

# MOBILE IPV6

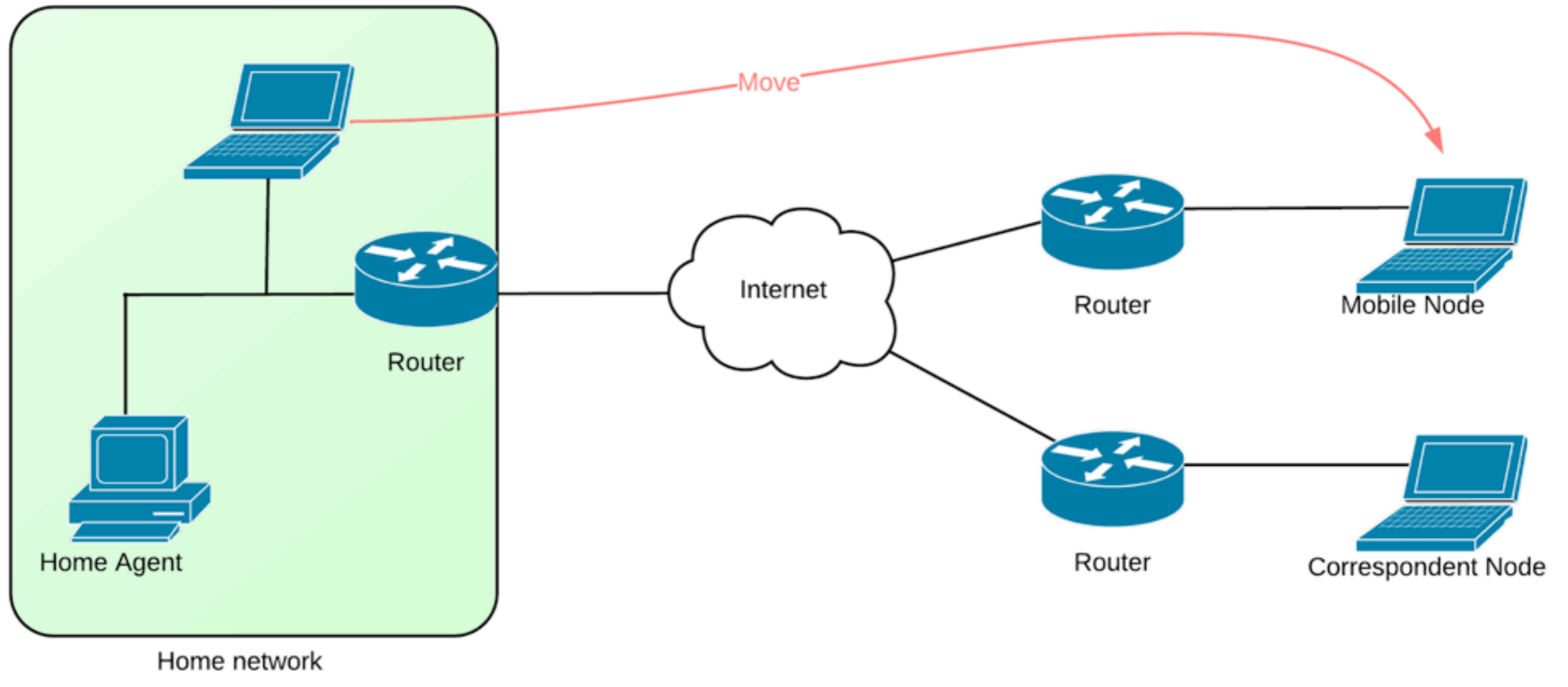
# OUTLINE

- Why?
- Introduction
- Briefly about IPv6
- Terminology
- Mobile IPv6 operation
- Mobile IPv6 advantages

# WHY?

- A mobile node is identified by a unique IP address
- The Internet is built so that a single IP address cannot move from network to network, and keep its connectivity
- Mobile nodes therefore need to change its IP address when it moves
- DNS is not possible to use as a solution

