Cluster-Based Mobility Management for Internet Connectivity of Mobile Ad Hoc Networks *

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Abstract: Devices in mobile ad hoc networks that support wireless multiple-hop routing often need global Internet connectivity in various fields of civil and military applications. Recently, much emphasis has been putting on the study to extend the support of Mobile IP to include Mobile Ad hoc Networks (MANET), so called MIPMANET. Such an extension increases the wireless-hop sphere of mobility management.

In order to realize the extended Mobile IP service, every mobile station on MANET has to be registered with Mobile IP foreign agent of a visiting network as well as with Mobile IP home agent. The approaches for the registration are categorized into three types: *Proactive* scheme, *reactive* scheme, and *hybrid* scheme. But all of these approaches use *flooding* of messages for registration and solicitation. *Flooding* can impose a relatively high overhead on MANET.

This paper extends the use of Mobile IP in order to include mobile ad hoc networks. The inclusion is costly since a sphere of mobility management is extended to multi-hop wireless mobile devices. We propose an efficient mobility management protocol by applying a dynamic clustering technique to the integrated environment of ad hoc network and infrastructure based network. The protocol enables wireless mobile nodes to build *clustered trees* such that each node in a tree keeps track of information of its descendant nodes. Thus, mobility management does not resort to an inefficient flooding. Simulations are also conducted to show the efficiency of the proposed mobility management protocol.

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