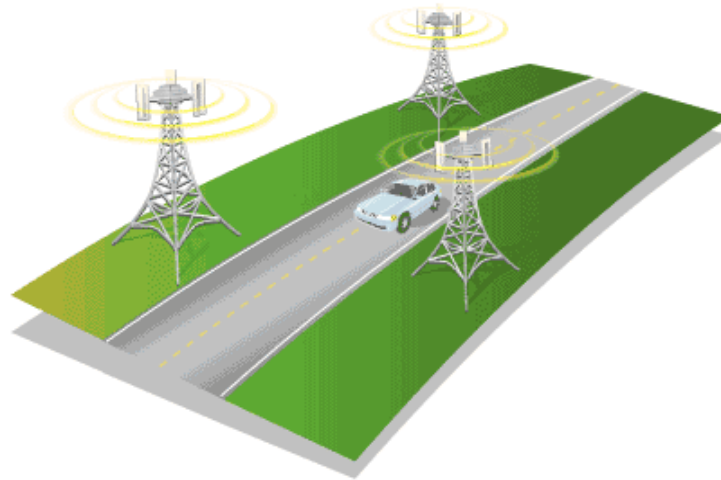# Hierarchical Mobile IP

UNIK 4700 Radio and Mobility

Outline

- Benefits of All-IP networks
- Mobility aspects
  - Macro Mobility
  - Micro Mobility
- HMIP
  - How it works
  - HMIP vs MIP
- HMIP v6
  - How it works
  - HMIPv6 vs MIPv6
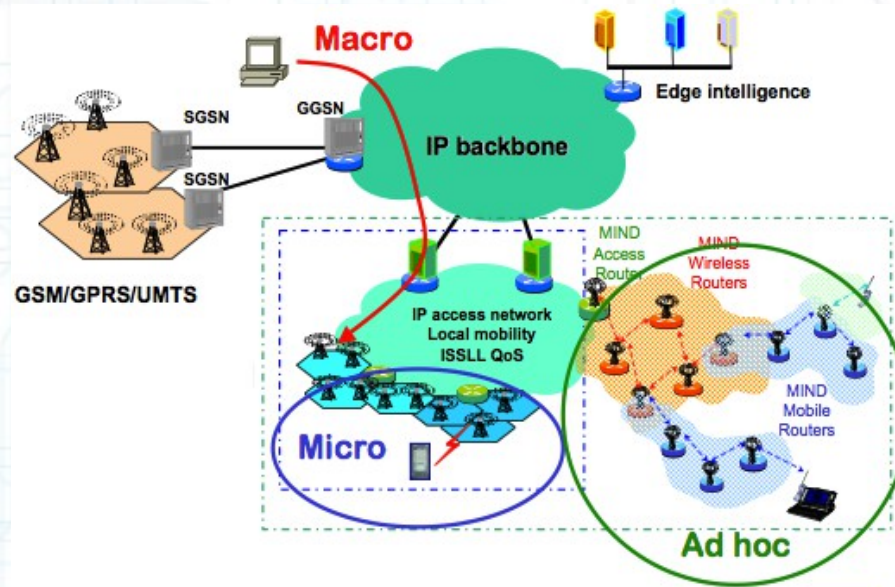
Benefits of All-IP Networks

Technical:

- Minimize system latency.
- Flexibility in network planning and deployment.
- Develop a flexible core network.

Economic:

- Reduce the number of network elements.
- Cost saving for the Core Netwok.

Mobility Aspects

- <u>Macro-mobility</u> concerns the management of users movements at a large scale: Mobile IP.