# INTRODUCTION



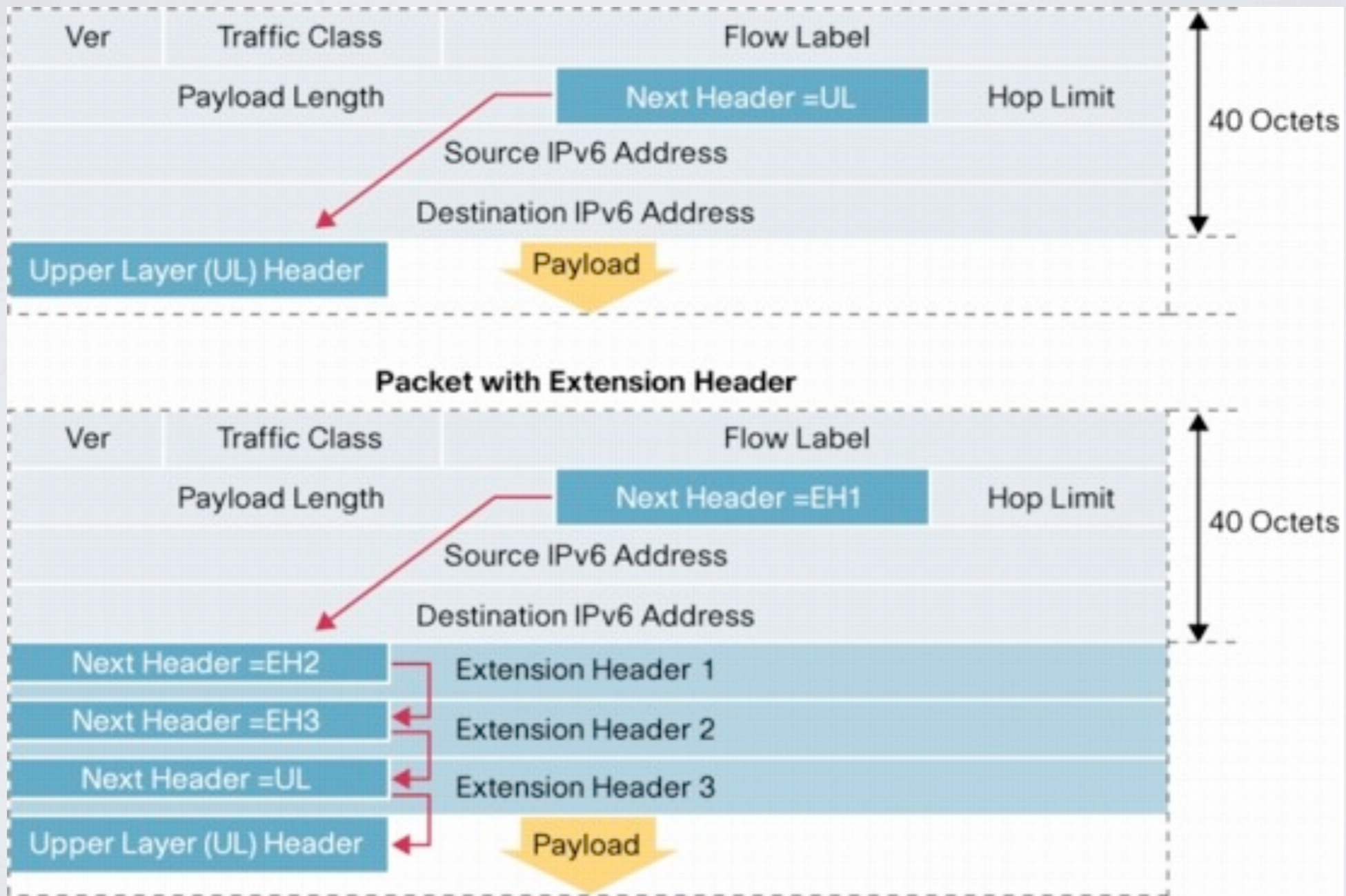
# PROBLEMS WITH MIPv4

- Sub-optimal routing (triangular routing)
- Overhead (MTU must be reduced due to tunneling)
- Firewalls (UDP 434/435, IPinIP)
- NAT-traversal (RFC 3519)
- Slow handover
- HA single point of failure, many hops away

