

Mobile Ad-Hoc Networks as the Access Networks for the Internet and Mobility Management

Quan Le Trung and Gabriele Kotsis
Department of Telecooperation, Johannes Kepler University
Altenberger Str. 69, A-4040, Linz AUSTRIA
E-mail: {quanle,gk}@tk.uni-linz.ac.at

Abstract

Currently, there are many mechanisms, protocols, and algorithms to solve the problem of providing Internet connectivity for mobile ad hoc networks (MANETs) and the mobility management of MANET nodes among Internet domains. However, many of the existing designs have not been properly evaluated due to their complexities. One reason for this is their own assumptions, which limit to evaluate some typical functions individually, not in an integration manner. Another reason is the lack of implementations. The contents of this presentation concentrate on the use of MANET as access networks for the Internet and mobility management at the network layer, including:

- Introduction
- Internet mobility management (both lay-3 and layer-2)
 - ❖ IP mobility management
 - ❖ WLAN (1-hop) mobility management
 - ❖ MANET (multi-hop) mobility management
- Design framework for performance and overhead comparisons among existing mechanisms and algorithms
 - ❖ MANET node location determination
 - ❖ Internet gateways discovery
 - ❖ Metrics for Internet gateway selection
 - ❖ Establishing and maintaining (Internet) gateway forwarding strategies (tunneling vs. default route)
 - ❖ Intra-MANET routing (table-driven vs. on-demand) and/or Inter-MANET/Internet routing for in/out traffic from/to Internet
 - ❖ Addressing schemes (manual vs. stateful auto-configuration vs. stateless auto-configuration)
 - ❖ Existing problems in proposed mechanisms: default routes, NAT traversing,... and corresponding solutions

We are currently implementing and testing different packages in ns-2 for comparisons among different approaches to provide Internet connectivity for MANETs and their mobility management. These scenarios include: (1) extensions of ad-hoc on-demand routing protocol (AODV) and mobile IP (MIP), and (2) extensions of optimized link-state routing protocol (OLSR) and MIP, for different Internet gateway discoveries, Internet gateway selections, and Internet gateway forwarding strategies.