**3GPP TSG-SA5 Meeting #143-e *S5-223107***

e-meeting, 9 - 17 May 2022

**Source: Ericsson**

**Title: Correcting clause 5.5.5**

**Document for: Approval**

**Agenda Item: 7.5.2**

# 1 Decision/action requested

**Include the proposed changes in TR 28.826.**

# 2 References

[1] 3GPP TR 28.826: " Study on Nchf charging services phase 2 improvements and optimizations"

# 3 Rationale

Correcting the issues and solutions for 5.5 so that they all cover one issue and not part of an issue.

# 4 Detailed proposal

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| **First change** |

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 32.255: "5G data connectivity domain charging; stage 2".

[3] 3GPP TS 23.503: "Policy and charging control framework for the 5G System (5GS); Stage 2".

[4] 3GPP TS 29.500: "5G System; Technical Realization of Service Based Architecture; Stage 3".

[5] 3GPP TS 32.240: "Telecommunication management; Charging management; Charging architecture and principles".

[6] 3GPP TS 32.291: "Telecommunication management; Charging management; 5G system; Charging service, stage 3".

[7] 3GPP TS 32.298: "Telecommunication management; Charging management; Charging Data Record (CDR) parameter description".

[8] 3GPP TS 32.299: "Telecommunication management; Charging management; Diameter charging application".

[9] 3GPP TS 29.513: "5G System; Policy and Charging Control signalling flows and QoS parameter mapping; Stage 3".

[10] 3GPP TS 29.594: "5G System; Spending Limit Control Service; Stage 3".

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| **Second change** |

### 5.5.4 The key issues

The following key issues are identified:

- **Key Issue #5a**: Non-blocking mode disable/enable affect only specific rating group or all rating groups for a UE.

- **Key Issue #5b**: Identify the Network Functions to disable/enable non-blocking mode.

- **Key Issue #5c**: Determine of the interactions required to disable/enable non-blocking mode for the special user/service.

- **Key Issue #5d**: CHF possibility to determine if non-blocking mode is possible for a rating group.

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| **Third change** |

### 5.5.5 Solutions

#### 5.5.5.1 Solution #5.1: Dedicated non-blocking indicator

The possible solution partially supports the potential requirements **REQ-3GPPCH-NB-01, REQ-3GPPCH-NB-02** and **Key Issue #5d** for the non-blocking mode reporting to CHF.



Figure 5.5.5.1-1: Message flow for dedicated non-blocking indicator

1. PCF sends the PCC rules to SMF with the sdfHandl set to true, indicating that the service data flow is allowed to start while the SMF is waiting for the response to the credit request i.e., non-blocking mode.

2. The service data flow are allowed to start while the SMF is interacting with CHF.

3. SMF sends the Charging Data Request to CHF for the quota request with a non-blocking indication for the rating group with the sdfHandl set to true.

The non-blocking charging reporting from the SMF is per rating group. After the PDU session establishment, when any service date flow delivery for a rating group with non-blocking (can be the first or the subsequent service data flows of the PDU session), the SMF should immediately report to the CHF with the non-blocking indication in the Charging Data Request [Initial] if it is the first service data flow or in the Charging Data Request [Update] for the subsequent service data flow.

#### 5.5.5.2 Solution #5.2: Rating group as non-blocking indicator

The possible solution partially supports the potential requirements **REQ-3GPPCH-NB-01, REQ-3GPPCH-NB-02** and **Key Issue #5d** for the non-blocking mode reporting to CHF.

Since the non-blocking charging reporting from the SMF is per rating group, the CHF can based on the rating group now if it is possible to have non-blocking for that specific rating group.

#### 5.5.5.3 Solution #5.3: Non-blocking mode change from CHF to SMF

A possible solution for the potential requirements **REQ-3GPPCH-NB-01, REQ-3GPPCH-NB-02** and **Key Issue #5a** to describe the non-blocking mode change from CHF. It enhances and extends the Nchf\_Convergedcharging defined in TS 32.255 [2] and SMF operation.



