Multipath Steering Modes in 3GPP ATSSS
("3GPP Access Traffic Steering Switching and Splitting (ATSSS)"

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Disclaimers and References

This presentation is only on ATSSS steering modes
ATSSS, 5G, and 3GPP are a LOT bigger than what I'm talking about now.

*This presentation is **my** understanding, wearing no 3GPP or IETF hats*

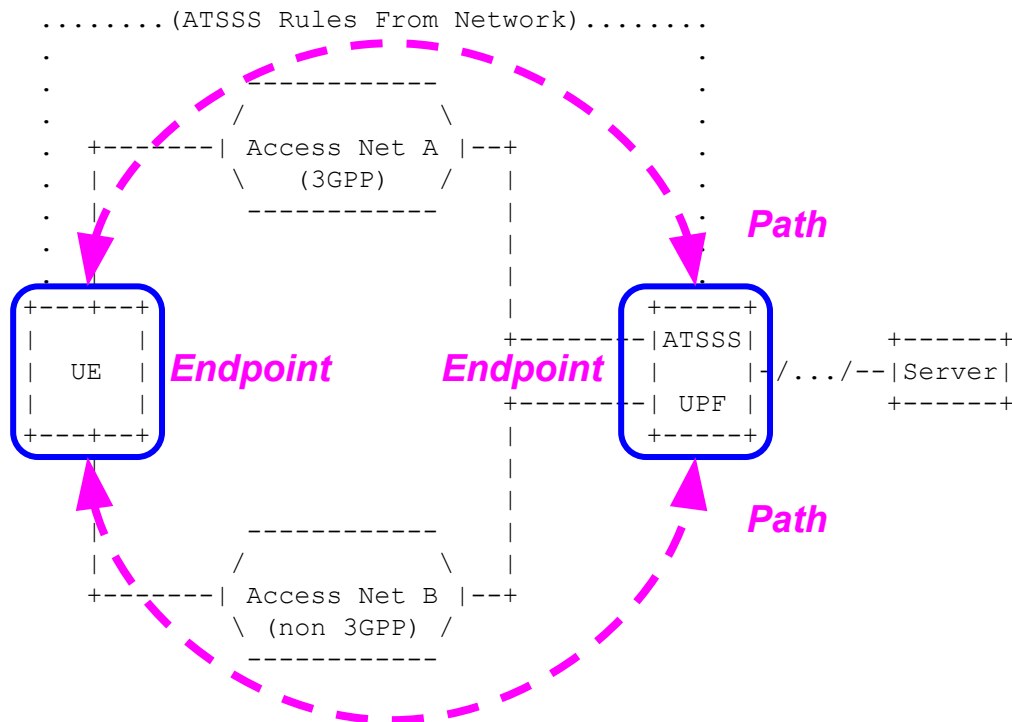ATSSS Phase One is documented [here](#)
ATSSS Phase Two Study is documented [here](#)
ATSSS Overview for IETF Participants is documented [here](#)
I gave a presentation at IETF 108 based on that Overview, available [here](#)

3GPP reference model in IETF terminology

- *ATSSS uses only two paths*
  - *"One 3GPP, one non-3GPP"*
  - *One cellular path, one WiFi*
- *Network provides ATSSS rules*
  - *Modes assigned "per flow"*
- *"Steering"*
  - *Selecting a path*
- *"Switching"*
  - *Selecting a different path*
- *"Splitting"*
  - *Using multiple paths*

```
........(ATSSS Rules From Network)........
.                                        .
.            -----------                 .
.           /           \                .
.  +------| Access Net A |--+            .
.  |       \   (3GPP)   /   |            .    Path
.  |        -----------     |            .
.  |                        |            .
+--+--+                  +-----+         +------+
|     |                  |ATSSS|         |      |
| UE  |  Endpoint  Endpoint |   |-/.../--|Server|
|     |                  | UPF |         +------+
+--+--+                  +-----+
   |                        |
   |        -----------     |
   |       /           \    |            Path
   +------| Access Net B |--+
           \ (non 3GPP) /
            -----------
```

Endpoint *Endpoint*

Path

Path

ATSSS Phase 1 steering modes in Release 16

- "Active-Standby" *(could work in QUICv1 using migration)*
  - Forward traffic via "active access" when available, switching to "standby"
- "Smallest Delay" *(could work in QUICv1 using migration)*
  - Forward traffic on access with the smallest RTT measured by UE/UPF
- "Load-Balancing" *(QUICv1 uses one path at a time)*
  - Forward traffic distributed among available access networks ("30%/70%")
- "Priority-based" *(could work in QUICv1 using migration)*
  - Assign priorities to accesses
  - Forward traffic on "high priority" path until congestion is encountered

ATSSS Phase 2 steering modes under consideration

- "Autonomous"/"advanced PMF" *(QUICv1 uses one path at a time)*
  - Allow UE and UPF to change access splitting weights dynamically
  - "Advanced PMF" adds measurement for per-QoS RTT, loss ratio, jitter
- "Redundant" *(QUICv1 uses one path at a time)*
  - Adds capability to forward on both accesses only when necessary
- "RTT Difference" *(QUICv1 uses one path at a time)*
  - Allow use of both accesses if RTT difference is below a threshold
- "UE-assisted" *(QUICv1 uses one path at a time)*
  - UE makes decisions about uplink access on its own
  - Reasons to choose an access include battery, energy consumption, etc.

Questions and Comments?

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