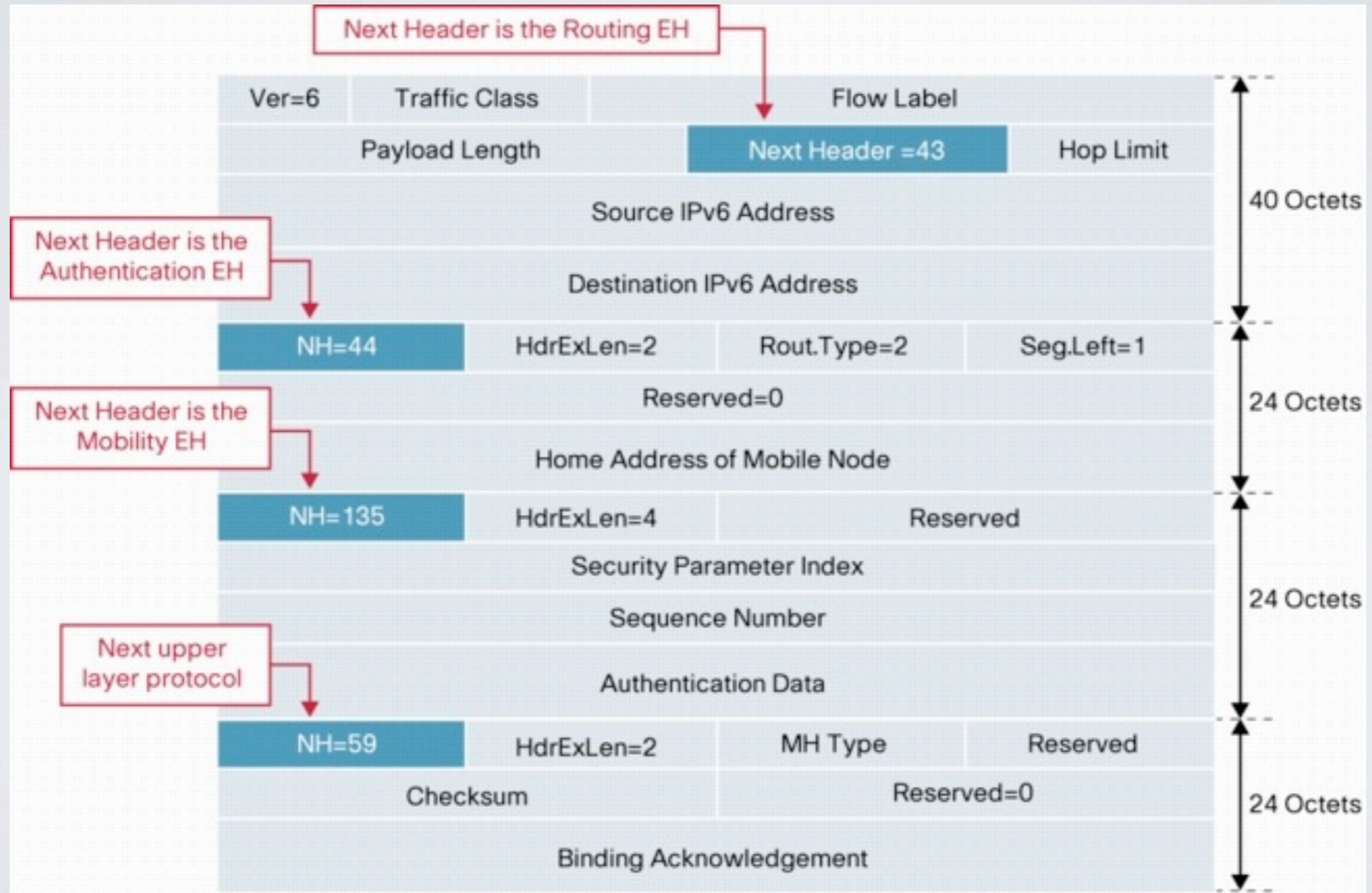
# IPV6

- $2^{128}$  addresses (compared to  $2^{32}$  with IPv4)
- Address Autoconfiguration (using DHCPv6 or SLAAC)
- Neighbor Discovery:
  - Discover each others presence and find routers
  - Determine each others link-layer addresses
  - Maintain reachability information

