

Mobility Support in IPv6



ECE 750 Course Presentation

by **Raihan Al-Ekram**

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Sources

- Charles E. Perkins and David B. Johnson, Mobility Support in IPv6, Proceedings of the second annual international conference on Mobile Computing and Networking, November 1996.
- Charles E. Perkins and David B. Johnson, Mobility Support in IPv6, Internet Draft, IETF Work-in-Progress, July 2000.



Context

- Mobile nodes in the Internet
- Assume link layer mobility problem is solved
- Network layer solution for mobility
- IPv6, next generation network layer protocol for the Internet



Overview

- Introduction
- Mobility in IP (version 4)
- Overview of IPv6
- Mobility in IPv6
 - Advantages from IPv6
 - Mobile IPv6 Operation
 - Extensions to IPv6
- Conclusion



Introduction

■ Scenario

- Each node is identified by its own IP address
- IP address = network prefix + host number

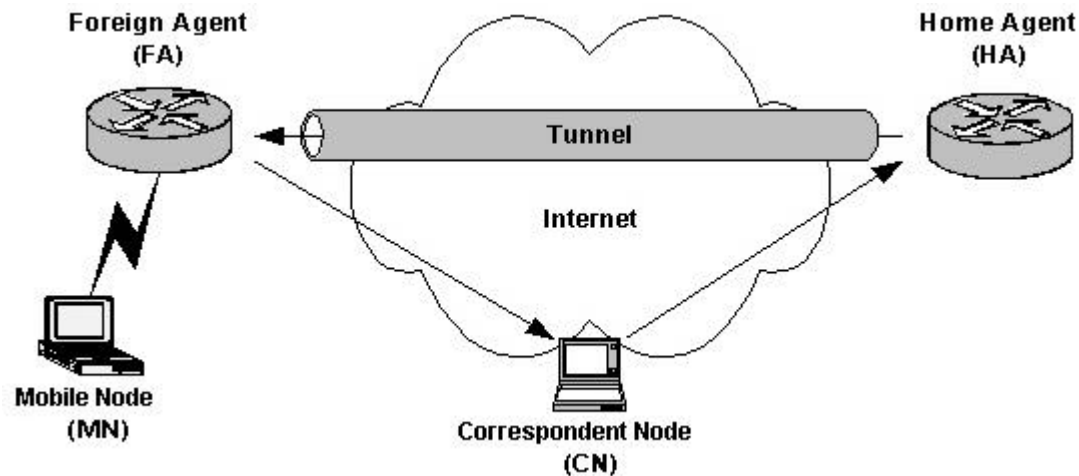
■ Problem

- Routing is based on network prefix of destination
- Packets destined to a mobile node won't reach it while away from home network
- If address is changed with location change, higher layer connections will be disrupted

■ Goal

- Transparent routing of packets to and from mobile nodes operating in the Internet

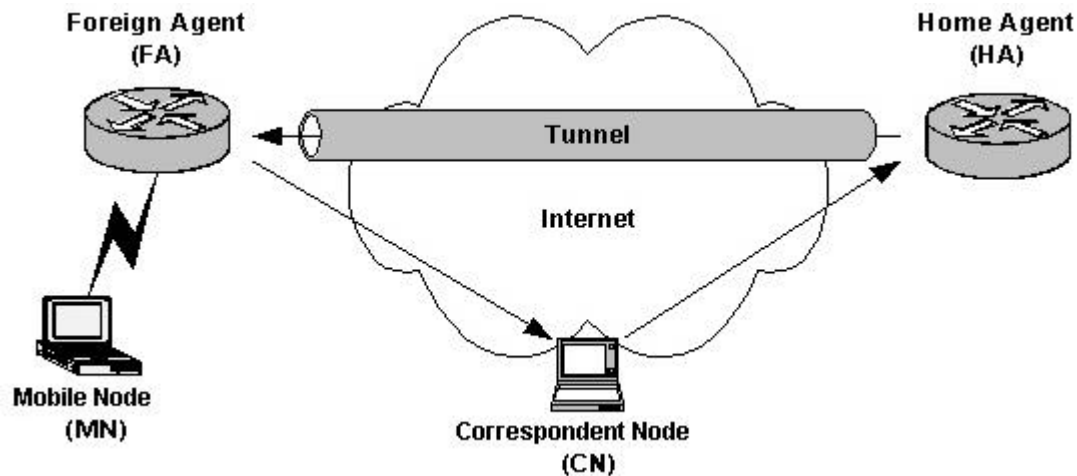
Mobility in IP



■ Mobile IP components

- Mobile Node (MN)
- Home Agent (HA) and home link
- Foreign Agent (FA) and foreign link
- Correspondent Node (CN)

Mobility in IP (Contd.)



