

MOBILE IPV6

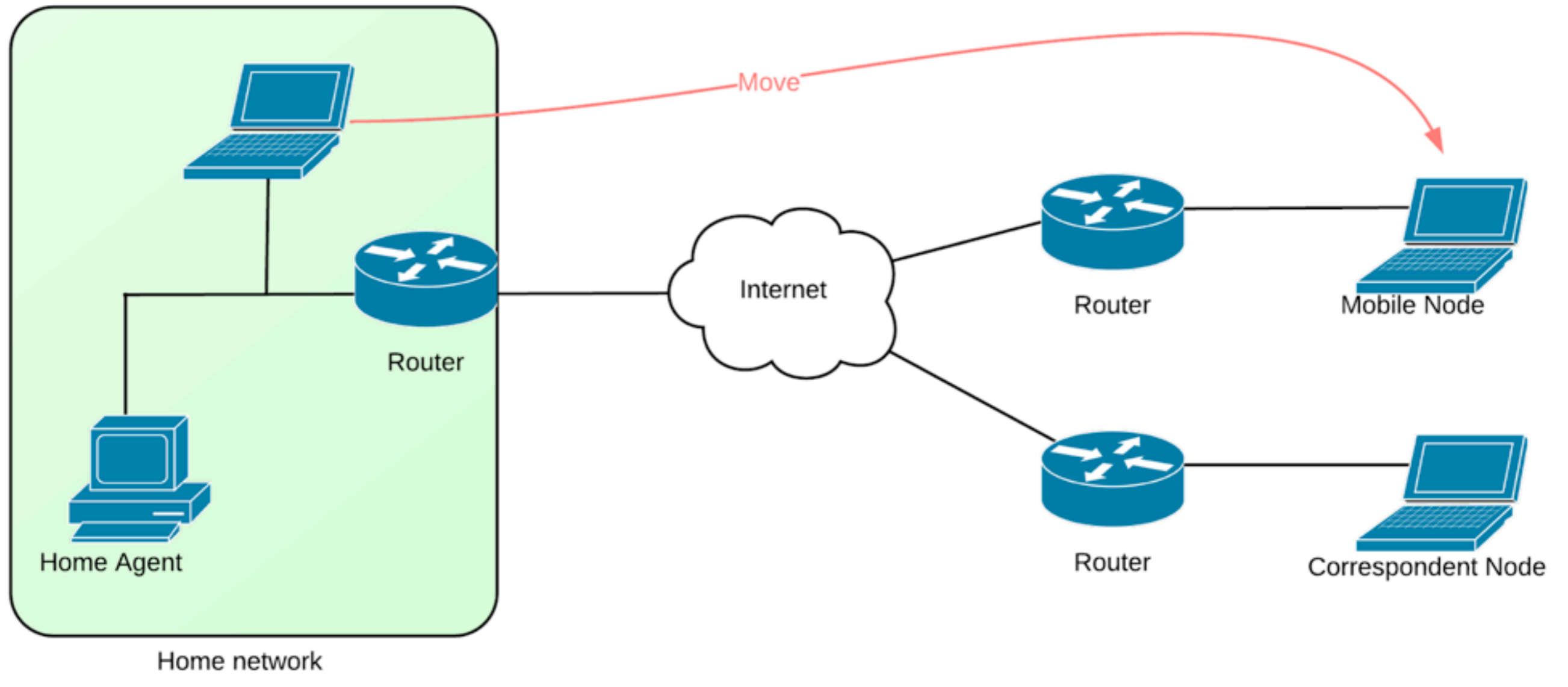
OUTLINE

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

WHY?

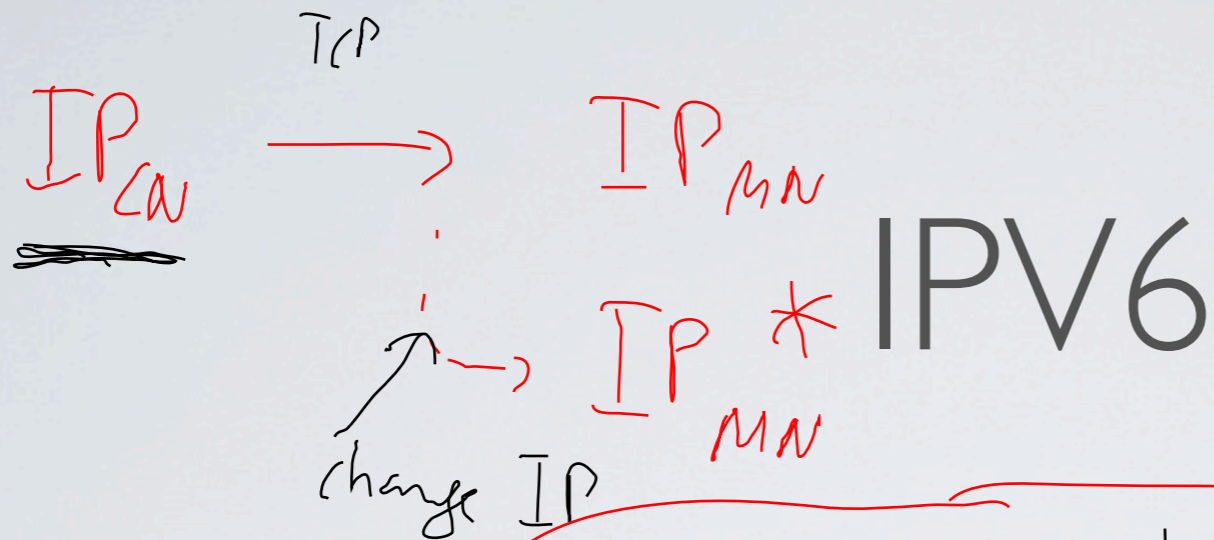
- A mobile node is identified by a unique IP address
- The Internet is built so that a single IP address cannot move from network to network, and keep its connectivity
- Mobile nodes therefore need to change its IP address when it moves
- DNS is not possible to use as a solution

