

3GPP TSG RAN Meeting #77
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Motivation for Further LTE Mobility Enhancements

OPPO

Motivations for Further Enhancements

- ✓ Real Time Game played on mobile terminal is becoming more and more popular, e.g. Arena of Valor: 5v5 Arena Game, which is developed by Tencent
- ✓ More than 100 million users are playing the game on their mobile terminal every day
- ✓ Characteristics of the Game
 - ✓ Competitive fight like Dota
 - ✓ Real time interactive between Players
 - ✓ An alarm will be reported when packet latency exceeds **50ms** (One way from terminal to Server)
 - ✓ The packets are classified as heart beat packet and game related packet based on UDP



Issues for Real Time Game

- ✓ When UE is static, the requirements could be satisfied in most cases
 - ✓ When UE is moving, there will be packet delivery latency experienced by the UE because of the handover **interruption and robustness**
 - ✓ First scenario: low or medium mobility speed without deterministic route, e.g. private car
 - ✓ Second scenario: Medium or high mobility speed with deterministic route, e.g. bus, railway, high speed train
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Requirements for Real Time Game

- ✓ The requirements for handover interruption and reliability
 - ✓ Interruption Time: No latency experienced, at least better than **6.7ms** interruption time for HO
 - ✓ Considering the average backhaul latency is 30ms as assumed by SA and RAN
 - ✓ S1 average 20ms, while X2 average 10ms
 - ✓ Considering the latency for data transmission is 13.3ms with one time retransmission (i.e. 12.5ms new transmission+8ms retransmission)
 - ✓ Reliability: **High reliable** packet delivery, especially considering UDP protocol used
 - ✓ Without retransmission in IP layer
 - ✓ Without HO failure caused by too late HO

Potential Standard Enhancements

- ✓ Interruption Time
 - ✓ DC based Handover targeting for 0ms handover interruption
 - ✓ Single Tx/Rx UE enhancements
 - ✓ Reliability
 - ✓ Conditional HO
 - ✓ Packet duplication when HO
 - ✓ Measurement parameters based on UE requirements, e.g. optimized DRX configurations, etc.
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Proposed Modification for WID on Mobility Enhancements

- ✓ [DC based Handover targeting for 0ms handover latency [RAN2/RAN3];]
 - ✓ Packet duplication [RAN2/RAN3]:
 - ✓ Duplicated RRC transmission (e.g. RRC diversity)
 - ✓ Duplicated data transmission during handover
 - ✓ Extend current dual connectivity(DC) to multiple connectivity(MC)
 - ✓ Specify the function split among the protocol layers and procedures to enable packet duplication[RAN2/RAN3]:
 - ✓ UE centric mobility with preconfigured condition and prepared context[RAN2/RAN3]:
 - ✓ [Single Tx/Rx UE enhancements;]
 - ✓ [Measurement parameters based on UE requirements, e.g. optimized DRX config., etc.;]
 - ✓ Specify necessary core requirements for the identified solutions [RAN4].
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Thank you!

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