# Mobility Support in IPv6

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<draft-perkins-ipv6-mobility-sup-02.txt>

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# The IPv6 Opportunity

Mobile IP for IPv6 could be provided easily:

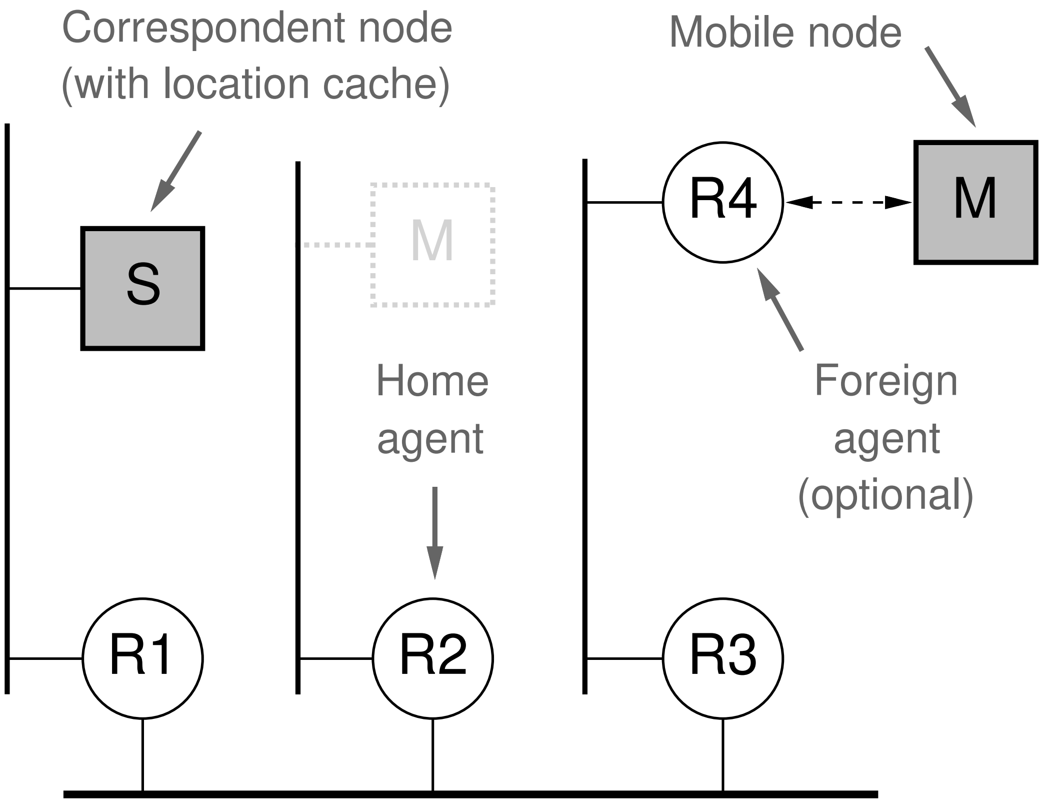
- The basic architecture of IPv6 is the same as IPv4
- So take the existing IPv4 mobility work
- Make the obvious changes from 32-bit to 128-bit addresses

But the development of IPv6 provides a unique opportunity:

- No installed base of IPv6 nodes to be compatible with
- We can get changes to the protocol if they are needed
- We can define things to be required of all nodes, or all hosts, or all routers
- Some technical changes in IPv6 over IPv4 make things easier (or possible)
- Authentication is “built in”

# The Basic Model

Same as IPv4 mobility with route optimization:



# Foreign Agents

Foreign agents in IPv4 conserve limited IP address space

Many mobile nodes can share the same care-of address

Also can add many other functions, though:

- Authenticate the identity of mobile clients
- Charge for connection services
- Produce or share a session key for use by new mobile clients (say, for encryption)
- Negotiate a compression algorithm
- Manage the resources of router's communications devices

Foreign agents are still useful in IPv6

# Tunneling

Tunneling can use IPv6 ***routing header***:

- IP loose/strict source routing options ***done right***
- Can be included in any packet
- Packet goes through nodes identified in source route
- Tunnel with loose source route to care-of address
- Very similar to “minimal encapsulation”

Tunneling with ***encapsulation*** may still be necessary too:

- Routing header is included in packet authentication
- Can only be inserted in packet by sender (before authentication computation)
- Most packets should be tunneled by sender due to caching, so most will use routing header
- For home agent tunneling, still need encapsulation (?)