INTRODUCTION



PROBLEMS WITH MIPv4

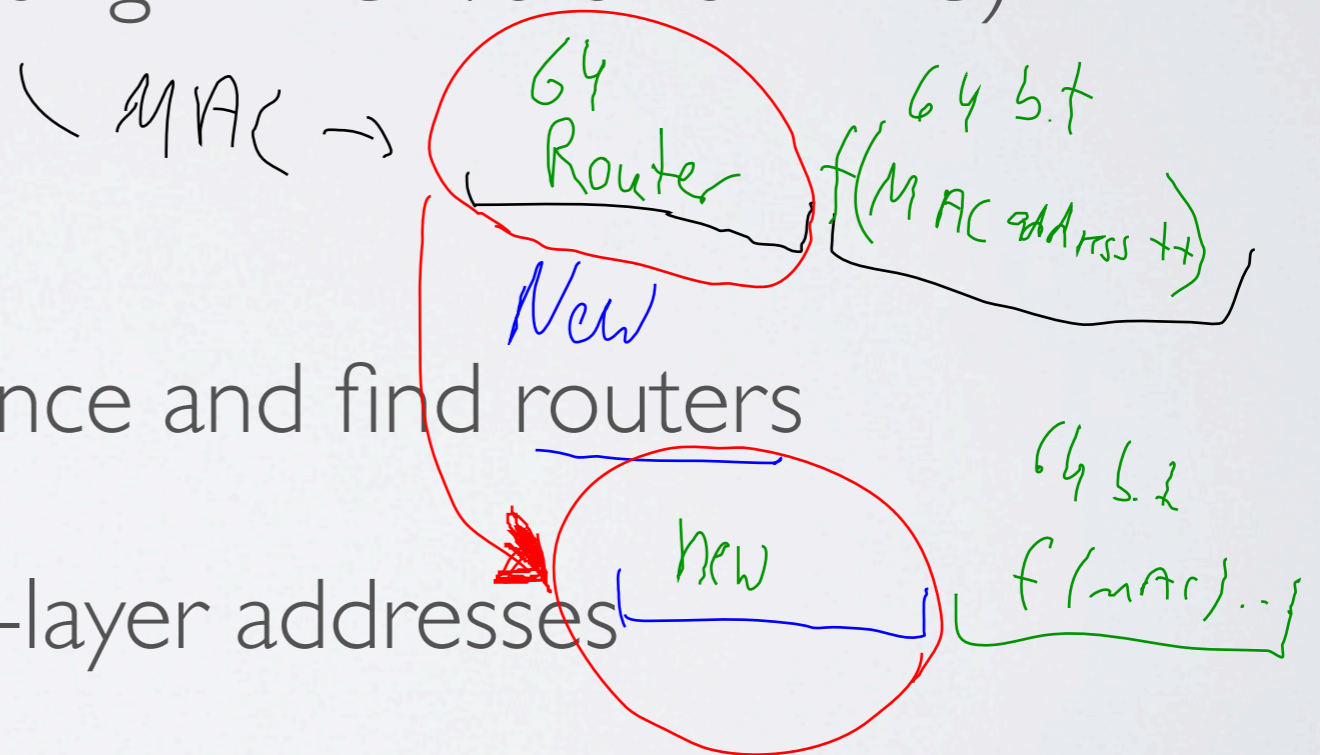
- Sub-optimal routing (triangular routing)
- Overhead (MTU must be reduced due to tunneling)
- Firewalls (UDP 434/435, IPinIP)
- NAT-traversal (RFC 3519)
- Slow handover
- HA single point of failure, many hops away



