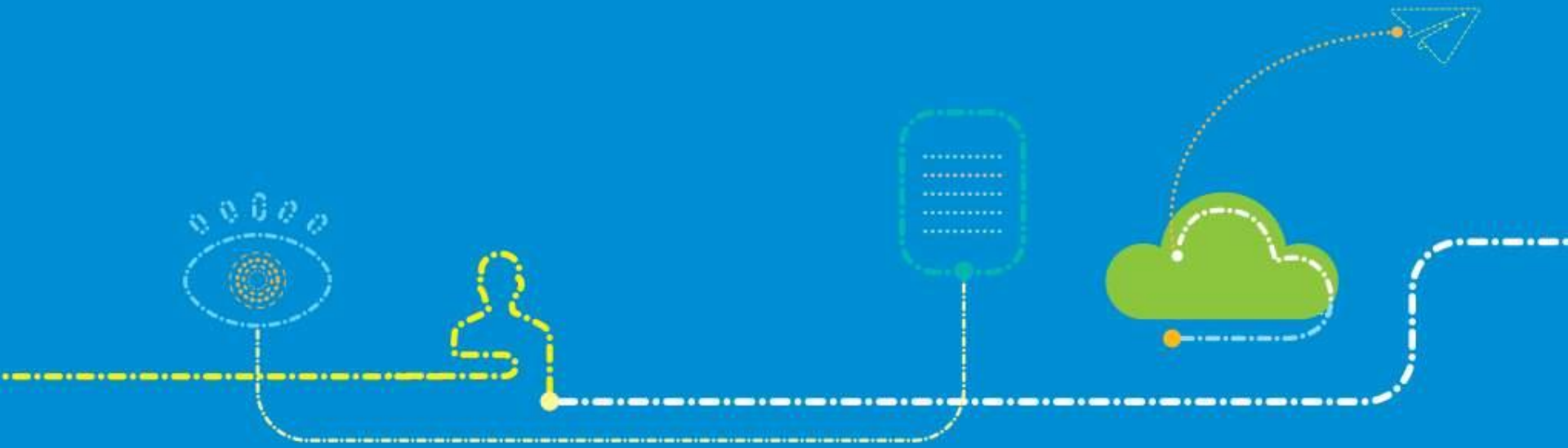
RP-232178

3GPP TSG RAN#101
Bangalore, September 11 - 15, 2023

Source: ZTE Corporation, Sanechips

Agenda: 8A.2.15

Views on lean protocol stack for Rel-19



Proposed enhancements to 5G protocol stack

- Few proposals made to either study or enhance the 5G protocol stack [1], [2]
- Motivations for this according to the proponents are as follows:
  - UP protocol stack has remained unchanged largely since 3G era
  - Overhead in UP stack can be reduced
  - Processing delay in UP may be reduced
  - Latency and reliability can be improved
  - General processing load reduction for UP
  - Prevention of head of line blocking etc
- It is also believed that one of the motivation for these is to serve as basis for 6G UP design

References

[1] Views on Rel-19 User Plane Enhancements *Apple Inc*

[2] Study on Lean Protocol Stack *MediaTek Inc*

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Current status

- 5G protocol stack has been carefully designed to satisfy various requirements specifically to support different verticals
    - eMBB required differential QoS and per packet handling of QoS
    - URLLC requirements imposed dynamic QoS handling and support for low latency applications
- As a result, the protocol stack for 5G has been chosen to satisfy these requirements and it has been optimised carefully to meet the requirements for 5G
    - Although the general protocol layer architecture is similar to 3G, there are specific enhancements included to satisfy the requirements for 5G
        - SDAP layer has been added to handle the per packet QoS handling and the reflective QoS requirements in 5G
        - Other enhancements were included in MAC to meet the latency requirements for URLLC like services

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Discussion

Lean protocol stack for 5G Advanced

- It is generally the case that when a new technology is designed, we have to carefully redesign the UP protocol stack to meet the specific requirements and targets of that generation of technology
- The overall UP stack design, once specified, stays relatively unchanged during the life cycle of the technology
    - Significantly altering the overall UP stack during a technology life cycle will result fragmentation
        - UEs and network will both need to support the new protocol stack
        - The support of an entirely redesigned protocol stack would require the UEs and networks to support both the old and new protocol stacks thus significantly increasing the cost and complexity of the devices

