Mobile User Plane Evolution

draft-zzhang-dmm-mup-evolution-09

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Objectives:

- **Recaptures of what have been done/achieved since the 1st adoption discussion in Nov. 2023 (IETF-118)**

The following slides are based on the summary email we have sent to the DMM alias on Oct. 11, 2024

WG Comments & questions vs. our replies & AIs, corresponding to the up-to-date revised draft, after the adoption-call and the IETF-118/-119/-120:

(From adoption-call) Comment#1: user-plane vs. control-plane

- The draft seems to include inconsistent C-Plane discussions compared to what the authors argued.

[Reply]:

- We agree with one comment: CP does play a pivotal role in realizing the original DMM principles. The full potential of ANUP can be achieved upon the consideration of both CP & UP.
- The work on user-plane & control-plane in the draft centers around the MUP/ANUP, i.e., the potential advantages with the integration of gNB & UPF.
- The discussions on 'control-plane' in the draft do not lay on the broader-sense aspects of 5G CP (e.g., RM, MM, SM, Paging, QoS settings, etc.). Nor do we intend to do so. Please see our replies to the following comment#2.

(From adoption-call) Comment#2: Regarding 'SMF/N4, AMF/N2, Paging/RNA-AMF, etc.'

- *Sec.2 of "draft-zzhang-dmm-5g-destiributed-upf" assumed SMF exists, which could contradict with the ANUP proposal for simplifying signalling (N4 still required). In terms of paging, RNA paging over Xn has no IP addr info. If it has, it is different from the current. And it also assumes AMF exists after paging. It seems to contradict with ANUP concept (N2 still required too). If AMF doesn't exist, it is different from the current.*
- *Basically, this comment concerns this I.D. might step into too much into the 3GPP territory, e.g., talking about architectures of the SMF/N4, AMF/N2, Paging/RNA-AMF, etc.*

[Reply]:

- First, we want to be crystal clear: as set forth at the beginning of the draft, the I.D. does not intend to do the 3GPP 5G/6G work in IETF. So, while we do list some critical 5GS CP features that might be related to this I.D., e.g., paging, CP signalling, etc., we have been acknowledging that the complete studies must be done in 3GPP SDO.
- Without doubt, 5GS is extremely complicated. While the MUP/ANUP might have certain advantageous impacts to the current 5GS CP, more will be explored along the time, with the main objective at the 6G evolution, once the draft is adopted.
- In summary, we don't intend to cross into the 3GPP territory. Just, if we do come up with novel thoughts during the normative work of the ANUP, we will liaise to 3GPP for possible advisory references.

[Some actions via I.D. revisions]:

- Remove: 2.1 (O-RAN), 6.3 (Mobility HO), 6.4 (Paging)
  - This change is to address the concerns from more than one commenter that the I.D. should not step into the 3GPP domain. These subsections, e.g., paging, mobile HO, etc., are sort of 3GPP RAN & CN-CP specific.
- Add & Revise:
  - A good scenario is added in the section#3 to justify the feasibility of ANUP: the solution proposals of the 3GPP Rel-19 SID (Satellite Phase-3) suggest the integrations of (a) CP registration/session establishment; and (b) UP gNB/UPF (eNB/MME).
    - Revise 6.11 (satellite), move & merge to the section#3.
  - Move the LIPA section (was sec#5) to be a sub-section under the section#3, to demonstrate it's being an ANUP-like feature already in 4G.
- Also modified the subject lines of some sections to make the draft more readable and easier to follow: Sections#3, #4, including sub-sections.

(From adoption-call & IETf-120) Comment#3: implementation & realization on 'consensus' claim

- When it comes to rough consensus, should it be proved by the running code? – The DMM WG Chair has clearly stated that 'the claim of reaching consensus among WG participants' means, in the context of IETF, implementation must have been successfully coded.
  - Thanks to this 'consensus' claim, similar comment can be seen: "the focus of the draft should be changed to address details of realizing "ANUP""

[Reply]:

· We recognize that the usage of 'consensus' might be a misrepresentation of our intention. Thus, we will correct the 'consensus' claim from now on.

· Regardless, we have made it clear that this MUP/ANUP draft represents some thoughts from the IETF/wireline background, though the actual specification work needs to happen in 3GPP. That is, IETF does not do 3GPP standardization.

· Further, in our common understanding, 'rough consensus' does not necessarily require running code. As we know, many great solutions started without running code and not every WG requires running code before progressing documents. Running code does not mean rough consensus either - only multiple reputable interoperable running codes are meaningful.

(From IETF-119/-120) Comment#4: Regarding the subtle demarcation btwn IETF and 3GPP

- What kinds of advisory references could this IETF draft provide to 3GPP? E.g., how this might be useful to the on-going 6G evolution (CP & UP)?

[Reply]:

- This I.D. targets at offering to the imminent 6G evolution a possible reference design, out of numerous proposals, focusing on integrating the transport functionalities of both AN and CN.
- As we know, there are lots of research contributions revolving around the 6G network architecture. For example, an 6G paper published in IEEE Communication Magazine in July 2023, *6G Architecture Design: from Overall, Logical and Networking Perspective*, analyzed various new scenarios, requirements as well as experience learned from the 5G deployment & operations. It proposed the holistic SBA and DAN (Distributed Autonomous Architecture) architectural principles for 6G, both of which talk about self-contained building blocks for AN and CN. Evidently, the integrated ANUP bears the potentials to offer transport advisory reference to 3GPP/6G evolution.

Conclusions

This draft targets at 6G evolution:

- The 3GPP Rel-20 (6G roadmap) will start from the Q1 of Y-2025, a perfect timing for the exploration of the ANUP-like work, e.g., to investigate a possibly distributed AN, potentially integrated with (some components) of a (holistic) SBA CN, etc.
- Further, many contributions are currently discussing the potential network architecture evolution for 6G, technical directions spanning both RAN and CN, new infrastructure impacts with TN-NTN integration, etc.
- The draft mainly proposes enhancements and potential extensions for 6G planning. In our thoughts, the ANUP work might result in some good advisory implications to 6G evolution, like: a flattened, simplified network architecture with the ANUP taking on both wireless (via air interface) and wireline (via IP network) connections.

Current status & proposed scope of the I.D. work:

- This draft represents work/thoughts from the IETF/wireline background. It has attracted significant interests and/or supports from many mobile operators & vendors.
- While the contribution from the draft strives to offer advisory reference to 3GPP, the actual specification work needs to happen in 3GPP, which is out of

Thank you !