**SA WG2 Meeting #139e S2-2003660**

**June 1th-12th, 2020 ; Elbonia (revision of S2-2003660)**

**Source: Nokia, Nokia Shanghai Bell**

**Title: KI#3, new solution: Providing selected radio information to an App requiring it**

**Document for: Agreement (P-CR)**

**Agenda Item: 8.3**

**Work Item / Release: FS\_enh\_EC / Rel-17**

*Abstract of the contribution:* **KI#3, new solution: Providing selected radio information to an App requiring it**

# 1 Discussion

Key Issue #3: Network Information Provisioning to Local Applications with low latency

# 2 Proposal

**It is proposed to update TR 23.748 as follows with following new solution**

*FIRST CHANGE (all text is NEW)*

## 6.x Solution #x: Providing selected radio information to an App requiring it

### 6.X.1 Description

This solution addresses Key Issue #3: Network Information Provisioning to Local Applications with low latency.

An APP (Local Application) running on a network edge EAS may need information that are determined/known in NG-RAN, e.g.:

- Information on current available Radio conditions for the UE e.g. UE Radio conditions, RSRP, Radio Throughput, RAN DL (PDCP) buffer in overflow status,

- PLMN information, which contains data about the underlying mobile network that the APP is actually using to exchange traffic with the UE

- UE location information

- Etc...

APP(s) running on the network edge EAS need such data and/or Events in (near) Real Time. The solution does not consider the App configuring a NG RAN, just the App retrieving information about an UE served by a NG RAN.

For this release, per the constraint expressed in the FS\_enh\_EC Study Item (SP-200093), RAN information about the UE is limited to information that the management system can currently report and defined

This solution is based on following principles:

- it is not expected that raw information handled by the NG RAN is directly provided to the APP as the network may want to protect / hide sensitive information: **an intermediate entity is needed to run policies on RAN related information being exposed to the APP**;

- the APP may only know how to address the UE over the DN (addressing information the APP uses to reach a UE e.g. the UE IP address + N6 tunnelling information) and is not expected to know the SUPI of the UE,

- the APP does not know and is generally not willing to know which NG RAN entities currently serve the UE; furthermore, it generally does not want to be bothered with Hand-Over information,

- the solution strives to **reuse as much as possible existing 3GPP mechanisms**:

- 3GPP R16 specifications allow an AF (Application Function) managing the EAS (Edge Application Server deployed locally to support Edge Computing) to subscribe to notifications of UE “UP path change” where it can get the mapping between addressing information to reach a UE and the 5GC identifier of this UE e.g. SUPI,

- 3GPP defines already a way for Tracing Requirements configured in the UE subscriptions data (in UDM/UDR) to be communicated to the NG RAN currently serving the UE,

- **3GPP Release 16 has defined streaming trace** and MDT capabilities (TS 32.422), allowing the NG RAN to **provide in Near Real time information** about a UE.

- 3GPP specifications about RAN tracing are reused

- The actual APIs that allow the APP to request information from the EC AF (AF dedicated to Edge Computing) is considered not to be under scope of 3GPP SA2.

At high level the solution works as follows:

1. The APP requests (RAN) information about a UE, providing what it knows about the UE i.e. addressing information to reach a UE (e.g. the UE IP address + N6 tunnelling information) as well as the APP URI where it expects to receive such information. This request is forwarded to the (Edge Computing) AF that terminates the Nnef\_TrafficInfluence\_Notify API (API as defined for R16 in TS 23.502 clause 5.2.6.7); the (Edge Computing) AF can thus map addressing information to reach a UE into the SUPI or the GPSI,
* the (Edge Computing) AF is thus assumed to be operated by the PLMN while the App and the EAS (data center) may be operated by a third party
1. The APP request is then transformed into a dedicated Requirement about a SUPI to get the related RAN information for this particular UE. Such Requirements are provided via Local NEF to management system by invoking MnS.

Editor’s Note: Whether SA5 MnS support this or not is FFS.

Editor’s Note: What RAN information can be received and transferred to AF is FFS.

1. The local NEF receives requested information from MnS producer and enforces policies related with the identity of the APP and then provides the filtered information on the APP URI. These policies allow the network operator to protect / hide sensitive information.

This is further defined in clause 6.X.2.

The solution introduces a new entity: the local NEF which:

* receives RAN information from MnS producer. For this purpose, it acts as a consumer of NOTIFICATION (SBA) defined by SA5 MnS framework

NOTE: The interface between MnS producer and the local NEF is Service Based but defined by SA5.