Figure 5.5.5.3-1: Message flow for non-blocking mode change from CHF to SMF

1. The SMF have indicated the non-blocking mode.

2. The CHF determines to change the non-blocking mode based on the account information (e.g., account balance and account status) in the charging system.

3. The CHF sends the non-blocking mode in the Charging Data Response to SMF.

SMF has the PCC rule with the sdfHandl and the non-blocking mode change from CHF subsequently, for any subsequent service data flows for the same rating group in the PDU session, the SMF will perform the setting from CHF with blocking mode. Possibly the CHF could change the non-blocking mode per UE, per rating group, or per service identifier.

The non-blocking mode set by CHF is only active during the PDU session i.e., when the PDU session is terminated, the non-blocking mode set by the CHF is removed and for next PDU session establishment, the SMF will use the PCC rules from PCF.

#### 5.5.5.4 Solution #5.4: Non-blocking mode change from CHF to SMF and PCF

A possible solution to support the potential requirements **REQ-3GPPCH-NB-01, REQ-3GPPCH-NB-02** and **Key Issue #5a.** It enhances and extends the Nchf\_Convergedcharging defined in TS 32.255 [2] and the interaction between PCF and SMF.



Figure 5.5.5.4-1: Message flow for non-blocking mode change from CHF to SMF and PCF

1. The SMF have indicated the non-blocking mode.

2. The CHF determines to change the non-blocking mode based on the account information (e.g., account balance and account status) in the charging system.

3. The CHF sends the non-blocking mode in the Charging Data Response to SMF.

4. The SMF transfers the non-blocking mode change to the PCF. The PCF will set the new PCC rules using the sdfHandl to SMF. The CHF can indicate the non-blocking mode change per UE, per RG, or per Service Identifier.

When the PDU session is terminated, the PCF still uses the updated non-blocking mode from CHF.

#### 5.5.5.3 Solution #5.5: Non-blocking mode change from CHF to PCF

A possible solution to support the potential requirements **REQ-3GPPCH-NB-01, REQ-3GPPCH-NB-02** and **Key Issue #5a** reuses the Npcf\_spendinglimit defined in TS 23.503 [3], TS 29.513 [9], TS 29.594 [10].



Figure 5.5.5.3-1: Message flow for non-blocking mode change from CHF to PCF

1. The PCF request information about the statues of policy counter(s) held at the CHF and subscribes to any changes of these.

2. The CHF responds with the current statues of the policy counter(s) as well as a confirmation of the subscription.

3. The PCF decides that the service data flow is allowed to start while the SMF is waiting for the response to the credit request.

4. PCF sends the PCC rules to SMF with the sdfHandl set to true, indicating that the service data flow is allowed to start while the SMF is waiting for the response to the credit request i.e., non-blocking mode.

5. The service data flow are allowed to start while the SMF is interacting with CHF.

6. SMF sends the Charging Data Request to CHF.

7. The CHF detects that status of a policy counter identifier(s) has or will be changed and the PCF requested notification of changes in the status of a policy counter(s).

8. The CHF sends the status of the policy counter(s) to the PCF.

9. The PCF decides that the service data flow is not allowed to start while the SMF is waiting for the response to the credit request.

10. Interaction between SMF and PCF where the PCF indicates sdfHandl is set to false as well as SMF and CHF quota request and usage.

The policy counter status is per UE and may also be per rating group. The policy counter id and status values are not standardized, or the interpretation and actions associated to these. How the values are calculated or derived by the CHF is also outside the current scope of 3GPP. ´The policy counter ids and statuses needs to be configured jointly in CHF and PCF, and can at this point be associated with the decision of bocking or non-blocking mode just as it can be associated with any other policy action.

In this case a specific policy counter id and status are used to indicate that a change in the non-blocking mode is preferred for the UE or for the UE and rating group combination.

The CHF can change the non-blocking mode per UE and possibly also on rating group.

When the PDU session is terminated, the PCF still uses the updated non-blocking mode considering the policy counter id and status from CHF.

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| **End of changes** |