- <u>Micro-mobility</u> covers the management of users movements at a local level: Hierarchical Mobile IP, HAWAII, Cellular IP...
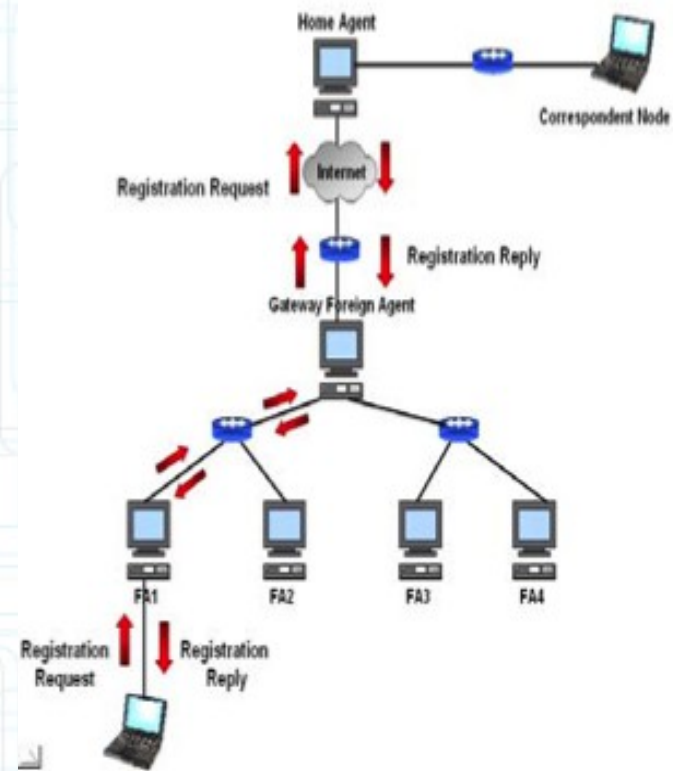
HMIP: How it works

- Hierarchy of FAs to locally handle Mobile IP registration.
- All FAs are connected to the gateway (GFA).
- Direct tunnels connect the GFA to FAs that are located at access points.
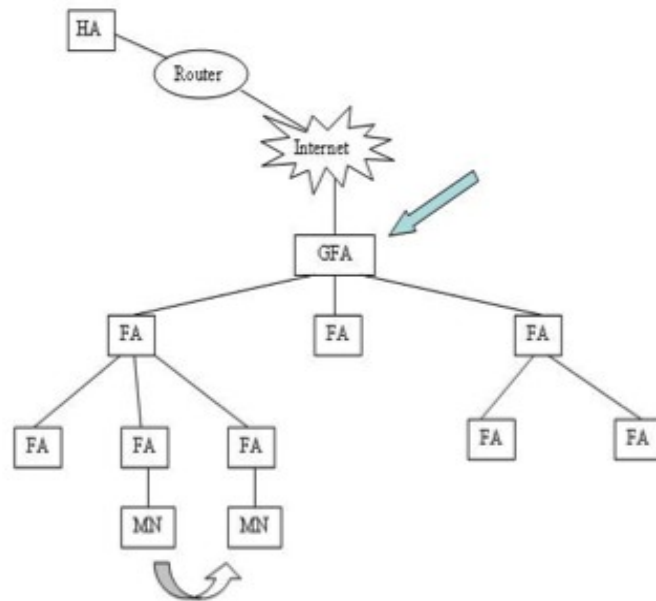
HMIP: How it works

When the MN moves to a foreign network for the first time:

- It will have to send a registration request to the HA.

- Then it will have to wait for a registration reply from the HA.

- Here, the CoA of the MN will be the same as its GFA.

HMIP: How it works

If the MN moves within the GF network:

- It will only have to inform and send Binding Updates to its GFA.

