Investigations on TCP behavior during Handoff

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Abstract

The talk gives an overview on the behavior of TCP during the handoff in mobile networks. We use the in detail analyzed packet traces, made by simulations with ns2 to show the reaction of TCP on packet losses and packet reordering. Several TCP versions are discussed including TCP Tahoe, TCP Reno, TCP NewReno and TCP Sack and performance guidelines are derived. We show that all TCP versions experience performance degradation during the handoff.

Our investigations align on typical handoff situations in mobile networks like GPRS or UMTS. Two scenarios are considered. During the so called local handoff only a small number of packets are lost. This number is controlled by a flow control mechanism. These simulations led to the best performance of TCP during the handoff.

The results become worse in the second scenario. This is called vertical handoff. The worst case for the performance of TCP happens if the Packet Forwarding mechanism is not enabled and a lot of packets are lost during the handoff. But the performance could improve when the Packet Forwarding mechanism is activated. The number of packets lost could then be reduced. But it also comes to a packet reordering and TCP reacts with spurious packet retransmissions. Duplicate packets being sent unnecessarily reduce the bandwidth efficiency of the wireless channel.

The talk will explain the reactions from TCP of the packets lost during the handoff. It describes also the differences between the four TCP versions and its consequences of the behavior of TCP during the handoff in wireless networks.