Location services
 based on IP
 193 757 → UAWIK
 → Norway
 → hiker

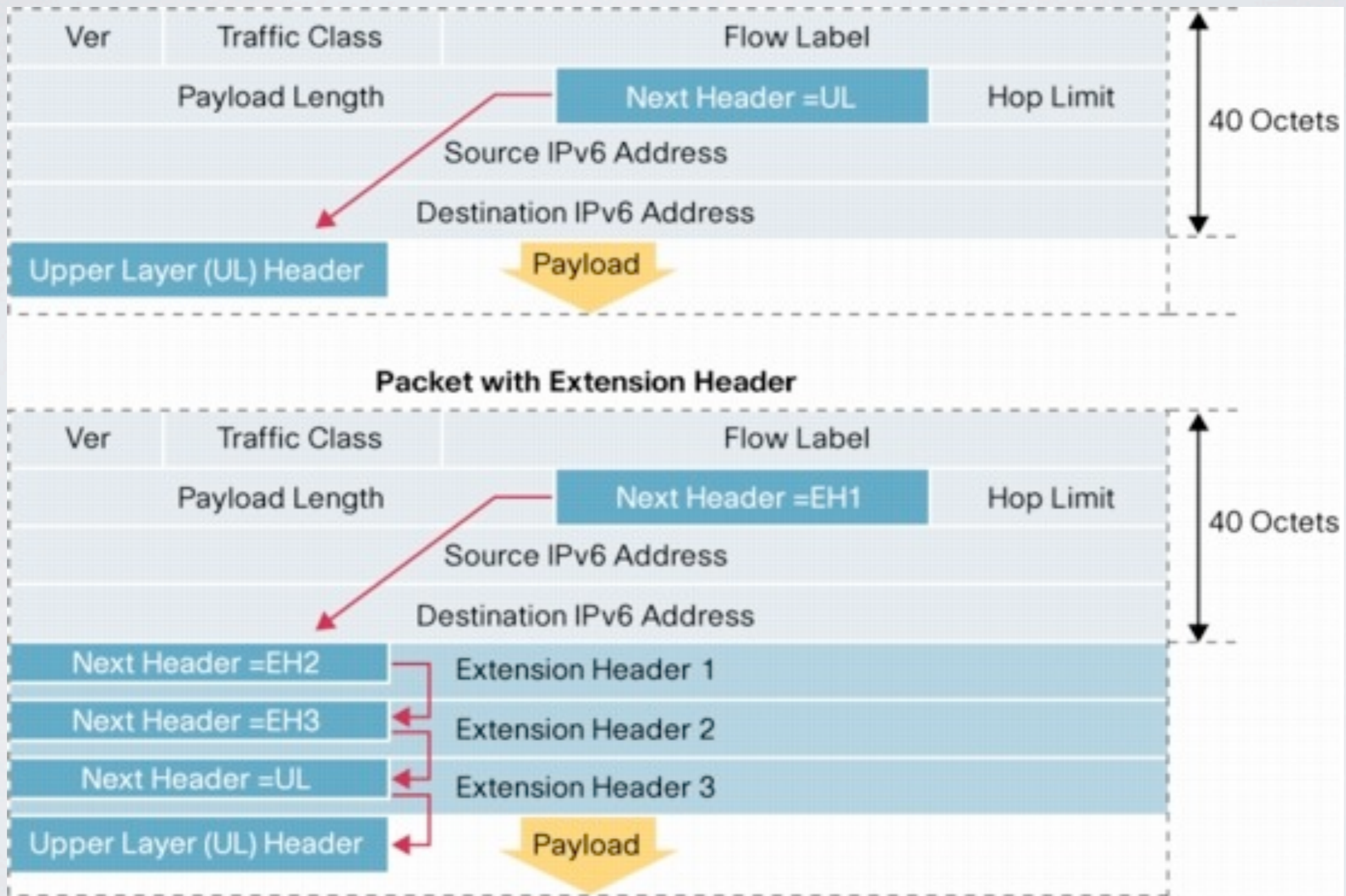
→ packet loss + binding update + ...

- 2^{128} addresses (compared to 2^{32} with IPv4)
- Address Autoconfiguration (using DHCPv6 or SLAAC)
- Neighbor Discovery:

