

Mobile IP Protocol

Unit - II

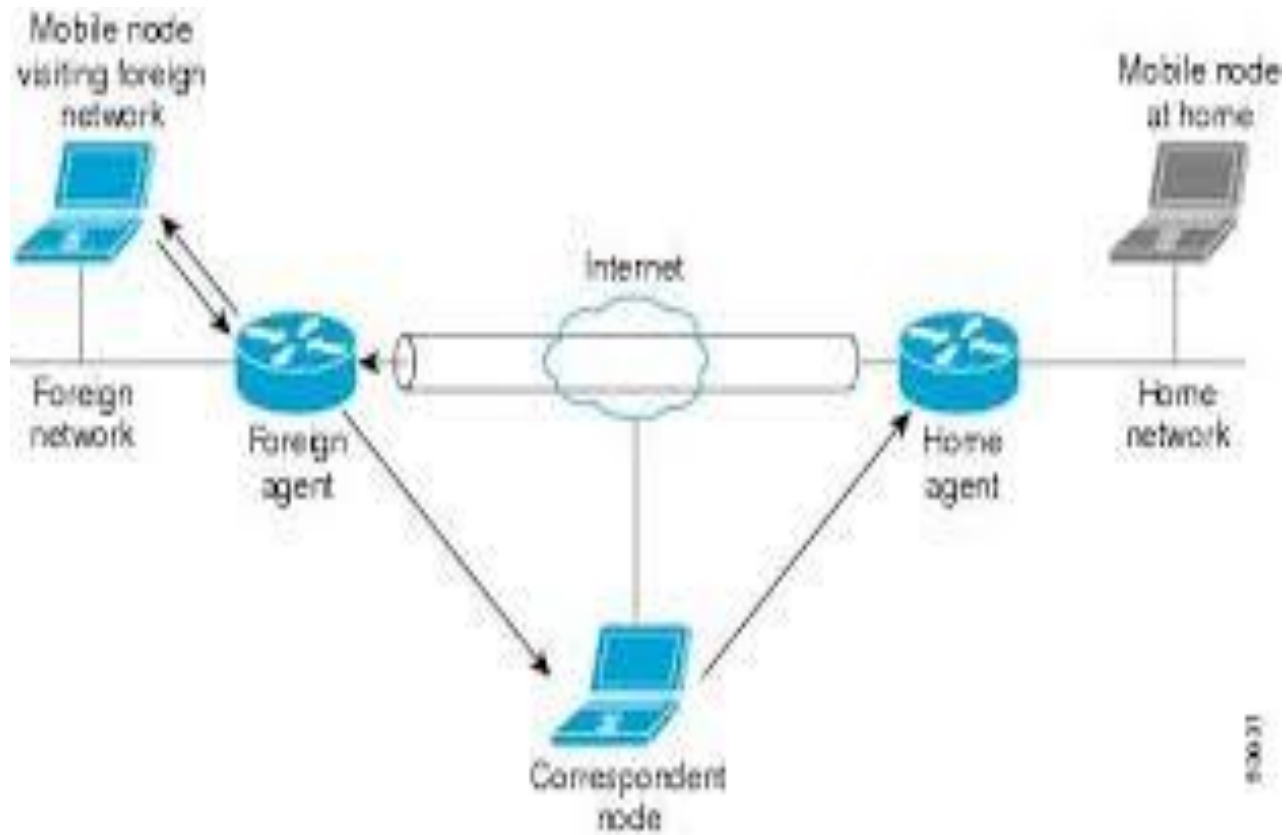
Need for Mobile Internet Protocol

- Internet build on collection of protocols – TCP/IP protocol suite
- IP performs:
 - Routing of packet to any host, uniquely identified by assigned IP address
- In traditional (wired) addressing scheme:
 - Each LAN has address
 - Nodes in the LAN assigned address based on the LAN address

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- When node moves to different location, it is moved to different LAN
- Need to change IP address w.r.t. that LAN
- Infeasible for frequent changes in mobile environment
- So Mobile IP was proposed by IETF
- Mobile IP – allows users connected with internet, regardless of location, without need of changing IP address
- Mobile IP extends standard IP - mobility issues addressed in transparent way to higher layers like TCP

Mobile IP



Entities of Mobile IP

- **Mobile Node (MN)**
 - Handheld equipment with roaming facility
 - Ex. cell phone, PDA, laptop etc.
- **Home Network**
 - Subnet which a mobile node belongs to as per its IP address
- Within home N/W no need for mobile IP
- **Home Agent (HA)**
 - Stores information about all mobile nodes whose permanent address is in network of HA
 - Acts as router for packet delivery, when MN is away from home

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- **Foreign Agent (FA)**
 - Router in foreign N/W
 - Point of attachment of MN when it is in Foreign N/W
 - Packets from HA sent to FA is delivered to MN
- **Foreign Network**
 - Current subnet to which MN is visiting other than it home network
- **Correspondent Node (CN)**
 - Communication partner of MN, when it is away from home network

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- **Care-of –Address (COA)**

- Indicates mobile node's current location
- Mostly, its FA's address
- Viewed as end of tunnel from HA

- **Tunnel**

- When mobile node is away, it is a virtual path between HA and MN's foreign network FA
- Tunnel starts at MN's HA and ends at MN's FA
- Packets are encapsulated before they are tunnelled

Types of Care-of-Address (COA)

- **Two types**
 - Foreign Agent COA
 - Co-located COA
- **Foreign Agent COA**
 - IP address of FA
- **Co-located COA**
 - Temporary address acquired by a MN in the foreign network
 - It acquires it using services like Dynamic Host Control Protocol (DHCP)

Agent Discovery

- HA maintain **Location Registry**
- Location Registry keep track of node location using current COA of MN
- For this MN should inform its COA when it is in foreign network
- To inform COA, MN should know its COA
- It get to know its COA in two ways:
 - Agent Advertisement
 - Agent Solicitation

Agent Advertisement

- FA and HA advertise their presence periodically through advertisement messages
- Advertisement messages contains one or more COA and a flag indicating HA or FA
- This method is called “**Agent Discovery**”

Agent Solicitation

- If mobile node in foreign network does not receive any COA it sends “**Agent Solicitation**” messages
- Solicitation Messages should not flood the N/W
- 3 solicitation messages are send one / second, when MN enters a new N/W
- Purpose of this message MN searches for a FA
- If MN does not receive any response from FA, should exponentially reduce its rate

Tunnelling and Encapsulation

- Tunnelling – virtual pipe for packets between tunnel entry and endpoint
- **“Tunnelling is process of sending packet via tunnel and achieved by mechanism called encapsulation”**
- Encapsulation refers to putting a packet inside the data part of existing packet
- Decapsulation refers to disassembling the encapsulated packet from the data part of a packet
- Encapsulation and Decapsulation is a normal process happens when a packet moves from upper protocol layer to lower protocol layer

Packet Delivery

- Suppose CN wants to send IP packet to MN
- It knows MNs permanent address and send the packet to it via internet
- But since mobile node is not in home network, it does not know where to deliver and so it delivers to MNs HA
- HA checks if MN present in home network, if not using location registry finds the COA address of MN
- Encapsulates the original packet and sets new source address as HA's address and MNs FA as the destination address

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- Send the encapsulated packet via tunnel with HA as tunnel entry and MNs FA as tunnel exit
- Once packet reaches at MNs FA, it is decapsulated and delivered to MN with original address
- MN replies with its permanent IP as source and CNs address as the destination address
- **Everything done transparently and both MN and CN does not know that happened at background**