



5G Backhaul Network with PPR and Mobility Scenarios

draft-clt-dmm-tn-aware-mobility-02

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What is being solved?

Background

REL15: TS23.501/502 specify 5G architecture and procedures for gNB mobility, which is similar to 4G mobility scenarios. These specifications also specify new mobility scenarios which are specific to 5G, viz., UPF mobility.

Problems

1. With various SSTs (eMBB, URLLC, MIOT):
 - different traffic characteristics needing low and deterministic latency, real-time, mission-critical or networked AR/VR on 5G networks (end-to-end) i.e. including N3/N9.
 - However, with current approach, it is difficult to provide SLA guarantees for the above, in various 5G procedures (including mobility).
 - This is mostly because 5G architecture focused only on Radio Access Network and Core Network and backhaul transport network is not seen in an integrated fashion.
2. An under specified mapping function from 3GPP PDU session to transport network paths. Where multiple technologies are possible in backhaul network to create the transport path.



Recap

This work first presented at IETF102, DMM WG

Objective

- Creating a reference architecture to integrate the transport backhaul network in 5G Service based Architecture.
- Providing a clear mapping function to integrate the PDU session to the underlay TE paths, which can be established with various IETF transport technologies.
- Describe how Preferred Path Routing (PPR) [[I-D.chunduri-lsr-isis-preferred-path-routing](#)] fits into this framework in various Session and Service Continuity (SSC) Modes including N9 interface.
- Also discuss how new IETF mobility technologies can be leveraged with undelay backhaul transport

Note

- This proposal doesn't remove GTP, rather assumes a overlay like GTP is existing
 - The approach specified does not change existing N3 user plane encapsulation
 - And it can work with any encapsulation (including GTP-U) for the N9 interface



Backhaul Transport Underlay

- This work is orthogonal and complimentary to SRv6, which focuses on various things including GTP layer removal
- with PPR (**Underlay**: SR supported user planes with optimizations + Native IP Support)
 - What is Preferred Path Routing (PPR): [[I-D.chunduri-lsr-isis-preferred-path-routing](#)]
 - For SR data planes PPR provides 2 key benefits
 - low transport path overhead
 - TE characteristics with specified bandwidth, Jitter, Latency and burst rate support, which can be signaled along the path [[I-D.draft-cls-ppr-te-attributes-00](#)].
 - For 3 different SSTs 3 PPR-IDs can be signaled from any node in the network.
 - For UL gNB will choose the right PPR-ID of the UPF based on the 5QI value.
 - Similarly in the DL direction right PPR-ID of the gNB is chosen.
 - More details in the draft.
- Framework proposed in this draft is applicable to other IETF TE technologies



Updates in 02 Version

Lot of offline feedback received including from couple of 3GPP Delegates

- ✓ How QoS is being carried out in the user plane on N3 and N9 Interfaces (Section 2)
- ✓ Differences w.r.t bearers in 5G (Section 2)
- ✓ Missing transport network related items w.r.t to Slice selection in integrated approach (Section 2.2)
- ✓ Example transport network function defined in 5GC (Section 3)
- ✓ Correction in SSC mode 1 (Section 3.4.1)
- ✓ Summary with PPR (Section 5)



Next Steps:

- Seeking more inputs/suggestions
- If you have more thoughts [✉ uma.chunduri@gmail.com](mailto:uma.chunduri@gmail.com)

Thank you!