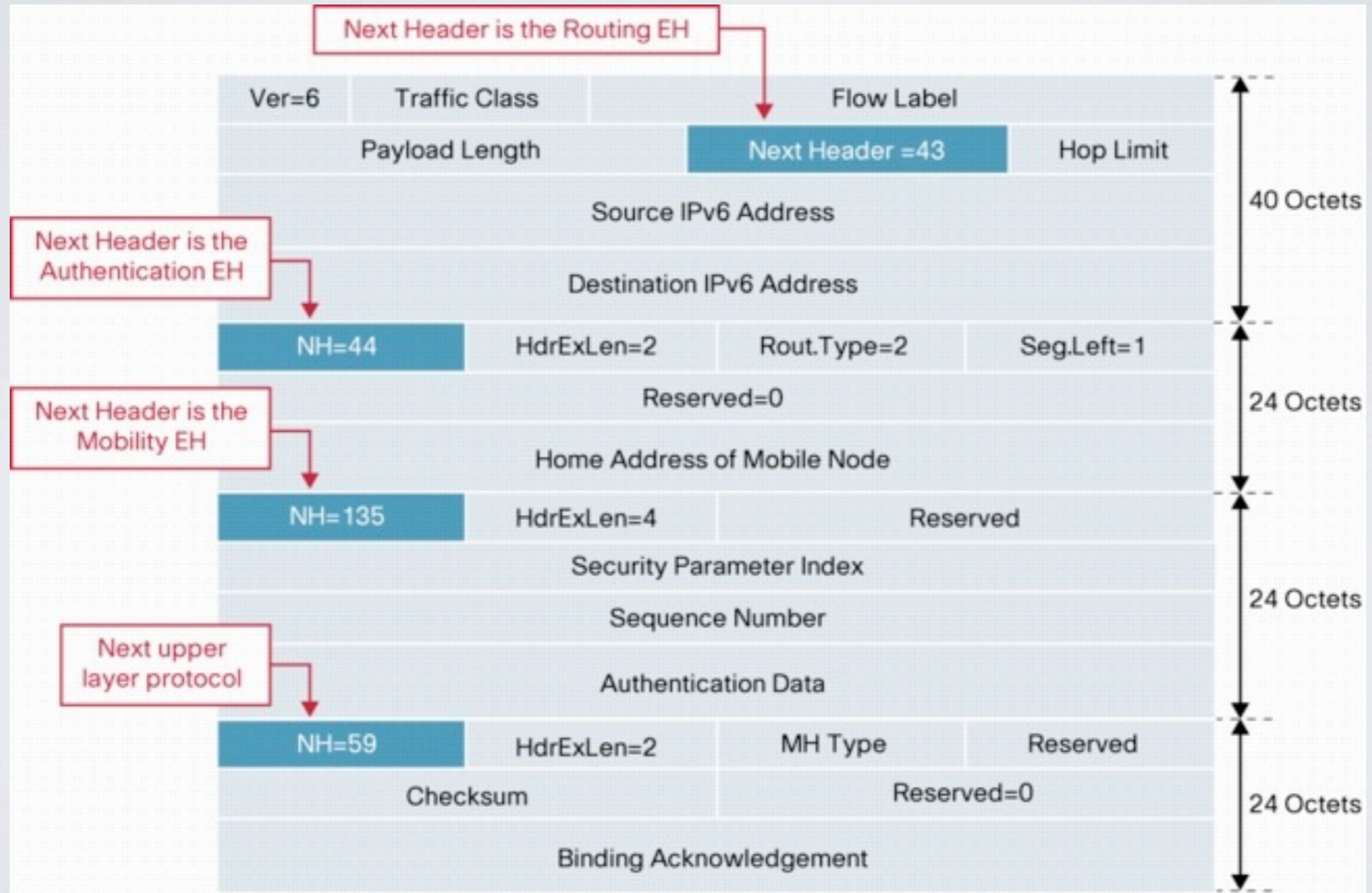


- Discover each others presence and find routers
- Determine each others link-layer addresses
- Maintain reachability information

IPV6 HEADER



MOBILITY EH



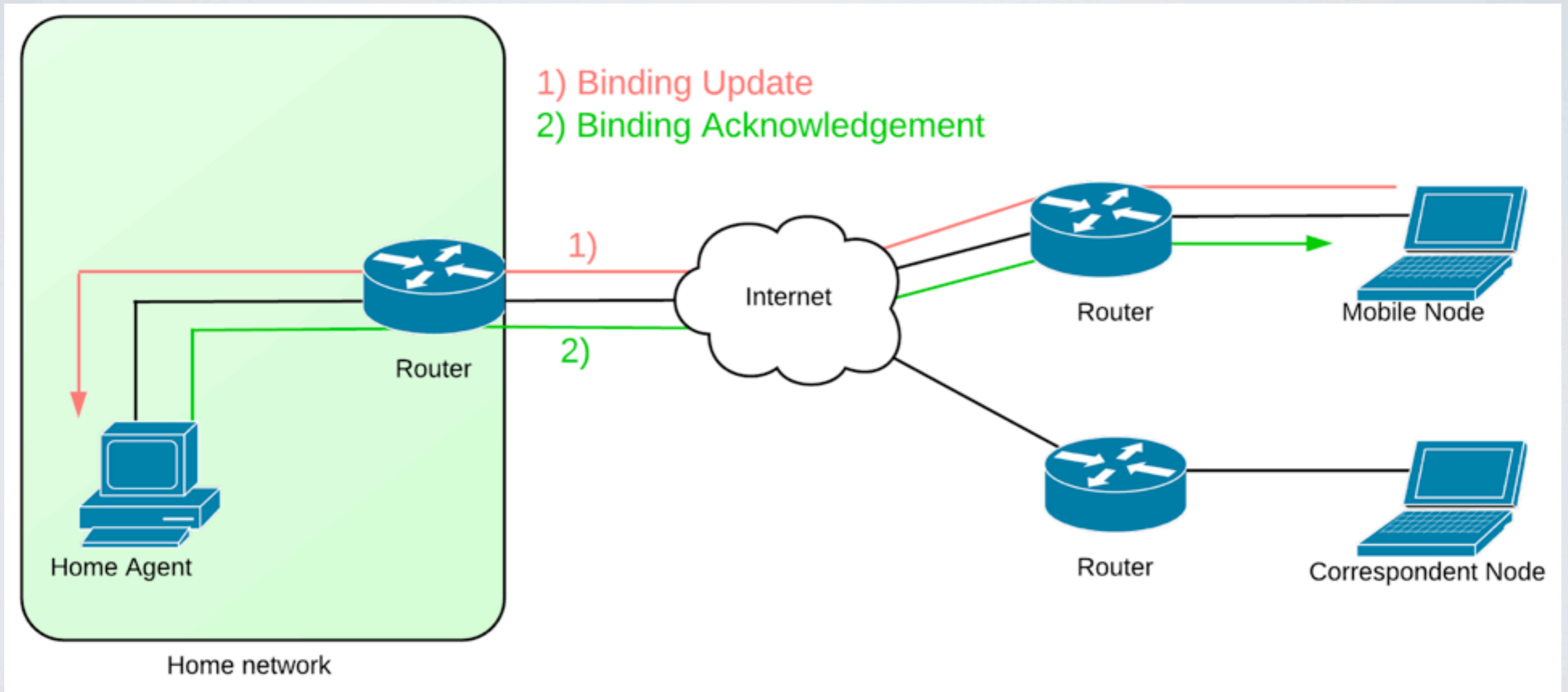
TERMINOLOGY

- **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.

