Deutsche Telekom 5G research topics

for internship & thesis work

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- As part of a close partnership between Karlstad University & DT
- Sophisticated academical challenges with high relevance to industry
- Best equipped labs and testbeds available
- Potentially visits or execution in Germany possible

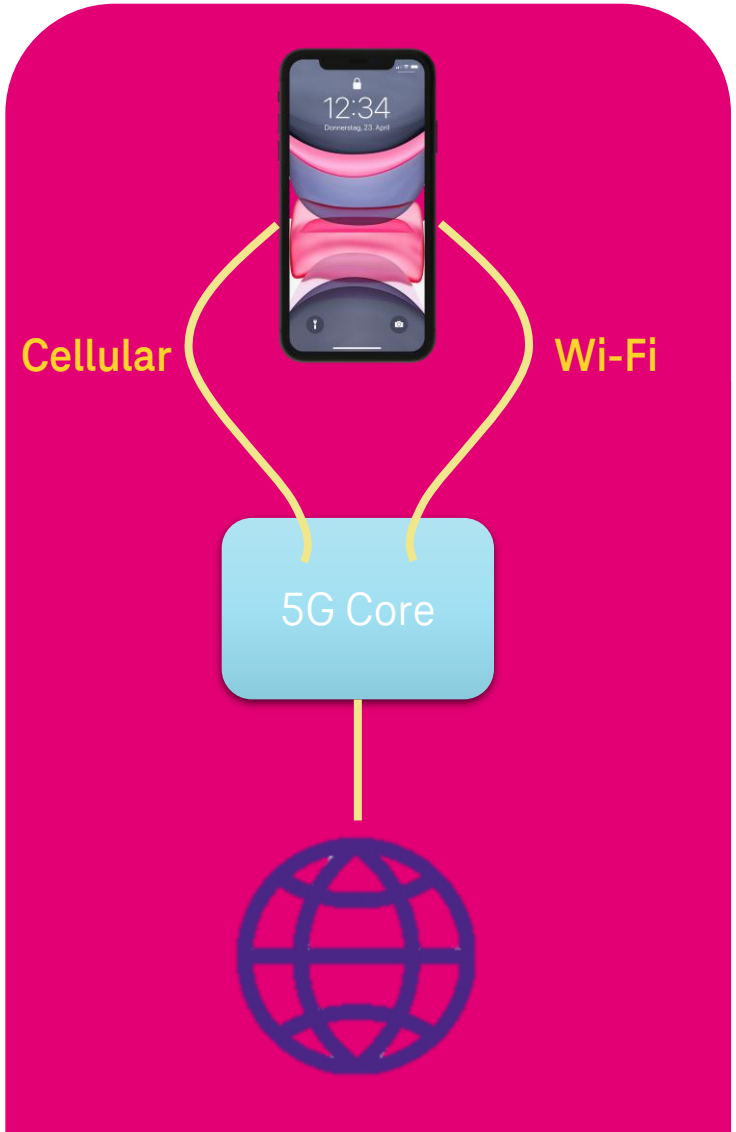
Two main focus areas are presented in the next slides, multiple topics can be jointly defined thereof…

1 - 5G ATSSS multipath communication

Multipath communication based on 5G ATSSS provides to customer simultaneous usage of Wi-Fi and cellular access within a mobile phone. Compared to the traditional single access usage, increased reliability and throughput are envisioned. Those multipath concepts give plenty of possibilities for new traffic engineering approaches and rely on multipath network protocols, such as MPTCP.

While this offers on concept level clear benefits, it leaves open questions when it comes to deployment.

- **How can a consistent multipath performance be guaranteed across todays and anticipated traffic mixes?**
- **Which multipath traffic distribution metrics as well as reassemble strategies are required?**



Skills:

Understanding of multipath concepts and network protocols (MPTCP, MP-DCCP, MP-QUIC)

Linux Kernel hacking / C programming language

Network traffic analysis

Literature:

5G ATSSS [1, 2], non-TCP multipath support [3], MPTCP [4], MP-DCCP [5, 6], MP-QUIC [7]

2 - Open 5GS testbed for 5G feature exploration

Features introduced with the first 5G 3GPP Release 15 and expected ones with the upcoming Rel. 16, open mobile network operators new opportunities which are not fully explored yet. Technologies like Network Slicing and multipath communication (5G ATSSS) are just mentioned as an example here.

To get practical experience, such new features shall be investigated in an open 5G system testbed under various conditions, e.g. based on free5GC or OpenAirInterface. Such a testbed still has to be implemented and missing features, have to be implemented. Analysis and evaluation is a substantial part to gain insights into the particular feature and estimate its value. Moreover new ideas might be evaluated which can be later brought into standards.

Skills:

Understanding of the 5G system + 3GPP documents

5G control plane (Service based architecture, protocols, policies)

Linux based implementation and operation

Literature: free5GC [1], OpenAirInterface [2], 5G System [3], 5G Policy framework [4]