**3GPP TSG-SA5 Meeting #146Bis-e *S5-231112***

Electronic meeting, 16 - 19 January 2023

**Source: Ericsson**

**Title: Correcting solutions in clause 5.1**

**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

Correction of solutions and adding of covered requirements.

# 4 Detailed proposal

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| **First change** |

### 5.1.5 Solutions

#### 5.1.5.1 Solution #1.1: New immediate trigger variant

A possible solution for key issues #1a, #1b, and #1c covering requirements REQ-CH\_INFO-01, charging information optimization.

This solution adds a variant of the immediate trigger category.

For the current immediate report chargeable events for which, when occurring, charging data generated by the NF consumer and sent to the CHF in a Charging Data Request message. Zero usage may be reported.



Figure 5.1.5.1-1: Message flow for current immediate triggers

**1) Service delivery ongoing:** there is a connection setup for service delivery and a charging session is established between the NF (CTF) and the CHF.

**2) Trigger event:** the NF (CTF) generates charging information related to the service delivered, due to that an immediate trigger for usage reporting or quota request is met.

**3) Charging data request [Update, Unit used, Quota requested]:** the NF (CTF) sends the request to the CHF reporting the used units and if the service is under quota management it includes a quota request for the service to continue.

**4) Account, rating, and reservation control:** The CHF performs the process related to the reported usage and if the service is under quota management it performs processes related to quota requested, it may involve the rating entity and user's account balance.

**5) Update CDR:** based on policies, the CHF updates the CDR with charging data related to the service.

**6) Charging Data Response [Update, Quota granted]:** The CHF responds and if the service is under quota management it includes a quota granted for the service to continue.

**7) Uplink/downlink transmission:** first data or events transmission after the trigger event.

**8) Service delivery continuing** service delivery is continuing and the charging session is continuing between the NF (CTF) and the CHF.

For the deferred report chargeable events for which, when occurring, charging data generated by the NF consumer and stored. Zero usage may be included. The charging data will be sent to the CHF in next a Charging Data Request message.



Figure 5.1.5.1-2: Message flow for deferred triggers

**1) Service delivery ongoing:** there is a connection setup for service delivery and a charging session is established between the NF (CTF) and the CHF.

**2) Trigger event:** the NF (CTF) generates charging information related to the service delivered, deferred trigger for usage reporting is met.

**3) Close counts and start new counts:** the NF (CTF) close all counts related to the service and starts new, keeping the closed counts for reporting when an immediate trigger occurs.

**4) Uplink/downlink transmission:** first data or events transmission after the trigger event.

**5) Service delivery continuing** service delivery is continuing and the charging session is continuing between the NF (CTF) and the CHF.

For the new immediate report chargeable events for which, when occurring and there is usage, charging data generated by the NF consumer and sent to the CHF in a Charging Data Request message. Zero usage may be reported.



Figure 5.1.5.1-3: Message flow for new immediate triggers

**1) Service delivery ongoing:** there is a connection setup for service delivery and a charging session is established between the NF (CTF) and the CHF.

**2) Trigger event:** the NF (CTF) notices that a new immediate trigger variant for charging reporting is met and await first data or event transmission (if any).

**3) Uplink/downlink transmission:** first data or events transmission after the new immediate trigger variant, was met, and the NF (CTF) generates charging information related to the service delivered.

**4) Charging data request [Update, Unit used, Quota requested]:** the NF (CTF) sends the request to the CHF reporting the used units and if the service is under quota management it includes a quota request for the service to continue.

**5) Account, rating, and reservation control:** The CHF performs the process related to the reported usage and if the service is under quota management it performs processes related to quota requested, it may involve the rating entity and user's account balance.

**6) Update CDR:** based on policies, the CHF updates the CDR with charging data related to the service.

**7) Charging Data Response [Update, Quota granted]:** The CHF responds and if the service is under quota management it includes a quota granted for the service to continue.

**8) Service delivery continuing** service delivery is continuing and the charging session is continuing between the NF (CTF) and the CHF.

#### 5.1.5.2 Solution #1.2: Keep rating group information together

A possible solution for key issue #1e covering requirements REQ-CH\_INFO-01, charging request optimization.

If the rating group have service with quota management (online), then the charging data request containing a quota request it must include all used units for that rating group. Only the quota management services reported will be used for quota allocation. This is to ensure that the CHF won’t interpret any reporting of used units for the rating group as a release of all granted service units for the rating group.

#### 5.1.5.3 Solution #1.3: NF consumer ensuring accuracy of location

A possible solution for key issue #1j covering requirements REQ-CH\_INFO-05, charging information accuracy of location.

Add a general description in the TS 32.240[5] in line with the following:

- the NF (CTF) (e.g., SMF, AMF, NEF) ensures that location reporting in the charging information is accurate for charging purposes.

#### 5.1.5.4 Solution #1.4: Stop and discard the used units during re-authorization

A possible solution for key issue #1l covering requirements REQ-CH\_INFO-07, control of granted quota during re-authorization.

The NF Service Consumer allows the service to continue whilst the re-authorization is progress, using the quota between the threshold and the granted quota. Either until the quota has been consumed or receiving a charging data response from CHF.

If the remaining part is used up before receiving a Charging Data Response:

- NF Service Consumer stops the service delivery and discards the recorded used units.

If the Charging Data Response with new quota is received before the quota is consumed:

- NF Service consumer continues the service delivery, deducting the used units from the new granted quota.

If the Charging Data Response with termination action is received before the quota is consumed:

delivery

#### 5.1.5.5 Solution #1.5: Stop and report the used units during re-authorization

A possible solution for key issue #1l covering requirements REQ-CH\_INFO-07, control of granted quota during re-authorization.

Clarify the description in clause 5.4.2 of TS 32.290 [12]. The NF Service Consumer allows the service to continue whilst the re-authorization is progress, until the remaining part had been used up.

The NF Service Consumer allows the service to continue whilst the re-authorization is progress, , using the quota between the threshold and the gr4anted quota. Either until the quota has been consumed or receiving the charging data response from CHF.

If the remaining part is used up before receiving a Charging Data Response:

- NF Service Consumer stops the service delivery and reports the used unit in a Charging Data Request [Termination].

If the Charging Data Response with new quota is received before the quota is consumed:

- NF Service consumer continues the service delivery, deducting the used units from the new granted quota.

If the Charging Data Response with termination action is received before the quota is consumed:

delivery in a Charging Data Request [Termination].

#### 5.1.5.6 Solution #1.6: CHF control of granted quota during re-authorization

A possible solution for key issue #1l covering requirements REQ-CH\_INFO-07, control of granted quota during re-authorization.

The quota is granted per RG. There may be several RGs in one charging session. The failure of granted quota for one RG will not impact on the quota granted for other RGs. For one special RG, the following mechanism is present.

When received quota threshold based re-authorization triggers (i.e. timeQuotaThreshold, volumeQuotaThreshold, unitQuotaThreshold), the NF consumer shall seek re-authorization for the quota when fall below the supplied threshold.

When the granting new quota is successful from the CHF, the used units during the re-authorization process are treated as the used part of the new granted quota.

When the granting new quota is unsuccessful from the CHF, the CHF may indicate that the remaining quota can be used up, the NF consumer shall allow the service to continue until the remaining part is used up, and then report the usage of remaining quota with the quota management indication. Otherwise, the NF consumer stops the service after receiving failure response if no indication from CHF.

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| **End of changes** |