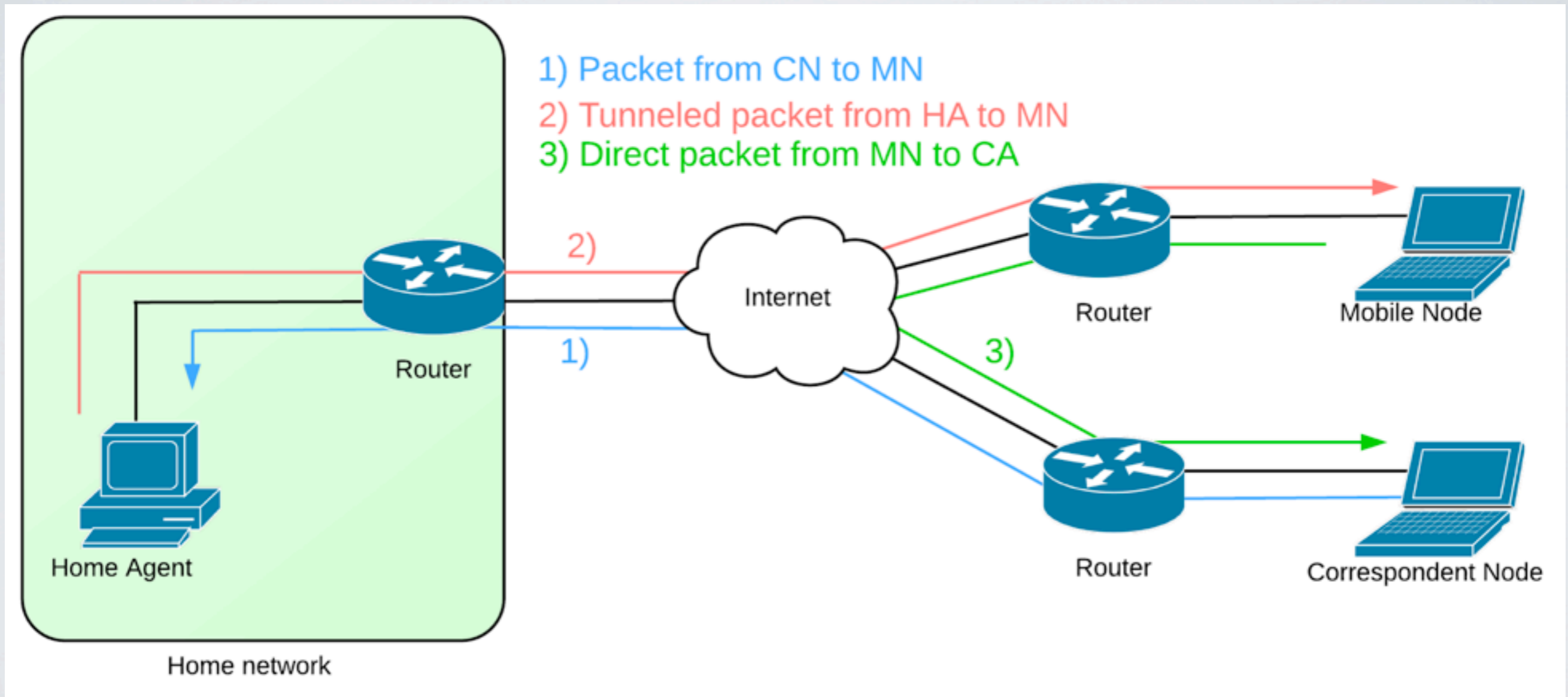
TERMINOLOGY

- **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.

