Need of Mobile IP

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I. WHAT IS IP ADDRESS?

IP address stands for Internet protocol address, it is a numerical address assigned to every device for communication, like we search for our friend by obtaining his home address, similarly, networking devices establish communication or finds other device by finding its IP address, and so by using the Internet Protocol we use this address for communication.

II. WHAT IS MOBILE IP?

Mobile IP is nothing but an Internet Engineering Task Force standard protocol for communication, which allows mobile users (who are continuously changing their position) to establish communication while maintaining a permanent IP address.

III. WHY MOBILE IP?

The question is why mobile IP is required if we can provide unique IP address to everyone, every time there is a change in position?

The answer to the above question can be explained with the help of an example:

Suppose device 1 and device 2 are communicating, now if device 1 has changed its position, and device 2 wants to communicate, he will be sending the data to the old IP address of device 1 which is known to him and thus device 1 can only receive the data if he is attached to its home address or the address which is known to device 2 hence after changing the position the new IP address is not known to the other communicating device thus we need mobile IP so that we can communicate every time, even if we are changing our position.
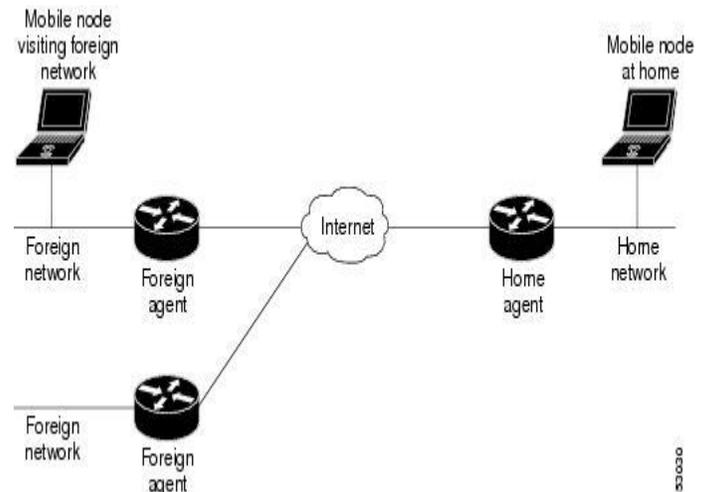
IV. MOBILE IP NETWORK AND TERMINOLOGIES

Fig. Mobile IP network

There are various terminologies in this:

- **Mobile Node (MN):** Mobile Node keeps its IP address and can continuously communicate with any other device in network as long as there is link layer connectivity.
- **Correspondent Network (CN):** Partner node of mobile node for communication is termed as Correspondent Node.
- **Home Network**: The subnet to which mobile Node is attached is termed as Home network.
- Foreign Network: The current subnet in which mobile node is present or at which the MN is roaming.
- **Home agent (HA):** Belongs to home network, it handovers the data packet to the foreign agent using care of address so that the data can be received at the destination.
- **Foreign Agent (FA):** Belongs to foreign network, it collects data packet and handovers it to the destination.
- **Care of Address (COA):** Current location of the mobile node in context of IP address.

V.   IP PACKET DELIVERY

IP packet delivery describes the whole procedure, how an IP packet is transmitted and received at the destination.

Firstly let sender wants to send data to the receiver, now the sender will send data packet to the home agent of the receiver, but since the receiver is not present at the home network and is roaming in some other network hence the home agent will find the foreign network on which the device is roaming and will find the care of address, and using the care of address it will send data pack to the foreign agent which belongs to the foreign agent, and now the foreign agent will forward data packet to the destination/receiver, the receiver after receiving the data packet can reply or send its data packet directly to the sender.

This is the whole procedure how an IP packet is delivered.

VI.   AGENT DISCOVERY

Is used to find the foreign agent and the care of address, there are two methods used for agent discovery: Agent Advertisement and Agent solicitation.
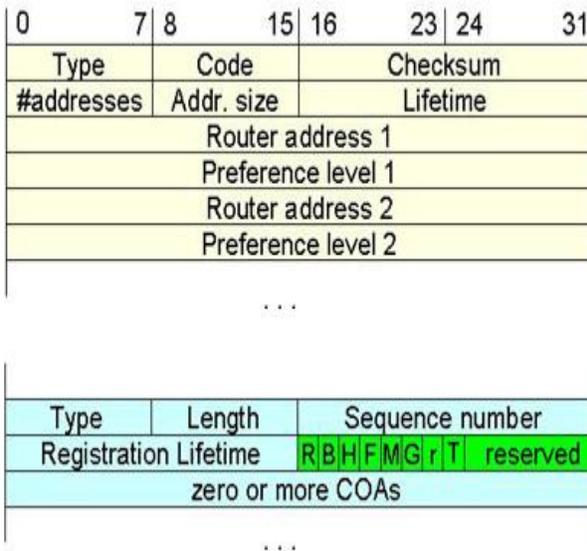
1)   Agent Advertisement:

