Linux client with WiFi and LTE
Project proposal

Pascal Maissen, Jovana Micic, Noe Wysshaar

University of Bern
pascal.maissen@unifr.ch, jovana.micic@students.unibe.ch,
noemathieu.wysshaar@unifr.ch

1 Project description

The task of this project is study of Dynamic Adaptive Streaming over HTTP video delivery in a mobile scenario using WiFi and Long Term Evolution (LTE). Case scenario is that the user is connected through LTE, but periodically gets the internet access through WiFi. The main goal of this project is to evaluate the quality gain in the parallel LTE/WiFi video transmission in comparison to a single LTE transmission using multi-path TCP (MPTCP).

2 Roadmap of project

Idea is to study the topic using MPTCP on Linux. User equipment (UE) will be connected to LTE and it will periodically get access to WiFi. First step will be establishing experimental setup on several laptops and PCs. Then we will start downloading video from some video server using only LTE. While the video is downloading, we will turn on and off WiFi. When WiFi access point is on we expect better experience in comparison to LTE. In next steps we will study quality gain in different scenarios.

3 Explanation of concepts

Long Term Evolution (LTE) is standard for high-speed wireless communication for mobile devices. It increases capacity and speed using new digital signal processing techniques. It represents 4th generation technology.

Wireless fidelity (WiFi) is technology for wireless local area networking (WLAN) with devices based on the IEEE 802.11 standards. Devices compatible with WiFi can connect to the Internet using WLAN and a wireless access point. Access points have range of about 20 meters indoors.

Dynamic Adaptive Streaming over HTTP (DASH) is streaming technique that enables high quality streaming of media content over the Internet. Client automatically selects the next segment to download based on current network conditions. It can adapt to changing network conditions.

Multi-path TCP (MPTCP) is solution that allows applications to use multiple paths for streaming. This feature is common on today's laptops and smartphones. Using MPTCP dramatically improves Quality of Experience of video streaming. Streaming video over MPTCP may incur undesired network usage.

References

[RE1] Bo Han, Feng Qian, Lusheng Ji, and Vijay Gopalakrishnan. 2016. MP-DASH: Adaptive Video Streaming Over Preference-Aware Multipath. In Proceedings of the 12th International on Conference on Emerging Networking EXperiments and Technologies (CoNEXT 16). ACM, New York, NY, USA, 129143.

[RE2] Thomas Stockhammer. 2011. Dynamic Adaptive Streaming over HTTP Design Principles and Standards. MMSys '11 Proceedings of the second annual ACM conference on Multimedia systems. San Jose, CA, USA .133-144.