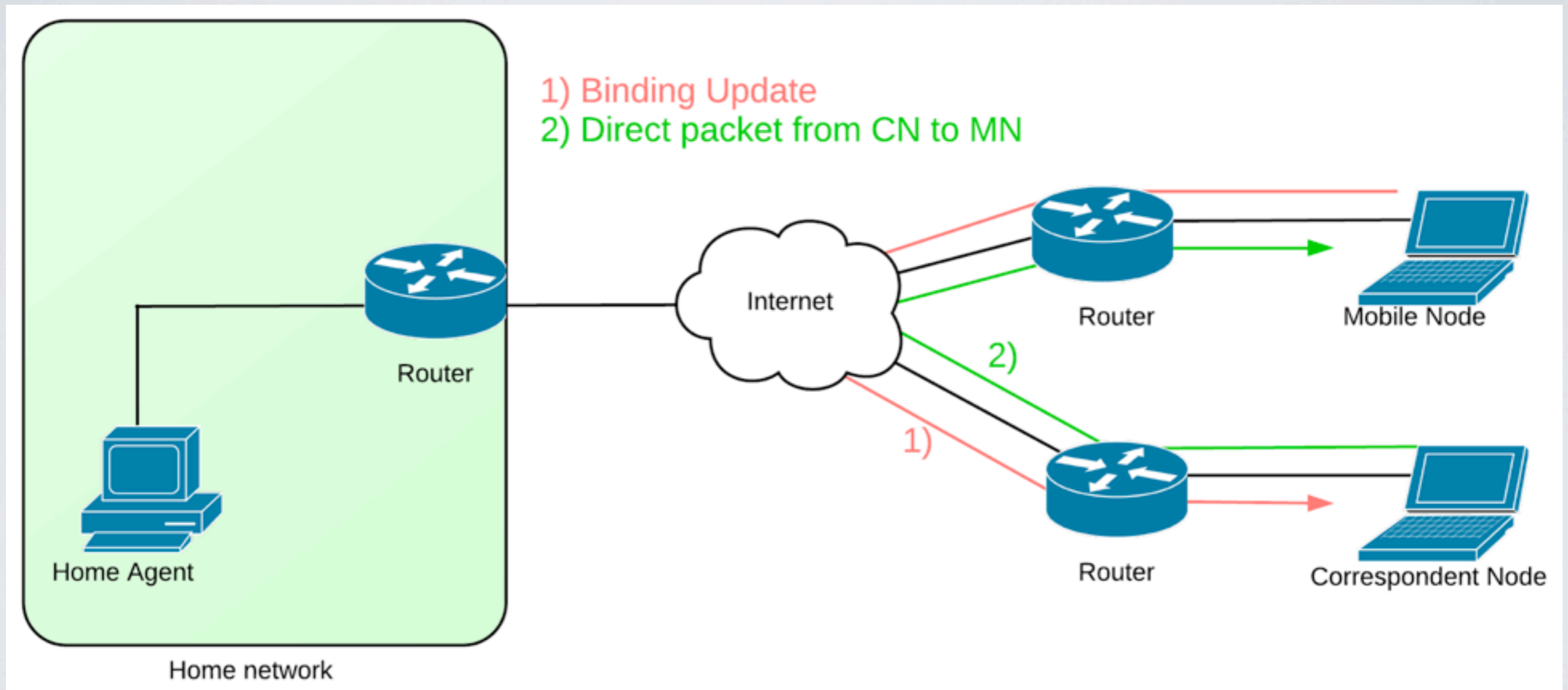
HA REGISTRATION



TRIANGLE ROUTING

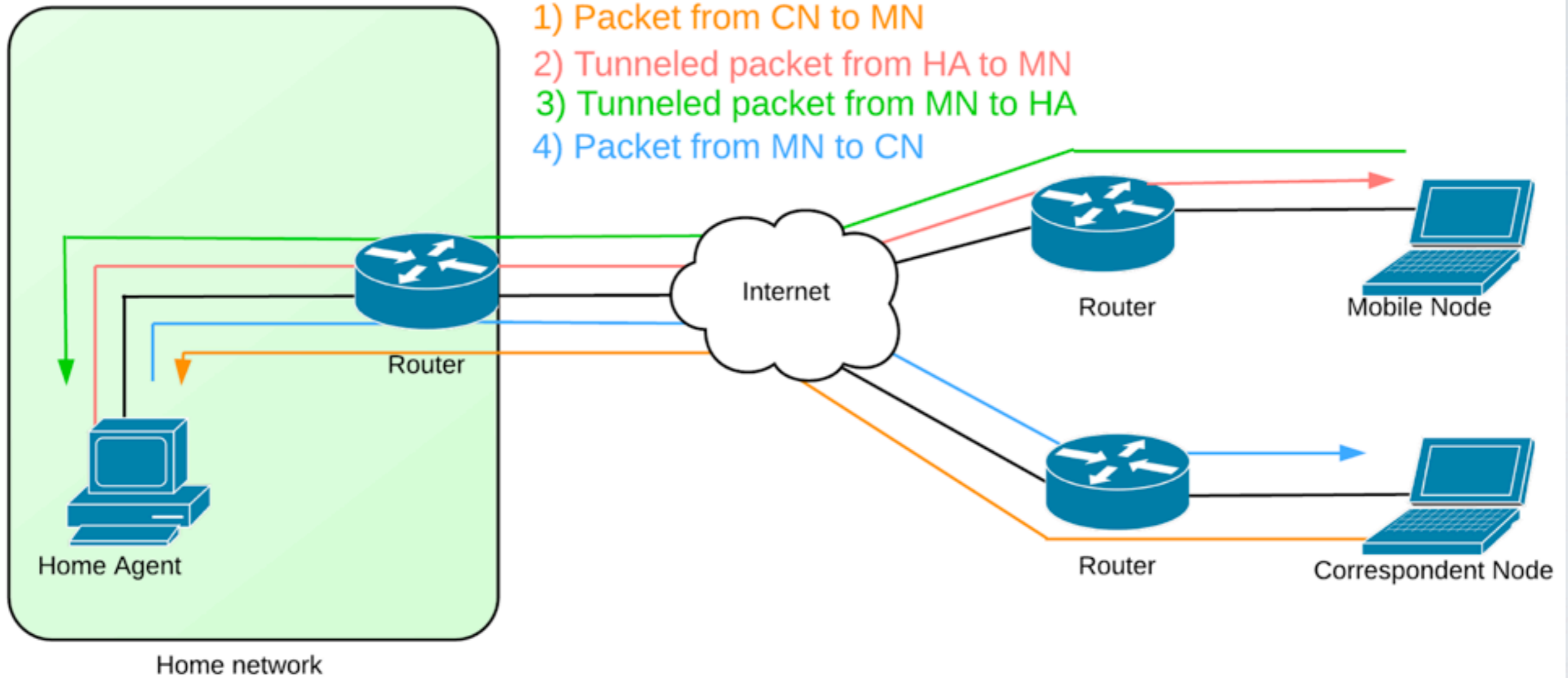


ROUTE OPTIMIZATION

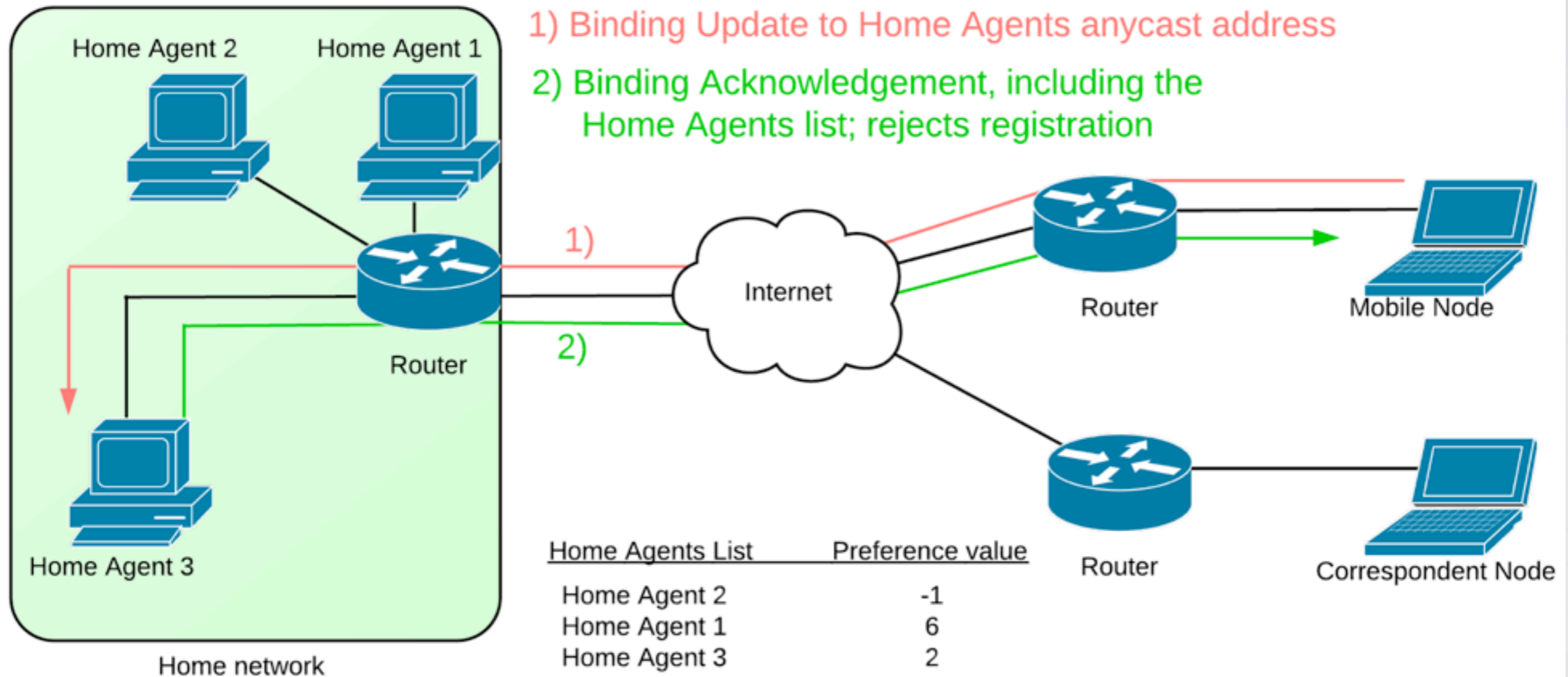