Fig. Agent Advertisement Packet

In this method both the foreign and home agents periodically advertise their presence using special messages, ICMP (Internet Control Message Protocol) is used for these advertisements. Above is the figure of Agent advertisement packet.

2)   Agent Solicitation: In case when agent advertisements are not present and mobile node is not receiving any COA then mobile node sends an agent solicitation. Mobile node can send three solicitations, but should not send too many solicitations as the network will be jammed due to this.

Hence by using the above two methods we find the care of address.

VII.   REGISTRATION

After receiving the COA the mobile node should get registered with the home agent.
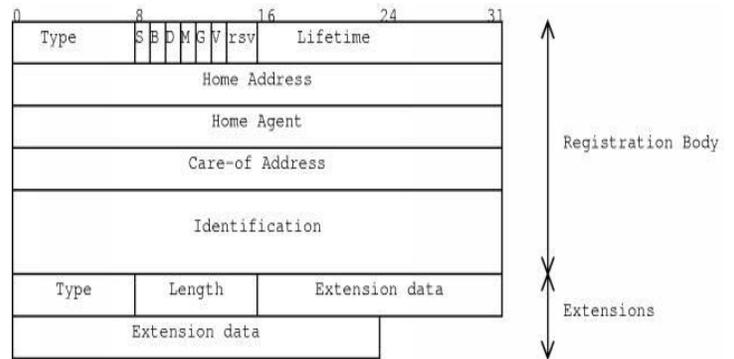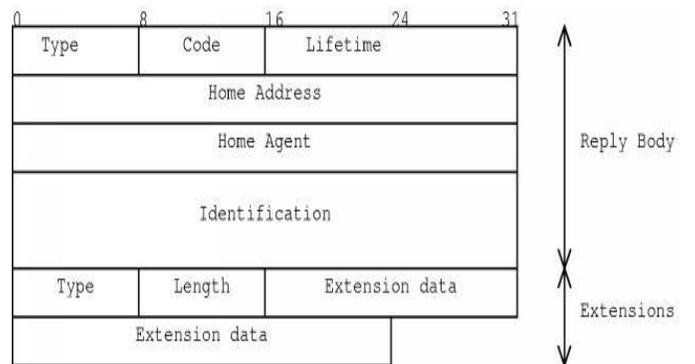

Fig. Registration Request Packet

Fig. Registration Reply Packet

VIII.   TUNNELING AND ENCAPSULATION

- Tunnel is a virtual pipe, or it is just a hypothetical pipe which describes the process of tunnel entry and tunnel end point, the procedure of forwarding data packet form home agent to foreign agent is known as tunneling. Tunneling is achieved by using encapsulation.
- Encapsulation is the process in which data packet containing packet header and data is taken and put into the data part of another packet.
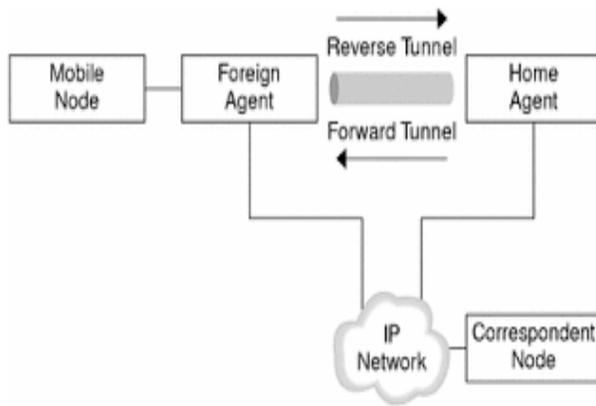
IX.   CONCLUSION

Hence we have studied the need of mobile IP, and various terminologies associated with it, how packet is delivered, agent discovery, registration and tunneling and encapsulation. Mobile IP is a need of today's world as every device like mobile and other handheld devices like PDA need a mobile IP for establishing communication.

REFERENCE

- Mobile Communications by **Jochen Schiller.**