**3GPP TSG-SA5 Meeting #143-e *S5-223225rev2***

**e-meeting, 9 - 17 May 2022**

**Source: MATRIXX Software**

**Title: pCR TR 32.847 Add new solution for Key issue#8**

**Document for: Approval**

**Agenda Item: 7.5.3**

# 1 Decision/action requested

**This pCR is to introduce a new solution for Key issue#8**

# 2 References

[1] 3GPP TR 32.847 "Study on Charging Aspects for Network Slicing Phase 2"

# 3 Rationale

This pCR is to introduce a new solution for Key issue#8

# 4 Detailed proposal

The following changes are proposed to be incorporated into TR 32.847 [1]

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| **First change** |

# 5 Potential charging requirements

**REQ-NSCH-01** The 5G charging framework should support converged charging per S-NSSAI.

**REQ-NSCH-02** The 5G charging framework should support converged charging per S-NSSAI, based on "number of UEs".

**REQ-NSCH-03** The 5G charging framework should support converged charging per S-NSSAI, based on "number of PDU sessions".

**REQ-NSCH-04** The 5G charging framework should support converged charging per S-NSSAI, based on "number of UEs", exempting Emergency Registered UEs

**REQ-NSCH-05** The 5G charging framework should support converged charging per S-NSSAI, based on "number of PDU sessions", exempting Emergency services, Multimedia Priority Service, and Mission Critical Service.

**REQ-NSCH-06** The 5G charging framework should support converged charging per S-NSSAI, based on "number of UEs", including UEs connected in the EPS.

**REQ-NSCH-07** The 5G charging framework should support converged charging per S-NSSAI, based on "number of PDU sessions", including PDN connections in the EPS.

**REQ-NSCH-08** The 5G charging framework should support converged charging per tenant based on assigned group of S-NSSAI(s).

**REQ-NSCH-09** The 5G charging framework should support converged charging per S-NSSAI, based on "aggregated PDU sessions volume".

**REQ-NSCH-10** The 5G charging framework should support converged charging per S-NSSAI, based on "PDU session maximum duration".

**REQ-NSCH-11** The 5G charging framework should support individual UE converged charging based on Network Slice usage charging criteria.

**REQ-NSCH-12** The 5G charging framework should support converged charging per S-NSSAI for the time an S-NSSAI is used.

**REQ-NSCH-13** The 5G charging framework should support converged charging for UE Network Slice-specific Authentication and Authorization (NSSAA) invocation invocation towards a 3rd party for network slice access.

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| **Next change** |

### 6.8.1 General Description

This key issue is for investigating how to support UE Network Slice-specific Authentication and Authorization (NSSAA) network slice access converged charging.

NSSAA functionality specified in clause 5.15.10 3GPP TS 23.501 [7] is an additional AAA-S EAP based authorization for UE to access a network slice, after the primary authorization was granted by the PLMN under the list of allowed S-NSSAI(s). This capability can be offered and monetized by Operators (PLMN) to 3rd party enterprises owning AAA-S.

The use case for this key issue is:

A UE has a subscription with the MNO. The MNO is the owner of NSSAF and AAA-P.

The MNO has a business relationship with the 3rd party MNO for access to network slice(s) by MNO UEs requiring Slice-Specific Authentication and Authorisation by the 3rd party. The 3rd pary is the owner of AAA-S.

The MNO to 3rd party charging could be based number of invocations by MNO UEs for this additional Authentication and Authorization towards the 3rd party:

This investigation covers the following:

- determination of which entity/entities in the 5G system is suitable to provide charging information for usage of NSSAA by UE;

- determination of the main interactions required to obtain charging information for usage of NSSAA.

- identification of the main charging information to be collected;

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| **Next change** |

#### 6.8.2.1 General description

This solution addresses the Key Issue#8 for REQ-NSCH-13 and is based on use of Nchf converged charging service by 5GS Network Functions involved in UE NSSAA procedures.

AMF interacts with CHF during NSSAA procedure with the Network Slice-Specific Authentication and Authorization Function (NSSAAF) for a given UE and S-NSSAI for CHF to produce appropriate CDR.

NSSAAF interacts with CHF during NSSAA procedure for a given UE and S-NSSAI for CHF to produce appropriate CDR.

The solution applies for NSSAA, AAA Server triggered Network Slice-Specific Re-authentication and Re-authorization procedure and AAA Server triggered Slice-Specific Authorization Revocation.

