Registration Request message sent by MN. The contents of the corresponding entry, except the Lifetime, do not need to be updated.

According to RFC3775, CN also maintains a binding cache which should be updated after MN acquires a new care-of address. In this scenario, however, the destination address of datagrams sent by CN consists of two parts: a 96-bit NAT-PT prefix and IPv4 care-of address. It is only based on the 96-bit NAT-PT prefix that the datagrams are routed to MIPv4/v6-TG. MIPv4/v6-TG will then send the datagrams to HA, rather than MN. Therefore, as long as the binding cache on HA has been updated, the datagrams sent by CN will be correctly delivered to MN by HA.

C. The usage of Type 001MIP Table Entries

The introduction of MIP table aims to maintain MIP sessions in IPv4/v6 mixed networks. When a datagram sent by MN or CN passes through MIPv4/v6-TG, MIPv4/v6-TG will take out the destination address of the datagram and uses it as an index to search the MIP table. If a matching entry is found, MIPv4/v6-TG will process the datagram, based on the information recorded in the entry.

When an IPv4 datagram passes through MIPv4/v6-TG, MIPv4/v6-TG will take out its destination address and uses it as an index to search the MIP table. If a Type 001 entry is found, MIPv4/v6-TG will process the datagram as follows.

(1) NAT-PT, a component of MIPv4/v6-TG, translates the datagram into IPv6 format.

(2) MIP-ALG inserts a Destination Option extension header into the IPv6 datagram, and fills the header with the source address of the IPv6 datagram. Then MIP-ALG uses the source address as an index to search Cached Bindings field, and takes out the care-of address bound with the source address, and replaces the source address with the care-of address.

(3) MIPv4/v6-TG sends the processed IPv6 datagram.

When an IPv6 datagram passes through MIPv4/v6-TG, MIPv4/v6-TG takes out its destination address and uses it as an index to search the MIP table. If a Type 001 entry is found, MIPv4/v6-TG will process the datagram as follows.

1).MIPv4/v6-TG replaces the destination address of the datagram with the IPv6 home address, which is taken from the type 2 routing header of the datagram.

2).NAT-PT translates the datagram into IPv4 format.

3).MIPv4/v6-TG sends the processed IPv4 datagram.

V. CONCLUSION

Mobile IP is one of the trends of Internet techniques. Mobile IPv4 and Mobile IPv6 have been specified by IETF in RFC3344 and RFC3775 respectively. Recently the issue of transition from Mobile IPv4 to Mobile IPv6 has attracted much attention. Many suggestions, including some Internet Drafts, have been proposed on this issue. But none of them has been adopted as RFC by IETF.

The key to our solution is a MIP table, a newly introduced data structure. With the help of this gateway and the MIP table, RFC3344 and RFC3775 can be reused in IPv4 network and IPv6 network respectively. In this way, the Mobile IP entities in IPv4 network and the Mobile IP entities in IPv6 network can be transparent to each other.

Compared with other solutions, our solution has three main advantages. Firstly, it can work compatibly with RFC3344 and RFC3775. This is very important in that it makes Mobile IP in IPv4/v6 mixed networks possible without any update to the existing networks. Secondly, our solution introduces MIP table. We can use the MIP table to realize the communication in IPv4/v6 mixed network easily. Thirdly, the creation, usage and update of the MIP table entries is easily too. Through the simulation we find that the MIPv4/v6-TG can realize the basic communication in IPv4/v6 mixed network.

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