



Eidgenössische Technische Hochschule Zürich  
Swiss Federal Institute of Technology Zurich

Spring Term 2014



## ADVANCED COMPUTER NETWORKS

### Assignment 7: Layer7 Switching and High Performance Networking

Assigned on: **10 April 2014**  
Due by: **17 April 2014 (Assignment7)**  
Due by: **8 May 2014 (Exam questions)**

#### Question 1:

What advantages does the use of IPv6 offer for mobility?

#### Question 2:

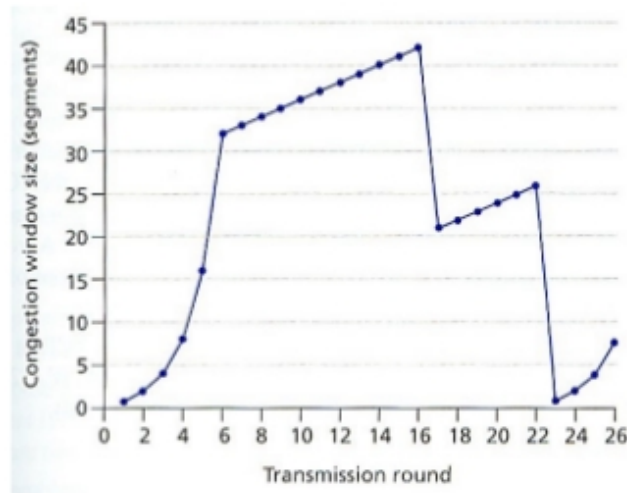
List the differences and similarities between Mobile IP and SIP in terms of what they provide for mobility.

#### Question 3:

In the lecture, we discussed several techniques to address TCP in wireless, such as fast retransmit, fast recovery, indirect TCP, snooping TCP, selective retransmission, etc. Please answer the following questions about this subject:

- (a) When indirect TCP is applied, describe a scenario when the TCP end-to-end semantics can no longer hold.
- (b) When comparing indirect TCP and snooping TCP, which one has a higher handover latency (when the mobile host moves from one cell/foreign network to another)? Briefly justify your answer.
- (c) Consider the plot of the TCP window size as a function of time shown in Figure 1. After the 16th transmission round, is segment loss detected by a triple duplicated ACK or by a timeout?
- (d) What are the influences of encryption on the proposed schemes? Consider for example IP security that can encrypt the payload, i.e., the TCP packet.

Figure 1: TCP window size as function of time



#### Question 4:

Read the paper “MAUI: Making Smartphones Last Longer with Code Offload” [?] and answer the following question:

802.11 has a special power-save mode (PSM), where the radio transmitter is put to sleep and then periodically woken up to receive packets. What effect has the PSM on saving energy for data transfers? How does this correlate with different RTTs?

(b) The authors evaluate the energy savings with MAUI over a few mobile applications. For the video and chess games the energy consumed by code offloading with 3G is higher than running the applications locally on the smartphones. Briefly explain why this happens.

#### Question 5 (mandatory):

Your task is to create an exam question including a (correct) solution for one of topics of the wireless network part of the lecture. If your question is extraordinary, we might use (a modified version of) it in the actual exam. Please note the following facts:

- The deadline to submit your exam question is **May 8th**.
- Please commit your exam questions to your SVN repo under the folder of *questions*.
- It should be a non-trivial question (i.e., not a pure knowledge question).

#### Hand In Instructions

This is a paper exercise. Please hand it in during the exercise session on the due date.

**ATTENTION** Please commit your exam questions to your SVN repo under the folder of *questions* by **May 8th**.

## References

- [1] Eduardo Cuervo, Aruna Balasubramanian, Dae-ki Cho, Alec Wolman, Stefan Saroiu, Ranveer Chandra, and Paramvir Bahl. *MAUI: making smartphones last longer with code offload*. In Proceedings of the 8th international conference on Mobile systems, applications, and services (MobiSys '10). ACM, New York, NY, USA, 49-62.