# IPV6 HEADER



# MOBILITY EH





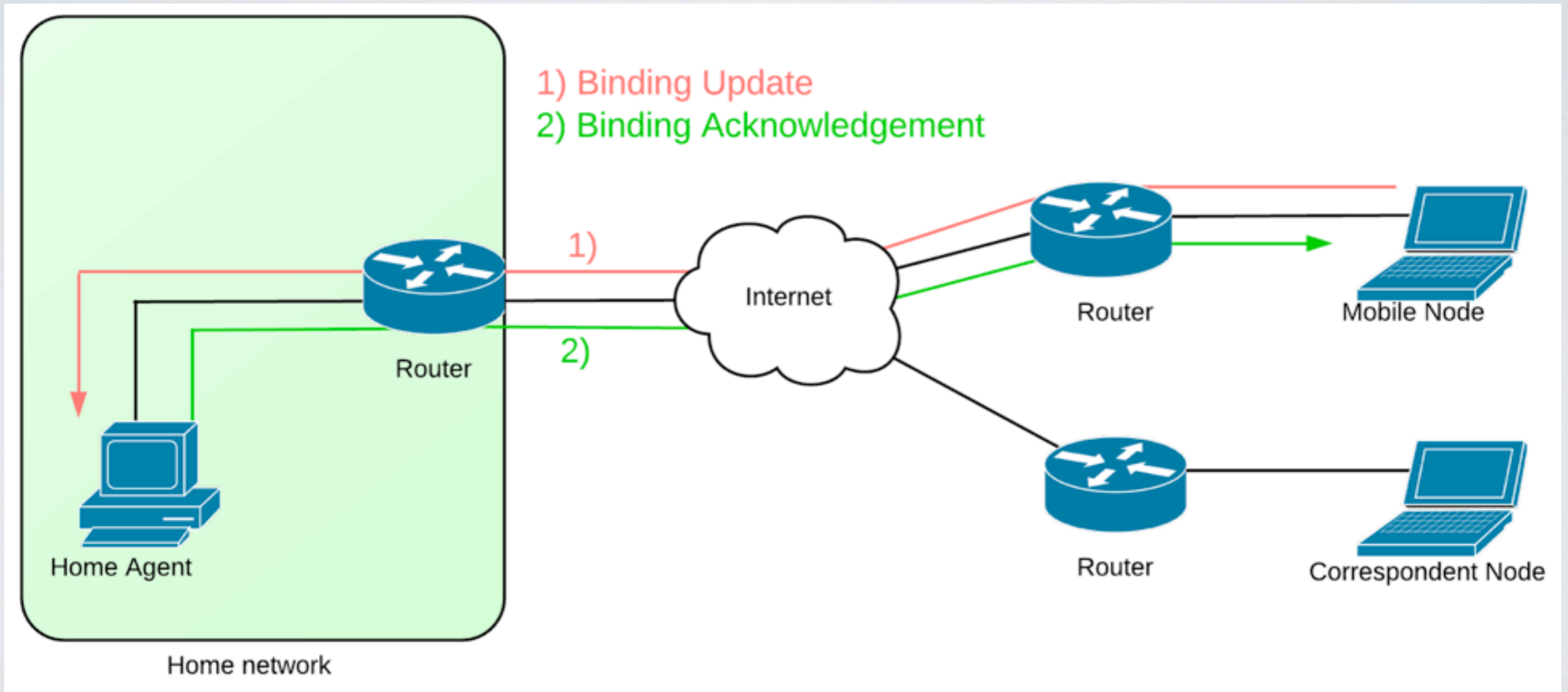
# TERMINOLOGY

- **Mobile Node (MN):** A node that can change its point of attachment from one link to another, while still being reachable via its home address.
- **Correspondent Node (CN):** A peer node with which a mobile node is communicating. The correspondent node may be either mobile or stationary.
- **Care-of-address (CoA):** A unicast routable address associated with a mobile node while visiting a foreign link; the subnet prefix of this IP address is a foreign subnet prefix.

