**SA WG2 Meeting #S2-153E S2-220xxxx**

**10 October – 17 October 2022, Electronic, Elbonia (revision of S2-220xxxx)**

**Source: Futurewei**

**Title: KI #4, 5 Discussion on Delivering DL PDU Set Information to RAN**

**Document for: Discussion**

**Agenda Item: 9.19**

**Work Item / Release: FS\_XRM /Rel-18**

***Abstract of the contribution:****This contribution discusses the options for delivering DL PDU Set Information to RAN*

# 1 Discussion

Some of the considerations in the options for delivering DL PDU Set Information to RAN are discussed here.

For the purposes of this analysis, media encoding is divided into two:

1. Constant: codecs use a fixed ratio of I/P/B frames (and predictable sizes).
2. Dynamic: codecs may use dynamic GOP (i.e., ratio of I/P/B frames are dependent on motion and other application-level aspects). Or use SVC - scalable coding, transcoding and flexible partitioning for rate adaptation.

**Main observation:**   
Option 1 can use current QoS model but has limitations for scalable/flexible video encoding.   
While Option 2 needs extensions to current QoS model it can handle scalable/flexible encoding better.  
Flexibility may be an important consideration (adaptive encoded video, audio, overlaid objects, etc for XR).

Details for Option 1 and 2 are described below.

**Option 1**: Use different QoS Flows with different priority level. PDU Set importance is mapped to existing QoS flow priority.

Data of the same service flow (IP tuples) are classified into multiple QFIs based on priority/importance, e.g., as shown in the figure below.



**Observations**:

1. Configuring QoS flow parameters for fractions of a flow may need extensive tuning for it to be optimal.
2. QoS model in RAN remains the same (current model). Extensions for handling (PDU sets, importance, etc) are primarily in 5GC.
3. For constant codec rates (case a), each of the flows/QFIs can be tuned accurately.
4. Under dynamic conditions (case b), provisioning QFIs per importance level may be complex.  
   GFBR and MFBR should be chosen for each importance class such that base information is guaranteed when resources are constrained but can be scaled up to the maximum rate when possible.  
   This fragmentation may lead to excess provisioning or poorer quality.

**Option 2**: Use one QoS flow for different PDU Set with different priority level.

Data of the same service flow (IP tuple) has one QFI but multiple priority levels/importance. RAN may split data of the same QoS flow into multiple DRB/LCHs based on importance, but the QFI parameters apply to the aggregate.



**Observations:**

1. Configuring QoS flow parameters in the UPF is for the aggregate flow only. Only additions for the PDU set need to be considered and not all QoS flow parameters for each PDU set.   
   GFBR and MFBR can be chosen conservatively
2. QoS model needs to be extended in RAN, for example, the SDAP entity splits data of the same QoS follow into different DRBs or the SDAP entity maps all data of the QoS flow into a single DRB and the transmitting PDCP entity serving the DRB splits data of the same QoS flow into different logical channels (LCHs), based on importance/priority. (note: this is just explanatory, not prescriptive).
3. For constant codec rates (case a), the aggregate rates are tuned to the media flow.
4. Under dynamic conditions (case b), the handling is the same as for constant codec rates. GFBR and MFBR can be chosen such that base information is guaranteed when resources are constrained but can be scaled up to the maximum rates when possible.