- Mobile IP protocol
 - Agent Discovery
 - Obtaining COA (Care-of-Address) from FA
 - Registration of COA with HA
 - Tunneling of CN packets from HA to FA
 - Standard routing of packets from MN to CN



Overview of IPv6

- Next generation Internet Protocol
- Addressing
 - 16 Byte address space
 - Link local, site local, globally routable address
 - Unicast, multicast, anycast address
- Neighbor Discovery
 - Router Discovery
 - Prefix Discovery
 - Stateless and Stateful Address Autoconfiguration



Overview of IPv6 (Contd.)

- Simple Base Header, faster routing
- Extension Headers
 - Authentication Header
 - Encapsulation Header
 - Routing Header
 - Fragment Header

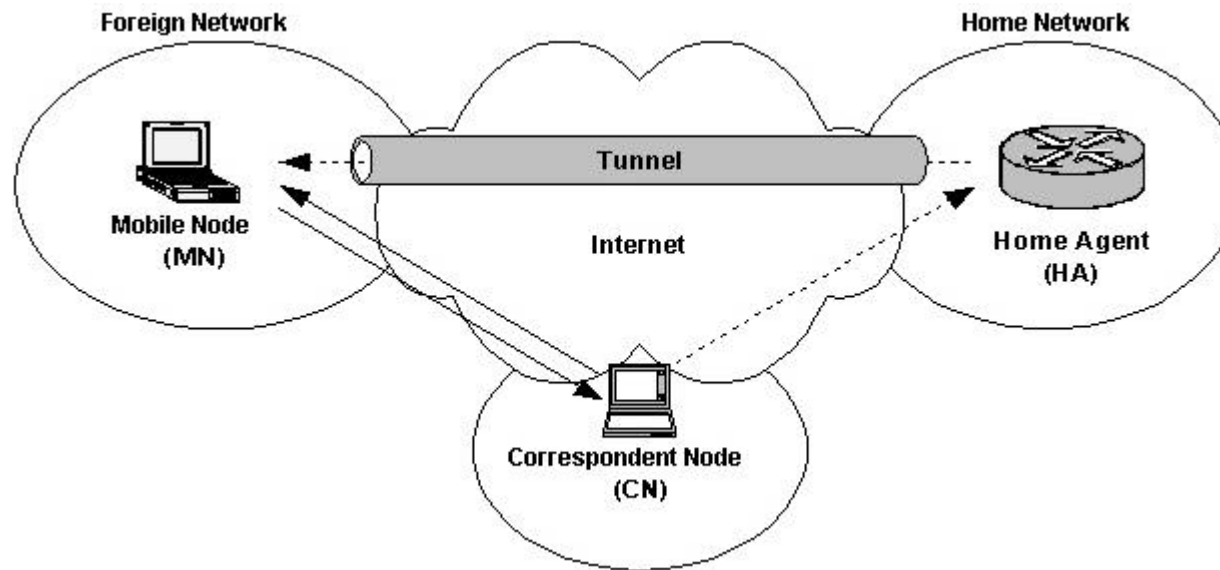
 - Destination Option
 - Hop-by-hop Option



Advantages from IPv6

- Larger address space
- Address Autoconfiguration
 - ➔ Eliminates the need for FA
- Routing Header
 - ➔ Eliminates the need for triangular routing
- Not yet widely deployed
 - ➔ Allows modification in the IPv6 fixed nodes

Mobile IPv6



- Components
 - Mobile Node (MN)
 - Home Agent (HA)
 - Correspondent Node (CN)



Mobile IPv6 (Contd.)

- In home link
 - MN acts like any other fixed node
- Movement detection
 - MN determines its current location using IPv6 Router Discovery
 - MN forms a new COA in foreign link using IPv6 Address Autoconfiguration
- Notification
 - MN notifies its HA the new COA using Binding Update
 - MN may dynamically discover its HA using Home Agent Discovery



Mobile IPv6 (Contd.)

■ Notification

- MN may also notify the new COA to selected CNs using Binding Update

■ Receiving packets

- Packets from CNs not aware of MN's current COA are routed to the MN's home network, from where HA tunnels the packets to the MN
- Packets from CNs aware of MN's current COA are sent directly to the MN using IPv6 Routing Header



Mobile IPv6 (Contd.)

- Sending packets
 - Packets sent by MN are routed directly to CN without any special mechanism
 - In presence of Ingress Filtering in the network, packets can be sent by MN to CN using Home Address Option



Extensions to IPv6

■ Addition

- Binding Update: Destination Option
- Home Address: Destination Option
- Home Agent Discovery: ICMP Message

■ Modification

- Router Discovery
- Prefix Information Option



Conclusion

- IETF Work-in-progress
 - Security association
 - Key distribution
 - IPSec
 - Mobile network support