 5G data connectivity converged charging architecture for roaming local breakout with V-SMF to H-CHF in reference point representation:



Figure 4.2.6: 5G data connectivity converged charging architecture in Local Breakout V-SMF to H-CHF scenario reference point representation

NOTE: In some scenarios only N40 may be a deployment option based on agreement between HPLMN and VPLMN, in this case the interactions with HPLMN or MVNO is outside the scope of this specification.

The N40 reference point is defined for the interactions between V-SMF and V-CHF, the N47 reference point is defined for the interactions between V-SMF and H-CHF.

One or both architectures in Figure 4.2.6 and Figure 4.2.6a may be supported for local breakout roaming.

In case both architectures in Figure 4.2.6 and Figure 4.2.6a are supported for local breakout roaming, SMF and V-CHF determines, for the inbound roaming UE, which of the architectures is to be used (only one can be selected) based on operator agreement.

Figure 4.2.6a, is an alternative to Figure 4.2.6, depicts the 5G data connectivity converged charging architecture for roaming local breakout with V-CHF to H-CHF in reference point representation:



Figure 4.2.6a: 5G data connectivity converged charging architecture in Local Breakout Inter-CHF scenario reference point representation

The N40 reference point is defined for the interactions between V-SMF and V-CHF, the N107 reference point is defined for the interactions between V-CHF and H-CHF.



Figure 4.2.x: 5G data connectivity converged charging architecture in MVNO (owning a CHF referred to as A-CHF) scenario in reference point representation

For scenarios with MVNO (owning a CHF referred to as A-CHF), the N40 reference point is defined for the interactions between SMF and CHF owned by MNO,the N107 reference point is used for the interactions between CHF owned by the MNO and A-CHF owned by the MVNO.



Figure 4.2.y: 5G data connectivity converged charging architecture in MVNO (owning a CHF referred to as A-CHF) scenario in reference point representation

One or both architectures in Figure 4.2.x and Figure 4.2.y may be supported for MVNO (owning a CHF referred to as A-CHF).

In case both architectures in Figure 4.2.x and Figure 4.2.y are supported for MVNO (owning a CHF referred to as A-CHF), the SMF and CHF owned by the MNO determines, for the MVNO UE, which of the architectures is to be used (only one can be selected) based on operator agreement.

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| **Second Change** |

5.2.1.20 Applicability of FBC and QBC

The default for PDU session charging is FBC. QBC is intended for interconnect charges. If both FBC and QBC are enabled, for a given PDU session, then QBC is to be performed by the SMF within the same charging session as the FBC.

**Table 5.2.1.20-1: Scenario and FBC/QBC usage**

| **Scenario** | **FBC Applicable** | **QBC Applicable** |
| --- | --- | --- |
| Non-roaming | SMF to CHF | - |
| Roaming home routed N40 | H-SMF to H-CHF | V-SMF to V-CHF(H-SMF to H-CHF)(NOTE 2) |
| Roaming local breakout N40+N47 (NOTE 4) | V-SMF to H-CHF | V-SMF to V-CHF(V-SMF to H-CHF)(NOTE 3) |
| Roaming local breakout N40+N107 | V-SMF to V-CHFV-CHF to H-CHF | (V-SMF to V-CHF)(V-CHF to H-CHF) |
| NOTE 1: Default usage is described without parentheses, and optional usage is described in parentheses.NOTE 2: QBC between H-SMF and H-CHF is dependent on roaming charging profile support.NOTE 3: QBC between V-SMF and H-CHF is dependent on roaming charging profile support.NOTE 4: In the case N47 is not used FBC is applicable for V-SMF to V-CHF, while QBC is optional |

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| **End of changes** |