Secure Mobile Networking
11th Quarterly Report*

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Project Status Overview

Progress during this quarter has been minimal as only a single graduate student, Bjorn Chambless, remains on the project. Bjorn is responsible for the HARP effort reported below. He will be working with Jim Binkley on the summer code release which will contain HARP as well as the MADRP and DHCP/IPSEC reported last quarter. John McHugh, Jim Binkley, and Sarah Mocas are working on papers describing the results of the project. One of these will be a paper on policy issues associated with mobility. A preliminary version of this paper will be presented by John McHugh as an invited talk the Naval Postgraduate School in August. Jim Binkley is currently working with John Richardson of Intel on a draft RFC on Mobile-IP and Firewall security considerations. We believe that we have an effective solution for the "Mobile Firewall" problem.

HARP – Bjorn Chambless

The Home Agent Redundancy Protocol (HARP) was completed and deployed during the Spring quarter. HARP provides additional security and robustness for the secure mobile IP system by allowing the transparent use of redundant Home Agents(HAs) by Mobile Nodes(MNs). A mobile node served by the HARP system will retain connectivity in spite of the failure of a Home Agent and/or a home subnet.

A pair (or more generally, a set) of active home agents share mobile node registration information through an IPSEC secured TCP tunnel so that each is able service any mobile host for which the group is responsible. In the event of a Home

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Agent failure, the route to the home network maintained by interior domain routing protocols (e.g. RIP, OSPF) is assumed to converge to one of the remaining hosts offering connectivity to the home network, i.e. a surviving home agent.

The HARP system was initially implemented and tested on a small three-host test network in which one host acted as a router and the other two acted as a home agent pair. The two HAs in turn provided connectivity to same virtual home subnet through their radio interfaces. Since the Home Agents shared registration information it was possible for either one to receive registration packets from a MN and forward packets addressed to a MN to an arbitrary Care of Address. This was tested by manually switching the route to the home subnet between the two Home Agents. Interoperability between the Mobile IP daemon and the FreeBSD routing daemon using the RIP protocol was also tested.

When deployed at PSU we sought to maximize survivability by locating the two Home Agents as far apart as possible. This was to insure that a local network disturbance, e.g. power failure, would have less likelihood of affecting the operation of the Mobile IP system. We further tested the system by repeatedly modifying the routing table on the local Cisco router and checking that connectivity for the Mobile Nodes being served was maintained.

HARP is currently in the final testing stages and will be contained in the Summer 98 code release along with MADRP and DHCP/IPSEC.