* applies operator policies related with data that the operator is willing to share with the EAS / Edge App. The local NEF is configured by the EC AF with the way (URI, etc…) to report RAN information to the EAS / Edge App.

The local NEF is an entity specified by SA2 but that uses MnS services defined by SA5 specifications to receive information from MnS producer.

The EC AF and the local NEF are owned by the operator.

### 6.X.2 Procedures

1 (pre-requisite) the UE has established a PDU session (where traffic offload may apply) and the EC (Edge Computing) AF has subscribed to the SMF event “UP path change” as defined in 23.502 § 5.2.8.3.1.

2 In the notification corresponding to the SMF event “UP path change” the SMF provides (as defined in 23.502 § 5.2.8.3.1 and § 5.2.8.3.2) the EC (Edge Computing) AF with:

- Event ID, Notification Correlation Information, UE ID (SUPI and if available GPSI), PDU Session ID, time stamp

- As it is for “UP path change”, the notifications contain also

- The Target DNAI (corresponds to the Edge Environment that hosts edge Application)

- addressing information to reach a UE:

- UE IP address / Prefix.

- N6 traffic routing information.

NOTE1: It is assumed that the EC AF is managed by the operator so that it can receive the SUPI

3 The UE invokes an APP connecting to the EAS,

4 The APP sends a request for information about the UE. The APP provides:

 - The Requested RAN Info Type (= e.g. request for throughput, UE location, etc.). The request may correspond to a one-shot information GET or to a SUBSCRIBE request to receive notifications

- The target UE identified by addressing information to reach the UE on the local N6 (which maps to the UE IP address / Prefix + N6 traffic routing information of the notification in step 2).

- a URI (Notification Target Address) where the APP wishes to receive the corresponding notifications and possibly an NCI (Notification Correlation Id) to help the APP to retrieve the proper APP context corresponding to the notifications it will receive due to this request.

NOTE2: the way for the UE to invoke the APP and for the APP sends requests for information to the EC AF about a UE is out of scope of SA2

5. The EAS forwards the request to the EC AF (which is acting as manager of the edge Computing deployments): the EC AF receives at least:

- The Requested 5G RAN Info Type,

- addressing information to reach the UE on the local N6,

- Data delivery information that contains at least the Notification Target Address / URI where the collected NG RAN related information is to be delivered but may also contain a Correlation identifier (NCI),

- the DNAI (to indicate the instance of Edge Environment) and,

- the APP or EAS identity.

In this solution the EC AF is assumed to be owned by the operator (it receives the SUPI) and to have access to (e;g. be configured with) a mapping from DNAI to local NEF

6. The EC AF asks Local NEF for RAN information about the UE identified by its SUPI/GPSI.

The EC AF knows per notifications received in step 2 how to map UE IP address information to the SUPI and can thus translate the request received in step 4 into a request targeting a UE.

7 The local NEF obtains requested RAN info by invoking MnS services provided by MnS producer defined in SA5 and makes any necessary control or parameter translation within Requested RAN Info based on local policies related with the APP identity

9. The local NEF sends the updated / filtered Requested RAN Info to the target (determined using Data delivery information) i.e. to the App on the EAS.

### 6.X.3 Impacts on Existing Nodes and Functionality

The proposed solution is based on Rel-16 procedures (EC AF receiving 5GS notification using Nnef\_TrafficInfluence service, but following enhancements are needed:

* the reporting mechanism does not require RAN change
* Addition of the local NEF in the architecture, where the local NEF is to apply operator policies to NG RAN information sent to the EAS / App

Upgrade of the role of the EC related AF: this AF is to transform an App/EAS request into a requirement and to configure the local NEF accordingly

*Next CHANGES*

## 6.0 Mapping of Solutions to Key Issues

Table 6.0-1: Mapping of Solutions to Key Issues

|  |  |
| --- | --- |
| Solutions | Key Issues |
| 1 | 2 | 3 | 5 |
| #1: Provisioning URSP configuration to the UE to establish PDU Sessions for edge applications | X |  |  |  |
| #2: Local DNS based edge server address discovery | X |  |  |  |
| #3: DNS AF | X |  |  |  |
| #4: Providing the DNS authoritative server with IP addressing information about where the UE is located | X |  |  |  |
| #5: Server Discovery using DNS, IP Routing and URSP | X |  |  |  |
| #6: Discovery of EAS based on DNS | X |  |  |  |
| #7: SMF/I-SMF selection based on DNAI | X |  |  |  |
| #X: Providing selected radio information to an App requiring it |  |  | X |  |

*End of CHANGES*