# Binding Updates

Mobile IPv4 distributes a mobile node's binding in three ways:

- Registration with home and foreign agent (basic protocol)
- Notify previous foreign agent of binding (route optimization)
- Notify correspondent node of binding (route optimization)

Our view:

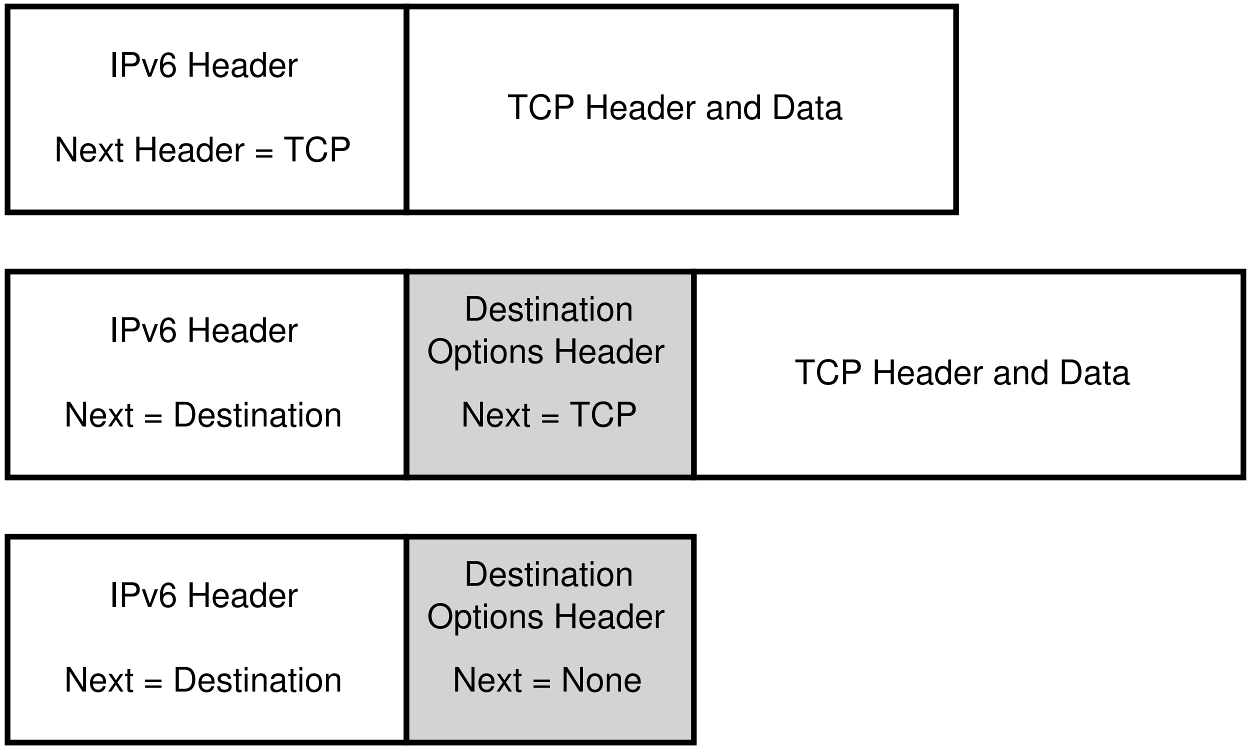
- These functions are critical to operation and scalability
- They serve essentially the same purpose
- So unify them for IPv6

IPv6 makes this easier in two ways:

- Any node will be able to authenticate to any other node
- Flexible extension header format

# IPv6 Extension Headers

Can chain any number of different headers into packet:




Destination Options carries sequence of options processed only by end destination node

## Binding Update Destination Option

Define a ***binding update*** destination option:

- Fields to carry a mobile node's binding
- Can add optional stuff through other Destination Options

Mobile node sends to home agent to register:

- Through foreign agent with routing header or encapsulation
- Home and foreign agents return binding acknowledgement

Mobile node also sends to previous foreign agent:

- Allows forwarding from previous foreign agent
- Previous foreign agent returns binding acknowledgement

## Binding Update Destination Option (cont'd)

Mobile node also sends when it receives packet indirectly:

- Foreign agent decapsulates if tunneled by sender
- Otherwise leaves routing or encapsulation header on
- Mobile node sends binding update to original sender
- No need for acknowledgement (but may be)

Mobile node may also send directly to corespondent nodes:

- Can easily include in any outgoing packet
- For example, send to correspondents with open TCP
- No need for acknowledgement (but may be)

# IPv6 Requirements

- Define Binding Update destination option
- Define Binding Acknowledge packet or option
- All nodes must be able to process them
- All nodes must be able to maintain a binding cache
- All nodes must be able to tunnel own packets
- Make sure authentication works OK during registration