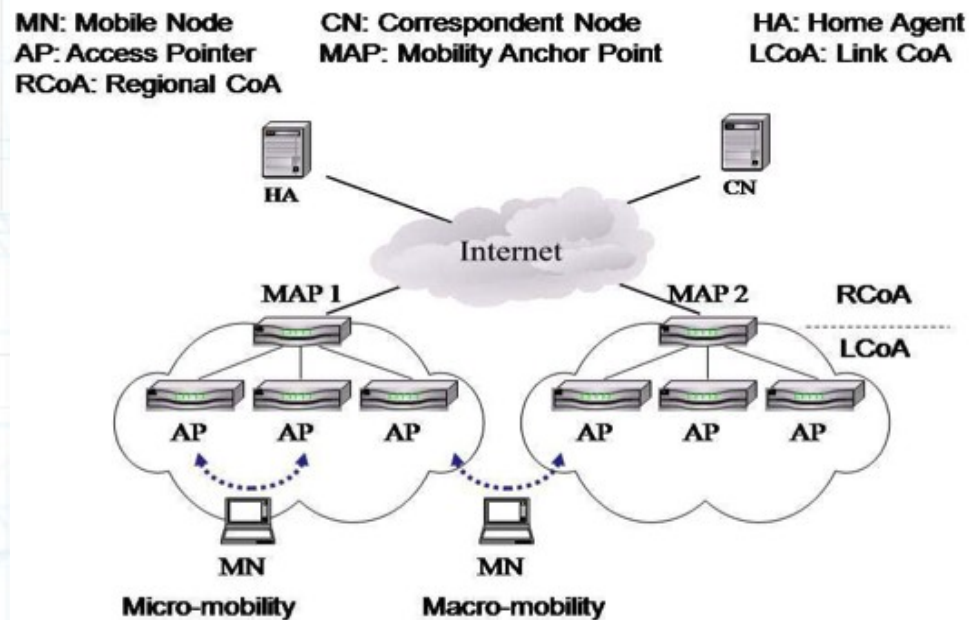- This will reduce the signaling overhead at the Internet.
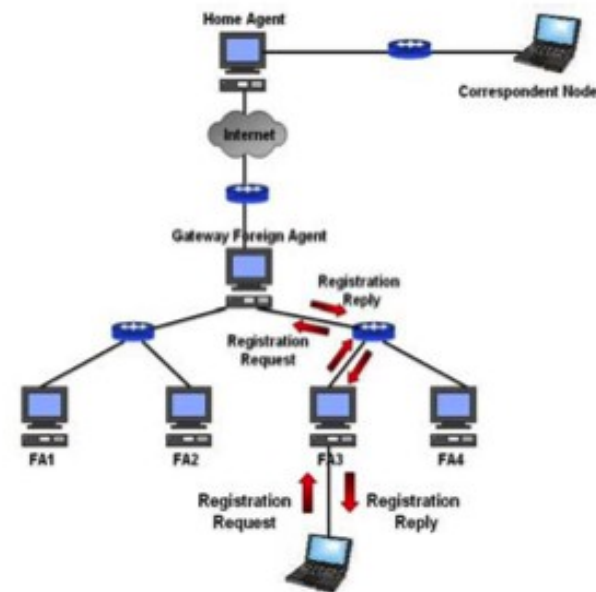
HMIP vs MIP

- <u>MIP packet loss:</u> signaling overhead at the Internet, registration process between the MN-HA; registration due to timeout when the MN is in the foreign network.
- <u>HMIP packet loss</u>: registration request and reply between MN-GFA-HA; regional tunneling in the GF Network.