The AMF Charging characteristics (Annex A of 3GPP TS 32.256[10]) is extended to include NSSAA related configuration.

NSSAAF Charging characteristics pre-configured in NSSAAF includes NSSAA related information.

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| **Next change** |

#### 6.8.2.3 Flow description

The figure 6.8.2.3-1 below describe the high level charging procedure for Converged Charging in PEC mode for Network Slice-Specific Authentication and Authorization (NSSAA) procedure based on figure 4.2.9.2-1 3GPP TS 23.502 [11]:

Graphical user interface, application

Description automatically generated

Figure 6.8.2.3-1: Converged Charging for NSSAA - PEC

Steps are based on steps of figure 4.2.9.2-1 3GPP TS 23.502 [11], with the following additions:

0ch. NSSAAF Charging characteristics is pre-configured in NSSAAF indicating: Charging active (Yes/No) for NS authentication/auth, re-authentication/re-auth, revocation per S-NSSAI.

17ch-a to c: Charging active in NSSAAF: Charging Data Request [Event] is sent to CHF with the result of NSSAA Authentication (EAP-Success/Failure, S-NSSAI, GPSI) for CHF NSSAAF CDR generation

17ch-d to e: Charging active in AMF: Charging Data Request [Event] is sent to CHF by AMF with the result of NSSAA Authentication (EAP-Success/Failure, S-NSSAI, GPSI) for CHF AMF CDR generation

The solution for Converged Charging AAA Server triggered Network Slice-Specific Re-authentication and Re-authorization procedure are based on figure 4.2.9.3-1 3GPP TS 23.502 [11] with additional interactions with CHF from NSSAAF and AMF on Nnssaaf\_NSSAA\_Re-AuthNotification.

The solution for Converged Charging AAA Server triggered Slice-Specific Authorization Revocation procedure are based on figure 4.2.9.4-11 3GPP TS 23.502 [11] with additional interactions with CHF from NSSAAF and AMF on Nnssaaf\_NSSAA\_RevocationNotification.

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| **Next change** |

### 6.8.x Solution#8.x Converged Charging for NSSAA from AAA-P

#### 6.8.x.1 General description

This solution addresses the Key Issue#8 for REQ-NSCH-13 and is based on use of Nchf converged charging service by AAA-P involved in UE NSSAA procedures towards a AAA-S belonging to a third party.

AAA-P interacts with CHF during NSSAA procedure for a given UE and S-NSSAI for CHF to produce appropriate CDR for charging for "requesting (re-)authentication/authorization" between the owner of the NSSAAF and the owner of the AAA-S.

The solution applies for AAA Server triggered Network Slice-Specific Re-authentication and Re-authorization procedure and AAA Server triggered Slice-Specific Authorization Revocation.

AAA-P Charging characteristics pre-configured in AAA-P includes NSSAA related configuration.

#### 6.8.x.2 Architecture description



**Figure 6.8.x.2-1: AAA-P converged charging architecture**

#### 6.6.x.3 Flow description

The figure 6.8.x.3-1 below describes the high level charging procedure for Converged Charging in PEC mode for Network Slice-Specific Authentication and Authorization (NSSAA) procedure based on figure 4.2.9.2-1 3GPP TS 23.502 [11]:

**Graphical user interface, timeline

Description automatically generated**

**Figure 6.8.x.3-1: Converged Charging for NSSAA from AAA-P - PEC**

Steps are based on steps of figure 4.2.9.2-1 3GPP TS 23.502 [11], with the following additions:

0ch. AAA-P Charging characteristics is pre-configured in AAA-P indicating: Charging active (Yes/No) for NS authentication/auth, re-authentication/re-auth, revocation per S-NSSAI.

16ch-a to c: Charging active in AAA-P: Charging Data Request [Event] is sent to CHF with the result of NSSAA Authentication (EAP-Success/Failure, S-NSSAI, GPSI) for CHF CDR generation

The solution for Converged Charging AAA Server triggered Network Slice-Specific Re-authentication and Re-authorization procedure are based on figure 4.2.9.3-1 3GPP TS 23.502 [11] with additional interactions with CHF from AAA-P on AAA Protocol Re-Auth Response.

The solution for Converged Charging AAA Server triggered Slice-Specific Authorization Revocation procedure are based on figure 4.2.9.4-11 3GPP TS 23.502 [11] with additional interactions with CHF from AAA-P on AAA Protocol Revocation Re-Auth Response.

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| **End of changes** |