BIDIRECTIONAL ROUTING

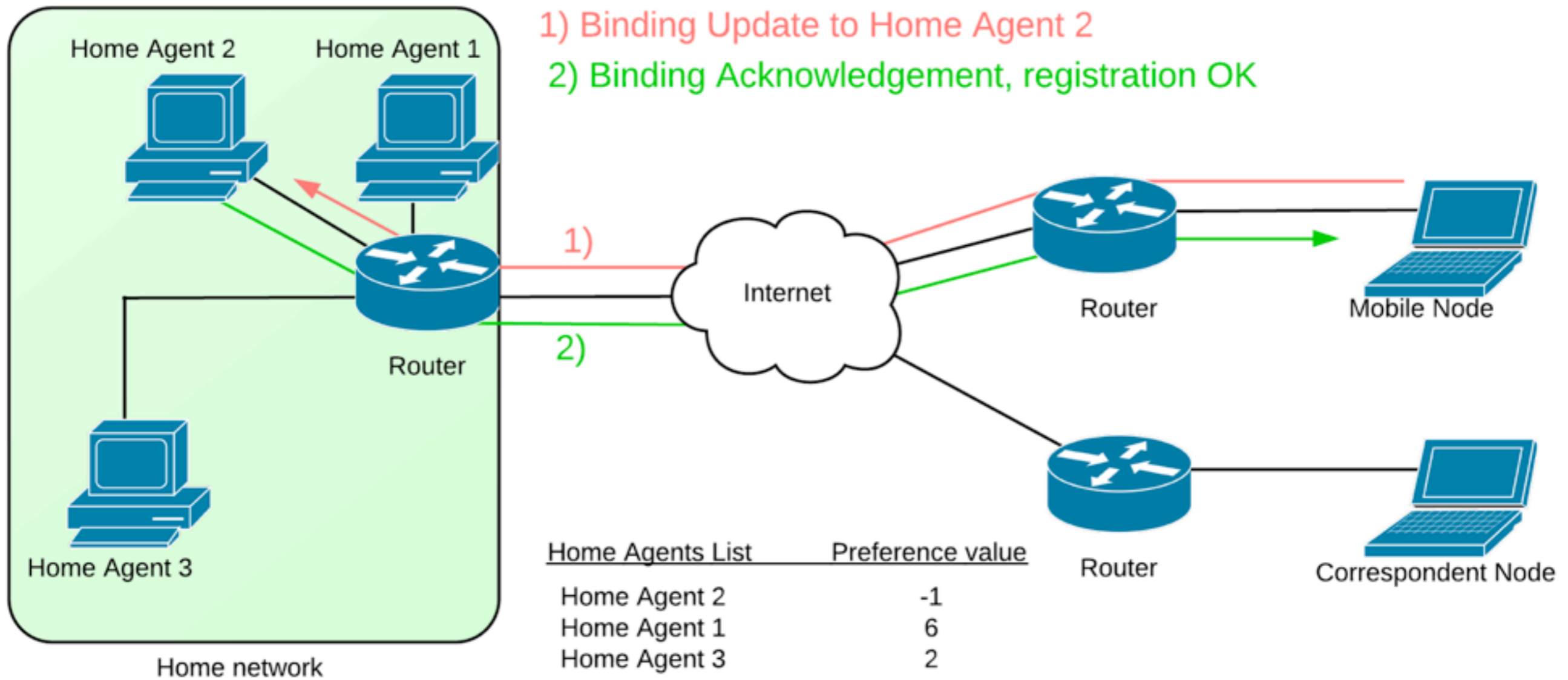
- 1) Packet from CN to MN
- 2) Tunneled packet from HA to MN
- 3) Tunneled packet from MN to HA
- 4) Packet from MN to CN



