Advances in Mobility Management for IP Networks

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SIGNALING FLOW OF M-HMIPV6/CXTP

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14.1 INTRODUCTION

This chapter described and explained how the enhanced M-HMIPv6 with Context Transfer Protocol (M-HMIPv6/CXTP) [1] scheme operates and shows step by step the scheme signaling flow. The Multicast Hierarchical Mobile IPv6 with CXTP [2]is benchmarked with the standard HMIPv6 (proposed by IETF) [3]. In M-HMIPv6/CXTP scheme the multicast information transfer is implemented based on the CXTP predictive handover scheme.

14.2 SIGNALING FLOW

The signalling flow for M-HMIPv6/CXTPis shown in Fig. 14.1, while the signalling flow for the standard HMIPv6is shown in Fig. 14.2. It is importance to note that communication or service on a network is resumed after the handover process completed. In Fig. 14.2 MAPs are considered to be multicast routers. The flow starts from the MLD query and MLD report between the previous M-MAP (M-MAP 1) and the MN. The flow ends when the MN received the multicast data from the next M-MAP (M-MAP 2).

The multicast context transfer block (M-CTB) for the multicast services of the mobile node is built in the M-MAP 1 and transferred to the next Multicast MAP (M-MAP 2). The M-CTB includes the multicast addresses required for the multicast services being used by the moving mobile node. Therefore, once the MN moves to the M-MAP 2, the MN will be able to receive the multicast packets immediately through tunneling form the M-MAP 2. This is because the M-MAP 2 already sent the join message to multicast source. Then the MLDv2 supplies the information from the M-CTB to the multicast routing protocol to build the routing context for the multicast addresses.

After receiving the context data message with the M-CTB, the M-MAP 2 dispatches it to the MLDv2 router in order to establish an individual node context and to update the aggregate state. A change in the aggregated state will then trigger the active multicast routing protocol to build the distribution trees for each of the multicast groups.

When the mobile node performs the handover, it has to send a Context Transfer Active Request (CTAR) message to inform its previous location. The CTAR message is sent to the next M-MAP (M-MAP 2), where the mobile node is connected. The CTAR includes the previous M-MAP's IP address. The Context Transfer Data Reply (CTDR) message is sent by next M-MAP to previous M-MAP to indicate the success or failure of context transfer.

From this operation, it can be seen that by applying the M-HMIPv6 with CXTP, the time needed to re-establish the service can be reduced. In M-HMIPv6/CXTPsignaling flow, regardless of whether the context transfer is initiated in a mobile node controlled