Macro/micro-mobility fast handover in hierarchical mobile IPv6

ABSTRACT

Mobile Internet Protocol version 6 (MIPv6) has been proposed to solve the problem of mobility in the new era of Internet by handling routing of IPv6 packets to mobile nodes that have moved away from their home network. Users will move frequently between networks, as they stay connected to the Internet. Thus, as mobility increases across networks, handovers will significantly impact the quality of the connection and user application. However, MIPv6 only defines means of managing global (macro)-mobility but does not address micro-mobility separately. Instead, it uses the same mechanism in both cases. This involves long handover delay and signaling load. The Hierarchical Mobile IPv6 (HMIPv6) protocol has been proposed as an extension of basic MIPv6 to solve this problem by splitting the handover management into macro-mobility and micro-mobility schemes. HMIPv6 introduced a new protocol agent called Mobility Anchor Point (MAP) to manage mobility and serve as a local entity to aid in mobile handover. The handover (or registration) operation is the operation when MN registers its presence to its Home Agent (HA) and Correspondent Node (CN). This paper proposes a mechanism to perform fast handover in HMIPv6 by adopting the multicast technique to the MAP for both macro-mobility and micro-mobility management. Our proposal is designed to minimize service disruption that occurs during the registration operation. We simulate the performance using network simulator (NS-2) and we present and analyze the performance testing for our proposal by comparing it with the basic hierarchical mobile IPv6. The results show that our scheme allows the MN to receive packets faster than the basic HMIPv6.