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Title: (TP to TR 38.769) Protocol Stacks for Topology 2 NAS/UP based solutions

Agenda Item: 16.2

Source: Huawei, CMCC, ZTE, CATT, NEC, Xiaomi, Lenovo, China Telecom, Samsung, Qualcomm

Document for: other

# Introduction

In this paper, we propose to capture the leftover details on UP based and NAS based solutions as provided in section 3.

# 2 Reference

[1] 3GPP TR 23.700-13 Study on Architecture support of Ambient power-enabled Internet of Things, (Release 19) V1.1.0 (2024-10)

# 3 Text Proposal

***-----------Start of the Change------------***

#### 6.4.2.1 Solutions for Topology 2

##### 6.4.2.1.0 General

To support Topology 2, the following solutions are to be studied for conveying A-IoT upper layer information:

**- RRC based solution.** With this solution, A-IoT CN applies A-IoT upper layer information explicitly over XXAP signaling. A-IoT upper layer information is then relayed explicitly to/from the A-IoT-enabled UE via NR Uu RRC.

- **NAS based solution**. With this solution, there is no explicit termination of A-IoT upper layer information at A-IoT-enabled gNB. A-IoT upper layer information is transmitted over A-IoT enabled UE's NAS.

- **UP based solution**. With this solution, there is no explicit termination of A-IoT upper layer information at A-IoT-enabled gNB. A-IoT upper layer information is transmitted as A-IoT-enabled UE's user plane data.

NOTE: The protocol stack for each solution option does not illustrate A-IoT CN internal architecture and how A-IoT upper layer information is transported, if any. Details are subject to SA2 agreements.

##### 6.4.2.1.1 Solution1: RRC based solution

Upon receiving XXAP: A-IoT related message from A-IoT CN, the A-IoT-enabled gNB transmits the related information towards the A-IoT-enabled UE via NR Uu RRC, and vice versa.



Figure 6.4.2.1.1-1: RRC based solution of Topology 2

##### 6.4.2.1.2 Solution 2: NAS based solution

The A-IoT related messages between the AIoTF and the A-IoT-enabled UE are carried via A-IoT-enabled UE’s DL/UL NAS packets, the A-IoT-enabled gNB handles the A-IoT-enabled UE’s NAS packets as legacy, i.e., using DL NAS Transport and UL NAS Transport procedures over NGAP.



Figure 6.4.2.1.2-1: NAS based solution of Topology 2

NOTE 1: The communication between AIoTF and the A-IoT-enabled UE via A-IoT related messages and the presence of AIoT-AP protocol are being discussed in SA2. If agreed by SA2, the , this requires coordination between RAN3 and SA2.

NOTE 2: The definition and description of AIoTF and AIoT-AP refers to TR 23.700-13 [7].

There are different ways discussed to achieve A-IoT radio resource coordination and allocation as described in 6.5.1.3. Figure 6.4.2.1.2-2 illustrates one candidate solution to support AIoT session resource control for the NAS based solution by utilising XXAP between A-IoT CN and A-IoT enabled gNB.



Figure 6.4.2.1.2-2: one candidate solution of Resource control for NAS based solution of Topology 2

For the NAS-based solution there are other candidate solutions discussed (e.g., A-IoT enabled UE request-based resource allocation) described in section 6.5.1.3 which might not need this additional protocol layer (XXAP) for resource allocation, refer to section 6.5.3.1.2.

6.4.2.1.3 Solution 3: UP based solution

The A-IoT related messages between the AIoTF and the A-IoT-enabled UE are carried via A-IoT-enabled UE’s PDU Session, the A-IoT-enabled gNB handles the A-IoT-enabled UE’s user plane data as legacy, i.e., over NG-U GTP-U tunnels.



**Figure 6.4.2.1.3-1: UP based solution of Topology 2**

NOTE 1: The communication between A-IoTF and the A-IoT-enabled UE via A-IoT related messages and the presence of AIoT-AP protocol is being discussed in SA2. As the , this requires coordination between RAN3 and SA2

NOTE 2: The definition and description of AIoTF and AIoT-AP/Transport/IP refers to TR 23.700-13 [7].

There are different ways discussed to achieve A-IoT radio resource coordination and allocation as described in 6.5.1.3. Figure 6.4.2.1.3-2 illustrates one candidate solution to support AIoT session resource control for the UP based solution by utilising XXAP between A-IoT CN and A-IoT enabled gNB for resource control.



Figure 6.4.2.1.3-2: one candidate solution of Resource control for UP based solution of Topology 2

For the UP based solution there are other candidate solutions discussed (e.g., A-IoT enabled UE request-based resource allocation) described in section 6.5.1.3 which might not need this additional protocol layer protocol layer (XXAP) for resource allocation, refer to section 6.5.3.1.2.