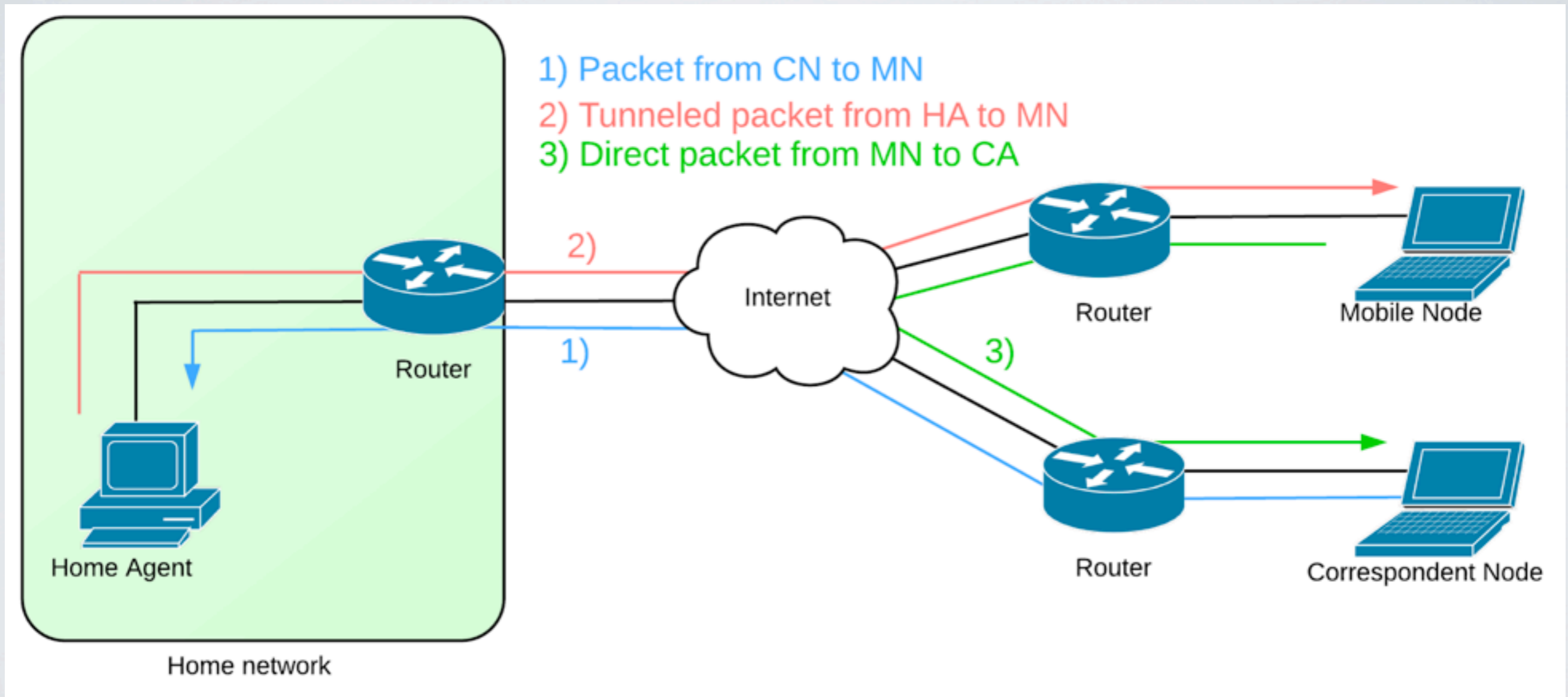
# TERMINOLOGY

- **Home Address:** Routable address assigned to a mobile node. Used as the permanent address of the mobile node. Within the mobile node's home link.
- **Home Agent (HA):** A router on a mobile node's home link with which the mobile node has registered its current care-of address.
- **Binding:** The association of the home address of a mobile node with a care of address for that mobile node.

