Cellular Network Delay: Measurements in Four Swedish HSDPA+ and LTE Networks

Anna Brunstrom

Karlstad University, Karlstad, Sweden

RAIM Workshop
Yokohama, Japan

October 31, 2015
Delay Measurements

Why have we focused on delay

- Delays typically directly impact user service perceptions
- Most TCP flows in cellular networks are short (90% < 36KiB)
- Per-user queuing are employed in cellular networks, but concurrent user flows can interact

Measurements for HSPA+ and LTE

- Networks of 4 main Swedish providers for 3+ years
- Different approaches to measure network layer delay
- Impact of concurrent traffic on measured delay and application performance
- Impact of congestion control
- Modeling and analysis of short flow performance
Delays are considerably increased when a background TCP flow is present.
Mean values for RTT and throughput from our measurements are used as baselines. The figure shows the relative impact of a 10% change in RTT and throughput.

The completion time is much more sensitive to variation in RTT than throughput.