Lean protocol study as a basis for 6G

- Studying a new protocol stack without a stable set of requirements for the new generation of technology is impractical
    - For a new technology generation (6G), as in the previous generations, the protocol stack has to be carefully designed to meet the requirements of that technology
    - The UP protocol design in 6G will strongly depend on overall network architecture and topology

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Conclusion and proposal

Based on the above, we make the following observations

- Overall redesign of 5G UP protocol stack is not essential
- Specific and targeted enhancements for critical issues identified in the field can be supported, but this should not result in a overall redesign of the UP protocol architecture.
- A study for redesign of UP protocol stack for the next generation of mobile communication system (6G) should be guided by stable set of new requirements and targets. So, starting a generic study item or work item without having these targets is premature.

Based on the above, we make the following proposal:

Proposal:

- *RAN shall not approve any new work for drastic redesign of UP protocol stack for 5G in Rel-19 and no new study for generic protocol enhancements for future technologies (e.g. 6G) should be carried out in Rel-19 either*

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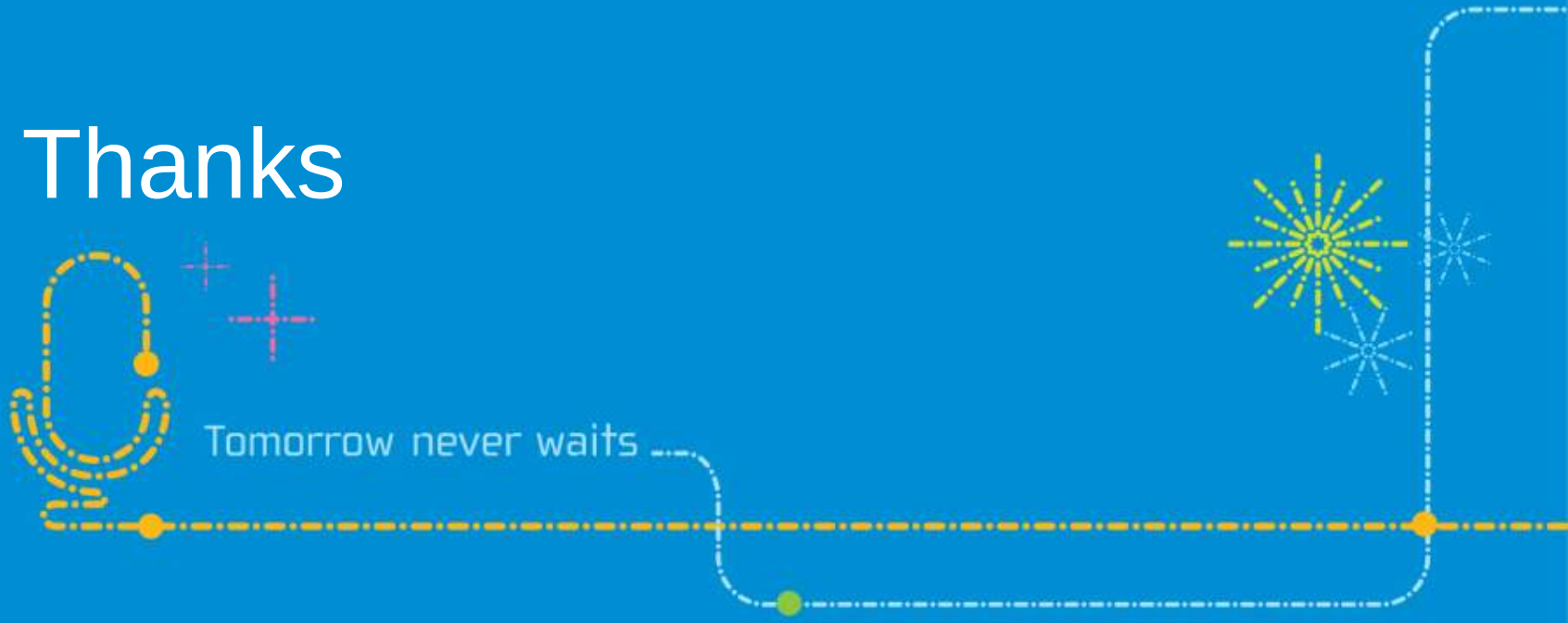
Thanks