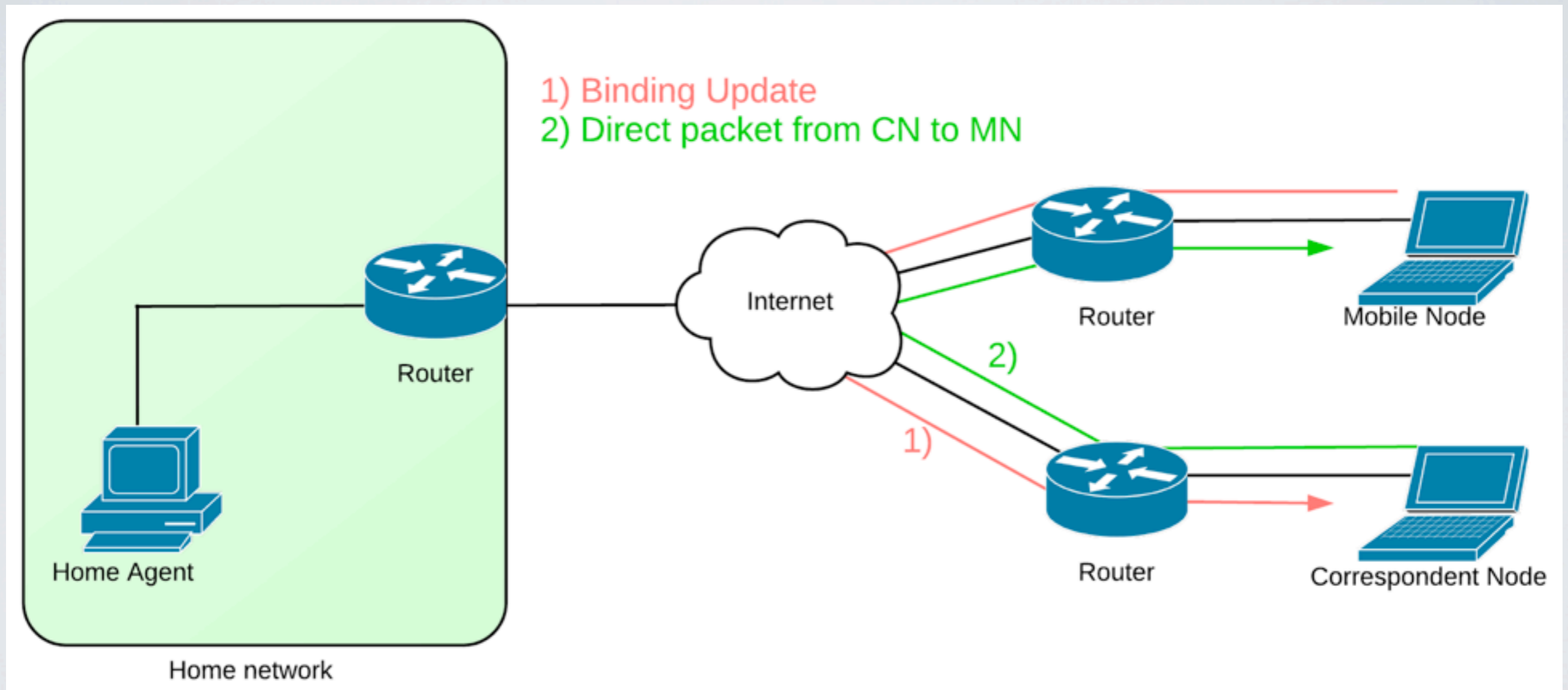
# HA REGISTRATION



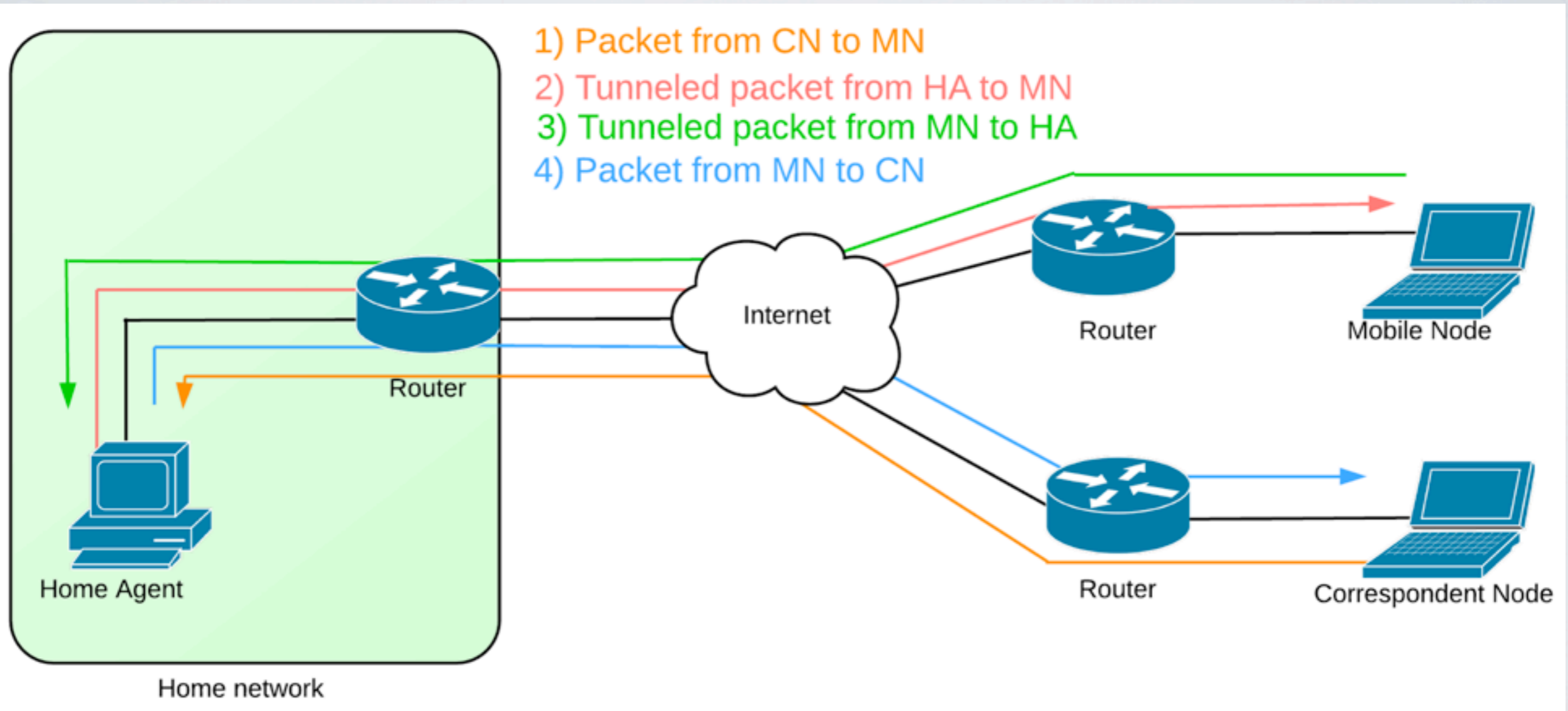
# TRIANGLE ROUTING



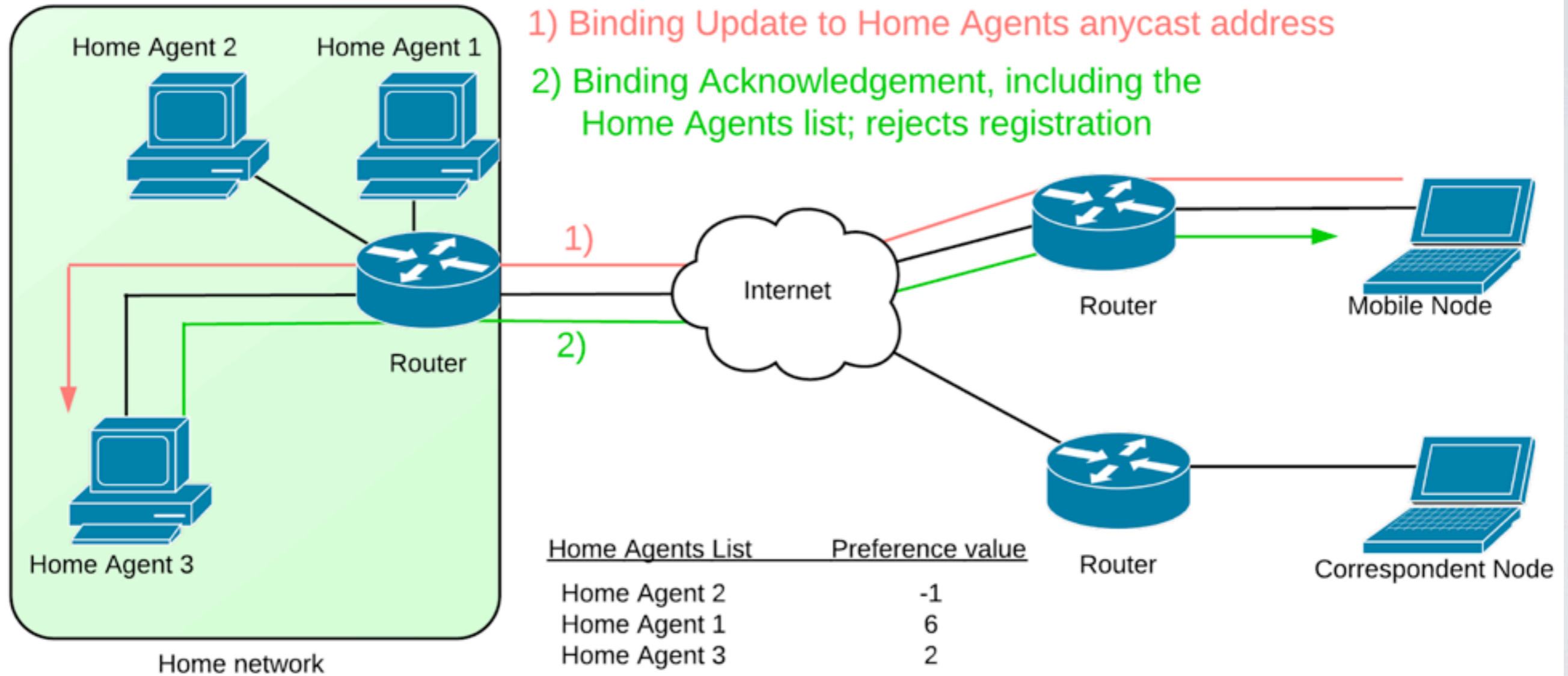
# ROUTE OPTIMIZATION



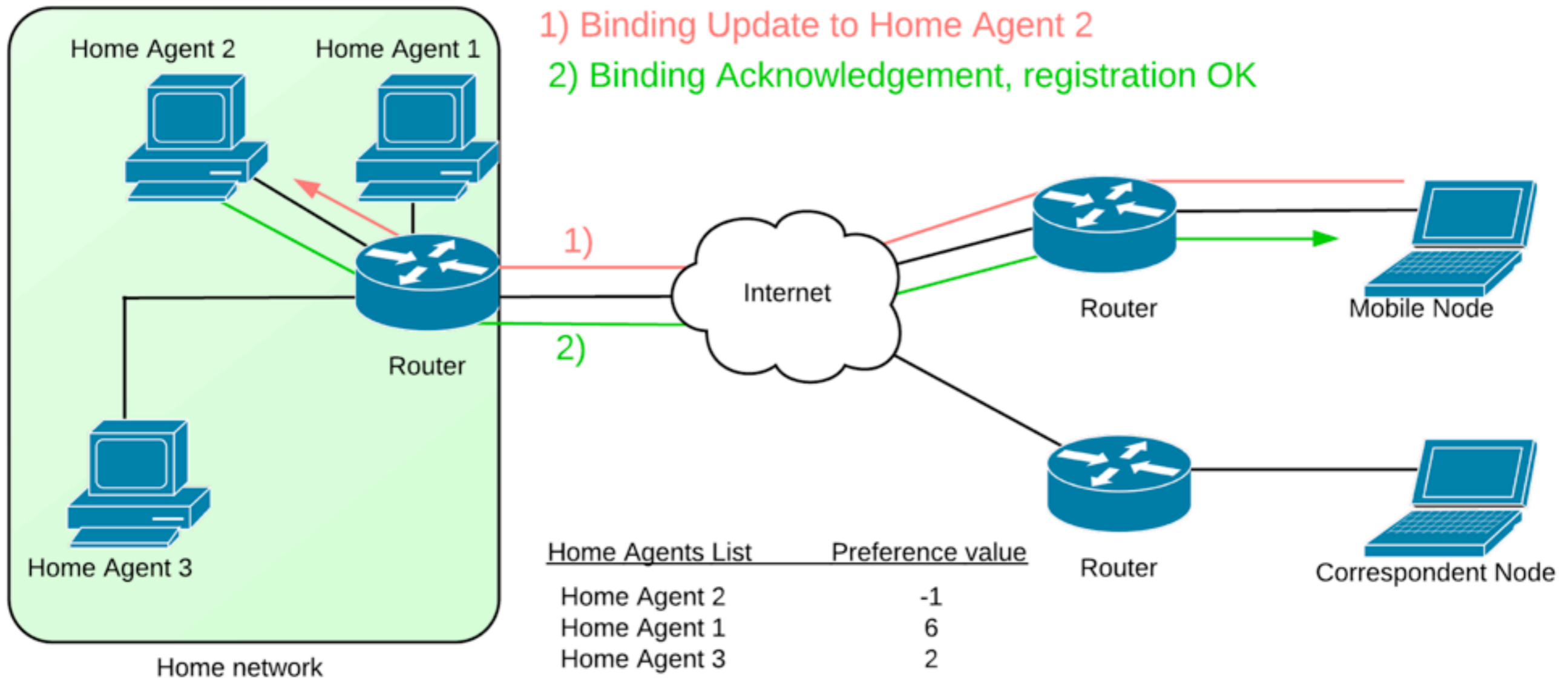
# BIDIRECTIONAL ROUTING



# HA DISCOVERY



# HA DISCOVERY

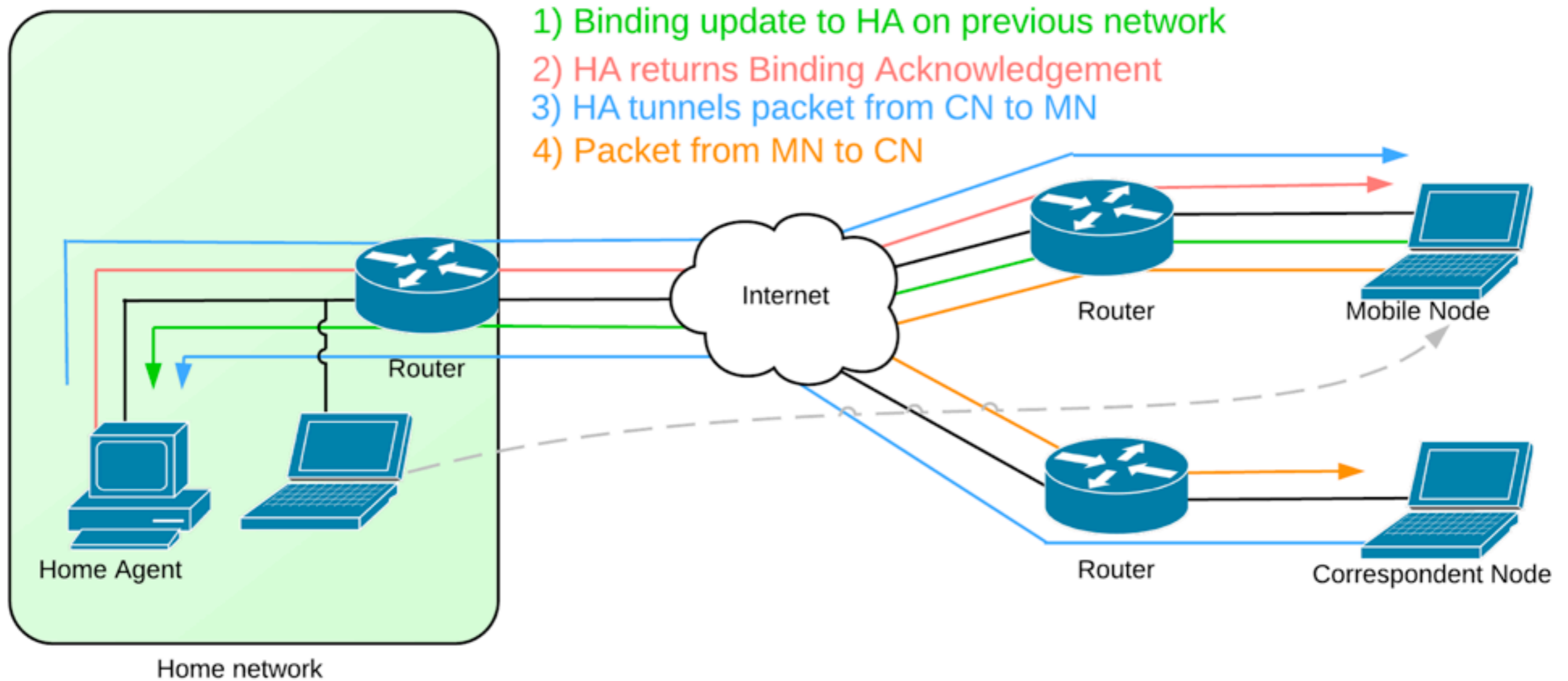




# HANDOVER

- **Smooth Handover:** Minimizes data loss during the time that the MN is establishing its link to the new access point.
- **Fast Handover:** Minimizes or eliminates latency for establishing new communication paths to the MN at the new access router.
- **Seamless Handover:** Both Smooth and Fast Handover

# ROUTER-ASSISTED SMOOTH HANDOVER



# MOBILE IPV6 ADVANTAGES

- No need for FA (Foreign Agents)
- Route optimizations as a fundamental part of the protocol (rather than a nonstandard set of extensions)
- Route optimizations can operate securely (Binding Update)
- Decoupled from link layer (uses ND instead of ARP)
- Dynamic HA discovery with single reply (and not multiple, as with broadcast in MIPv4)