Build a Mobile Wireless Virtual Reality for Testbed Nodes

Mobile wireless environments and heterogeneous networks with cellular and direct Node-to-Node links are important to emerging technologies, such as 5G. The network experienced by these mobile nodes is drastically different from the wired infrastructure-based environments traditional protocols such as TCP were developed for. In order to develop and experiment with new protocols in these dynamic environments we need to emulate the dynamic wireless experience a controllable testbed, including microsecond-level latency patterns, link outages, losses, errors, and packet timings.

We are using Intel's Data Plane Development Kit (DPDK) and MoonGen to build link emulation tools that can run on commodity network hardware, but are capable of precisely emulating diverse link and network-layer properties of mobile wireless environments.

Some specific candidate tasks include:
- Run experiments to characterize and validate existing emulation tools.
- Propose interesting mobile wireless network scenarios and write MoonGen scripts to emulate these environments.
- Identify and debug statistical anomalies in link emulation performance.
- Integrate MoonGen/DPDK link emulation into an Emulab testbed.
- Conduct measurements in live mobile wireless scenarios of interest and tune our link emulation tools to match the real world properties.

Qualifications:
- Good knowledge of Linux
- Knowledge of MAC layer protocols and TCP
- C or C++ programming
- Basic statistics

Contacts:
Dr. Brenton Walker
Leibniz Universität Hannover
Institut für Kommunikationstechnik
Tel.: 511 / 762 – 2827
E-Mail: brenton.walker@ikt.uni-hannover.de