**3GPP TSG-WG SA2 Meeting #170 S2-2507698**

**25 - 29 August, 2025, Goteborg, Sweden (revison of 6609)**

**Source: vivo, ETRI**

**Title: New solution for KI#4: Sensing Data and the Associated Information Collection and Transport via data tunnel**

**Document for: Approval**

**Agenda Item: 20.2.1**

**Work Item / Release: FS\_Sensing\_ARC/Rel-20**

*Abstract of the contribution: This paper proposes a new solution for KI#4: Sensing Data and the Associated Information Collection and Transport of the FS\_Sensing\_ARC TR 23.700-14.*

# 1 Discussion

This paper proposes a new solution to address KI#4 Sensing Data and the Associated Information Collection and Transport.



**Figure 1: System Architecture to support Sensing Services in reference point representation**

As shown in this reference point architecture, a new direct interface (e.g. Nx) between the Sensing Entity (i.e. gNB) and the Sensing Function is defined for either the sensing signaling transport or the sensing data transport or both.

The solution is based on the following principles to support sensing data and associated information collection and transport:

1. A direct data tunnel is established between the Sensing Entity (i.e. gNB) and the Sensing Function via the sensing control signalling interaction.
2. The Sensing Function and the Sensing Entity (i.e. gNB) exchange their tunnel information (e.g. TEID (Tunnel Endpoint ID) and/or IP address) for data tunnel establishment.
3. The sensing data and the associated information (e.g. Sensing Service ID) are transmitted from the Sensing Entity to the Sensing Function via the established data tunnel.

Reasonably, the sensing signaling transport and the sensing data transport could use different protocols to provide differentiated handling (e.g. QoS) considering sensing data could be frequent and big-volume:

* For sensing signaling transport, the existing NRPPa protocol (as specified in TS 38.455 [6]) can be extended; and
* For sensing data transport, the exiting GTP-U protocol can be re-used without any extension, e.g. just mimic the logic of N3 tunnel to the new direct interface (e.g. Nx) between the Sensing Entity (i.e. gNB) and the Sensing Function.

The specific protocol used for the sensing signaling transport and the sensing data transport needs to be discussed and decided by RAN3.

Based on the above principles, an end-to-end procedure for KI#4 is provided.

# 2 Proposal

It is proposed to include the following changes in TR 23.700-14 V0.2.0.

 **\* \* \* \* Start of Changes \* \* \* \***

6 Solutions

6.0 Mapping of Solutions to Key Issues

**Table 6.0-1: Mapping of Solutions to Key Issues**

|  |  |
| --- | --- |
|  | **Key Issues** |
| **Solutions** | **#1** | **#2** | **#3** | **#4** | **#5** | **#6** |
| **#1** | X |  | X | X | X |  |
| **#2** |  | X |  |  | X |  |
| **#3** | X | X | X | X | X | X |
| **#4** | X |  |  |  |  |  |
| **#5** | X |  |  | X |  |  |
| **#6** | X | X | X |  |  |  |
| **#7** | X |  |  |  |  |  |
| **#8** |  | X |  |  |  |  |
| **#9** |  | X |  |  |  |  |
| **#10** |  | X |  |  |  |  |
| **#11** |  | X |  |  |  |  |
| **#12** |  | X |  |  |  |  |
| **#13** |  |  | X |  |  |  |
| **#14** |  |  | X |  |  |  |
| **#15** |  |  | X |  |  | X |
| **#16** |  |  | X |  |  |  |
| **#17** |  |  | X |  |  |  |
| **#18** |  |  |  | X |  |  |
| **#19** | X | X |  |  | X |  |
| **#20** |  |  |  |  |  | X |
| **X** |  |  |  | X |  |  |

 **\* \* \* \* Next Changes (All text new) \* \* \* \***

## 6.X Solution #X: Sensing Data and the Associated Information Collection and Transport via data tunnel

### 6.X.0 High-level solution Principles

The solution is based on the following principles to support sensing data and associated information collection and transport via data tunnel:

1) A direct data tunnel is established between the Sensing Entity (i.e. gNB) and the Sensing Function via the sensing control signalling interaction.

2) The Sensing Function and the Sensing Entity (i.e. gNB) exchange their tunnel information (e.g. TEID (Tunnel Endpoint ID) and/or IP address) for data tunnel establishment.

3) The sensing data and the associated information (e.g. Sensing Service ID) are transmitted from the Sensing Entity to the Sensing Function via the established data tunnel.

### 6.X.1 Description

This solution is to address KI#4 Sensing Data and the Associated Information Collection and Transport.

### 6.X.2 Procedures

 

**Figure 6.x.2-1: Procedure for Sensing Data and the Associated Information Collection and Transport**

0. The Sensing service consumer (e.g. AF) sends Sensing service request to the Sensing Function (SF). In case of the Sensing service consumer is untrusted, the NEF is involved.

1. The Sensing Function selects the Sensing Entity (SE) (i.e. gNB) as specified in Solution #13 for KI#3. In order to establish a direct data tunnel for sensing data transport, the Sensing Function allocates its SF tunnel information used for data tunnel establishment. The SF tunnel information includes the tunnel end point information and/or the address of the Sensing Function (i.e., TEID and/or IP address).

2. The Sensing Function sends the Sensing service request to the selected gNB including the allocated SF tunnel information and the Sensing service ID. The Sensing service request can also include other information required for Sensing service operation at the gNB, e.g. the Sensing configuration information and the Sensing service requirement information.

3. After receiving the Sensing service request including the SF tunnel information, the Sensing Entity allocates its SE tunnel information used for data tunnel establishment. The SE tunnel information includes the tunnel end point information and/or the address of the Sensing Entity (i.e., TEID and/or IP address). The Sensing Entity sends a Sensing service response including the SE tunnel information and an operation execution result indication. The operation execution result indication indicates whether the Sensing service request is accepted or not. After exchanging the tunnel information, a logic data tunnel is established between the Sensing Function and the Sensing Entity for sensing data and the associated information collection and transport.

Editor's note: The detailed protocol (e.g. NRPPa) used for the sensing control signaling transport between the Sensing Function and the Sensing Entity is up to RAN3 discussion and decision.

Editor's note: The detailed protocol (e.g. GPT-U) used for the data tunnel is up to RAN3 discussion and decision.

4. The Sensing Entity performs sensing service operations to obtain the sensing data.

5. After the sensing data obtention, the Sensing Entity sends the sensing data and the associated information to the Sensing Function via the established data tunnel. The associated information includes the Sensing service ID provided by the Sensing Function in step 2 for binding the sensing data and requested Sensing service.

6. The Sensing Function performs sensing result generation based on the sensing data and associated information received in step 5.

7. The Sensing Function exposes the sensing result to the Sensing service consumer (e.g. AF). In case of the Sensing service consumer is untrusted, the NEF is involved.

### 6.X.3 Impacts on services, entities and interfaces

The solution has impacts on the following entities:

Sensing Function:

- Support to provide the SF tunnel information to Sensing Entity.

- Support to receive the SE tunnel information from the Sensing Entity.

- Support to receive sensing data and the associated information from the Sensing Entity via the data tunnel.

Sensing Entity (i.e. gNB):

- Support to receive the SF tunnel information from the Sensing Function.

- Support to provide the SE tunnel information to the Sensing Function.

- Support to transfer sensing data and the associated information to the Sensing Function via the data tunnel.

**\* \* \* \* End of Changes \* \* \* \***