HA DISCOVERY



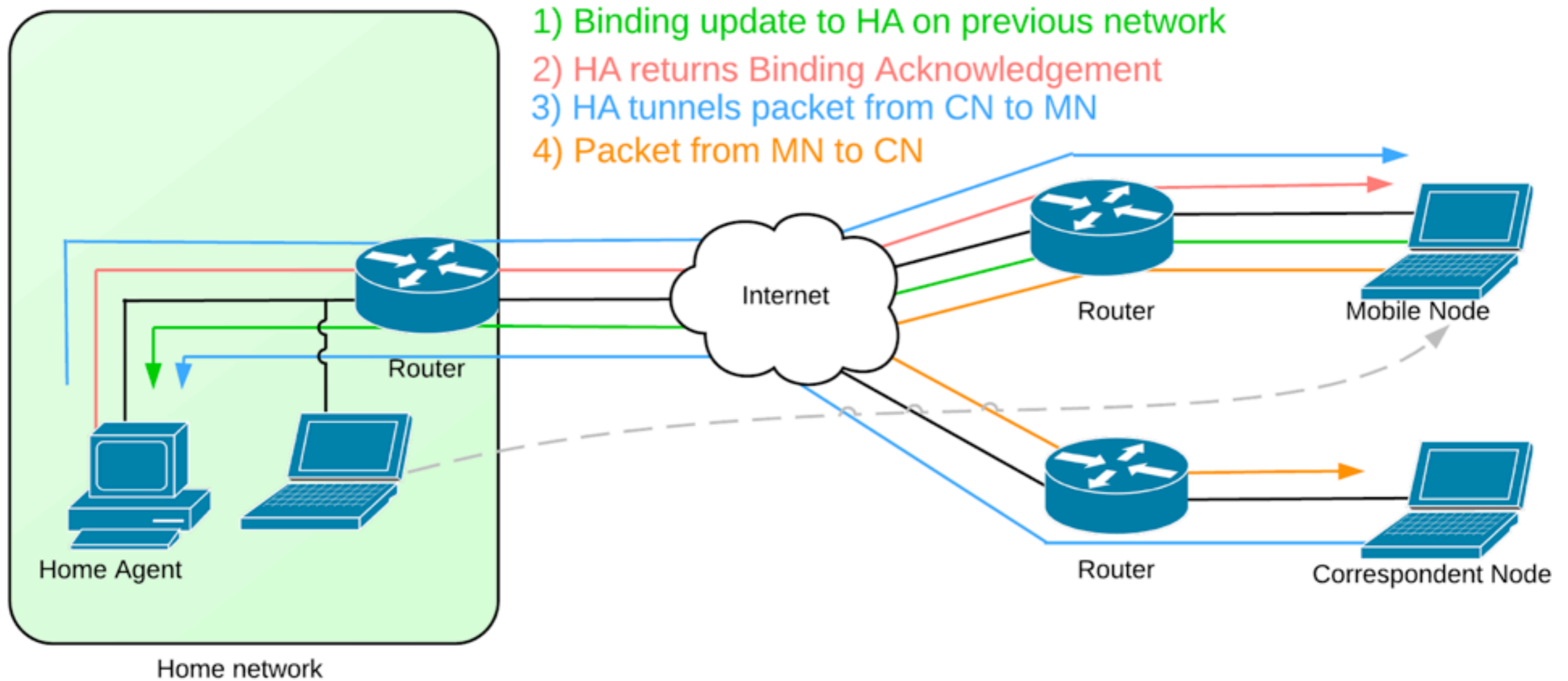
HA DISCOVERY



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)