

Evaluation of TCP Performance in hybrid Mobile Ad Hoc Networks

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Abstract

Nowadays a lot of research efforts focus on Mobile Ad-hoc NETWORKS (MANETs). A MANET is a collection of mobile autonomous nodes, which can move arbitrary, leading to a constantly changing network topology. However, today most of the information is still stored on wired servers. A wired network has a hierarchical topology, while in a MANET the topology is usually flat to allow for nodes to easily change their position in the network. Due to the different topological natures of these systems, interconnectivity is not trivial.

To further complicate the situation the Transmission Control Protocol (TCP) is designed for wired networks, in a MANET with different link and route characteristics, as multihop and frequent packet losses, the performance of current TCP proposals drop considerably.

The purpose of this report is to give an overview of the current MANET – Internet connectivity situation and to evaluate TCP performance in a hybrid MANET where mobile nodes connect to a wired network through a gateway.

The report is divided into two parts. The first theoretical part will evaluate the different routing and mobility problems that occur in a realistic scenario with multiple gateways. Main problems that will be discussed are: path selection, gateway discovery, handover between gateways and address configuration in current solutions.

In the last part, a simulation-based evaluation will be made on a simplified scenario where one gateway is linking the two different networks. The simulation will be conducted with ns-2.28, which is extended with support for Uppsala University version of Ad-hoc On-demand Distance Vector (AODVUU) as routing and gateway discovery protocol and TCP AP (Adaptive Pacing) as transport protocol. In the performance evaluation, AODVUU and Destination-Sequenced Distance-Vector Routing (DSDV) combined with TCP Newreno, TCP Vegas and TCP AP will be used. The simulation based evaluation concluded that the best performance was achieved with TCP Vegas in conjunction with AODVUU.