NUMBER OF PACKET LOSSES
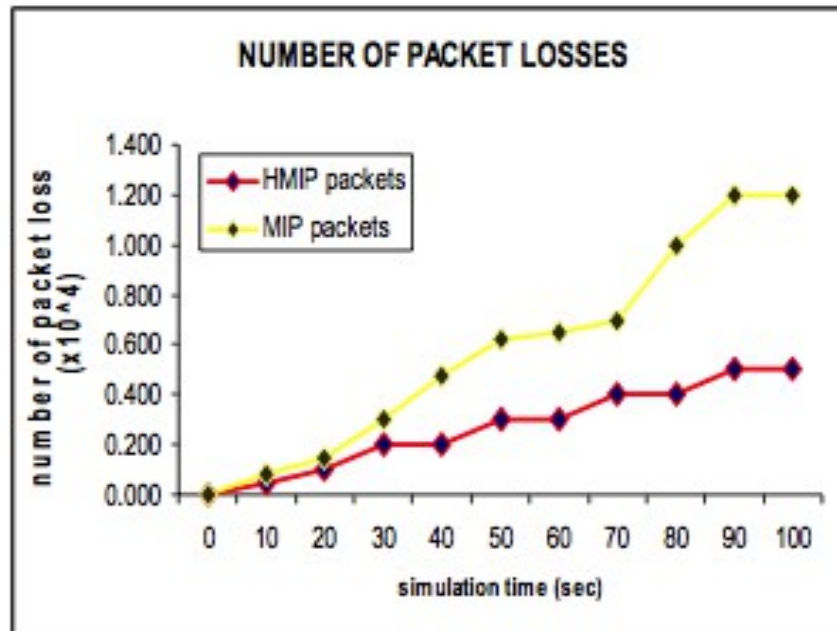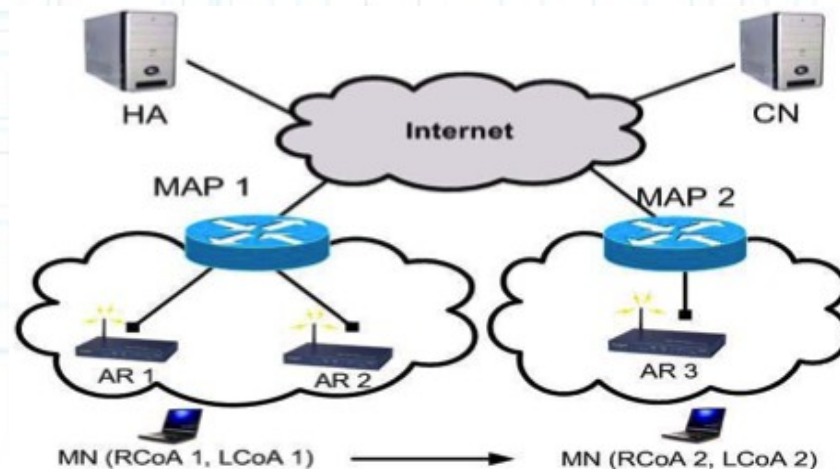
HMIP v6: How it works

- There are no FAs, but there is still need to provide a central point to assist with MIP handoffs.

- It uses anchor points to deploy two levels of hierarchies (MS or Mobility Anchor Point-MAP).

MN: Mobile Node
AP: Access Pointer
RCoA: Regional CoA
CN: Correspondent Node
MAP: Mobility Anchor Point
HA: Home Agent
LCoA: Link CoA

HMIP v6: How it works

If MN moves into new domain, It gets two CoA: regional CoA(RCoA) and on-link CoA (LcoA).

- RcoA: in the Mobility Network (stays constant as long as MN is roaming within the site).

- LcoA: in the visited LAN (changes at each movement of MN)

HMIP v6: How it works

If it moves within a domain:

- It only needs to change its LcoA.

- MN register its RCoA with its HA and correspondent hosts.

- The MAP can be changed dynamically without having to change the RCoAs of the MNs currently roaming in the domain.
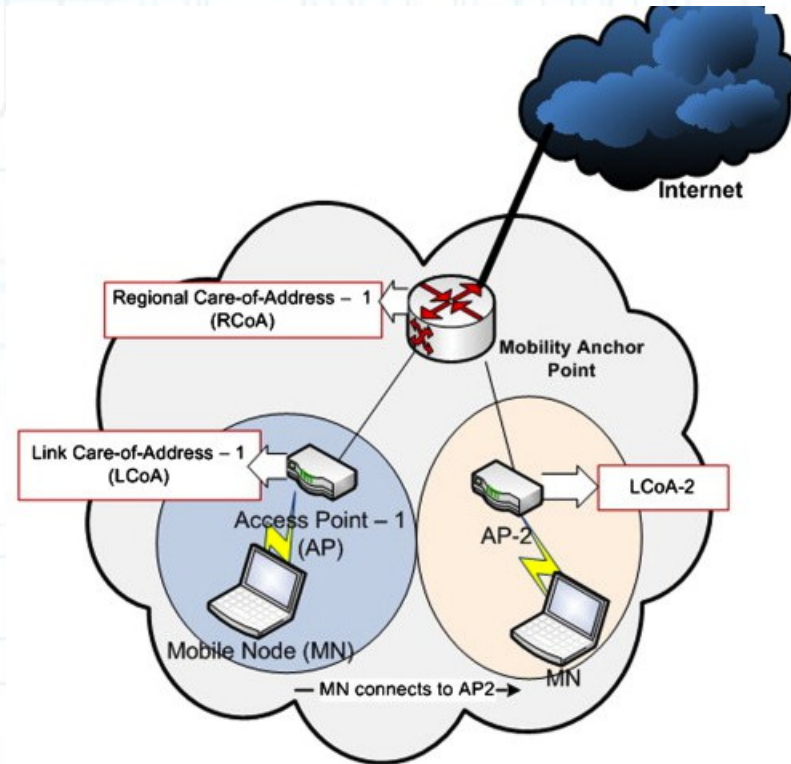
HMIP v6: How it works

