KT’s GiGA LTE
- Commercial Mobile MPTCP Proxy service launch
- Collaboration with handset manufacturers

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Updates

KT started launching mobile MPTCP proxy service in commercial since June 2015. It’s world 1\textsuperscript{st} commercialization!

- **GiGA LTE** (a.k.a., GiGA Path, mobile MPTCP proxy)
  - Premium service providing the fastest mobile data speed (theoretically LTE + WiFi combined giga bps)
  - Deploy mobile MPTCP proxy GWs w/ UE support (national-wide LTE/3G and public/private WiFi coverage)
  - Collaboration with handset manufacturers (Samsung Electronics, etc) – now Galaxy S6/S6 Edge works

※ Theoretical maximum speed. Practical combined throughput in the real field may vary according to network conditions.
Both mobile MPTCP proxy gateway and UE are ready to work for every applications

- **Protocol and basic functionalities**
  - GW (x86) and UE (android) are ported MPTCP kernel v0.89 from multipath-tcp.org
    - 2 subflows maintained per session: LTE for MP_CAPABLE and WiFi for MP_JOIN
  - Default packet scheduler with fullmesh path manager, mptcp_checksum=off
  - Well known proxy protocol basis: SOCKSv5
  - UE's traffic redirected to the GW (both up/downlink, and UDP as well)
  - Turns on “GiGA LTE” button on UE, that’s all subscribers to do
    - All application using TCP works via mobile MPTCP proxy
    - Subscriber should have enough billing plan required for GiGA LTE service

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<th>MA-UE (mobile MPTCP handset)</th>
<th>MA-GW (mobile MPTCP proxy gateway)</th>
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<tr>
<td>(1) UE UX/UI : service scenario, on/off GUI</td>
<td>(1) Protocol Relay: MPTCP-to-TCP session relayed forwarding</td>
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<td>(2) Proxy Agent : traffic redirection to MA-GW</td>
<td>(2) Multipath Aggregation : MPTCP based multi-net support</td>
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<td>(3) MPTCP kernel : support MPTCP/IP networking stack</td>
<td>(3) Packet Scheduler : schedule per-DS level pkt according to nw env</td>
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<td>(4) Path Monitoring : detect and bypass when WiFi path going down</td>
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- **Protocol and basic functionalities diagram**
  
  MA-UE |
  ----  |
  | 1 UE UX/UI |
  | 2 Proxy Agent |
  | Android Framework |
  | 3 MPTCP kernel |

  MA-GW |
  ----  |
  | Protocol Relay: MPTCP-to-TCP session relayed forwarding |
  | Multipath Aggregation |
  | Packet Scheduler |
  | Path Monitoring |

  MA-UE LTE/3G WiFi ICP
03 Mobile MPTCP Proxy System Deployment
How GiGA LTE works? Explicit proxy deployment model

① Service activation & acquisition of GW info (DNS/MA-PE)
② Check valid subscriber
③ Proxy Agent redirects traffic to GW (SOCKSv5)
④ Protocol Relay (MPTCP↔TCP)
⑤ MultiNet Aggregation

MA-UE : MultiNet Aggregation User Equipment
MA-PE : MultiNet Aggregation Policy Engine
MA-GW : MultiNet Aggregation Gateway
ICP : Internet Content Provider
Future Works

- Possible IETF work
  1. Contribute implementation and experience on mobile MPTCP proxy topic

- Enhancement of MA-GW features
  1. Roaming support (for outbound and/or inbound roaming users)
  2. Packet scheduling with fine-grained bandwidth throttling
  3. MPTCP aware Load balancer
  4. IPv4/IPv6 dual-stack
Thank you