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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 1: 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.

NOTE 2: No down selection for T2 solutions in RAN3 in the study.

##### 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 A-IoT CN 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 A-IoT CN and the A-IoT-enabled UE via A-IoT related messages and the presence of AIoT-AP protocol are up to SA2 decision.

NOTE 2: The definition and description of AIoTF and AIoT-AP refers to TR 23.700-13 [7]. AIoT-AP may carry same/similar information as defined for other solutions over XXAP.

There are different ways to achieve A-IoT radio resource allocation as described in 6.5.1.3, Figure 6.4.2.1.2-2 illustrates one way to support resource control of NAS based solutions. In this solution, due to the disassociation of communication paths of the NAS option, additional protocol functions are needed in order to associate RRC, NAS and RAN-CN signalling to the same AIoT transaction.



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

##### 6.4.2.1.3 Solution 3: UP based solution

The A-IoT related messages between the A-IoT CN 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-IoT CN and the A-IoT-enabled UE via A-IoT related messages and the presence of AIoT-AP/Transport/IP protocols are up to SA2 decision.

NOTE 2: The definition and description of AIoTF and AIoT-AP/Transport/IP refers to TR 23.700-13 [7]. AIoT-AP may carry same/similar information as defined for other solutions over XXAP.There are different ways to achieve A-IoT radio resource allocation as described in 6.5.1.3, Figure 6.4.2.1.3-2 illustrates one way to support resource control of UP based solutions. In this solution, due to the disassociation of communication paths of the UP option, additional protocol functions are needed in order to associate RRC, UP and RAN-CN signalling to the same AIoT transaction.



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