- Packets addressed to the MN's RCoA are routed to the domain intercepted by the MAP & encapsulated to the MN's current LCoA.
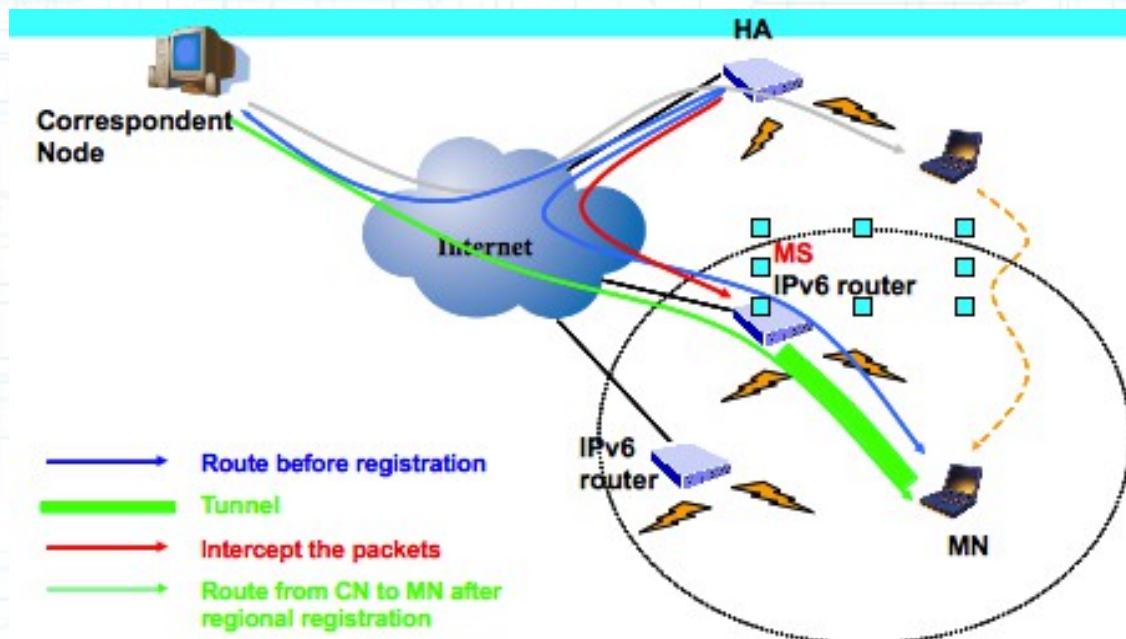
HMIPv6 vs MIPv6

- Extension of MIPv6
  - CN and HA operation will not be affected.

- The introduction of the MAP concept
  - Minimize the latency due to handoffs between AR.

  - Diminish signaling cost.

- Local Location Transparency
  - If the MN changes its LcoA within a local MAP domain, it only needs to register the new LcoA with the MAP

  - This makes the MN's mobility transparent to the CNs

END

Questions?