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Mobile IPv6 Tutorial

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Outline

- Mobile IPv6 overview
- Mobile IPv6 improvements
- Mobile IPv6 Applications

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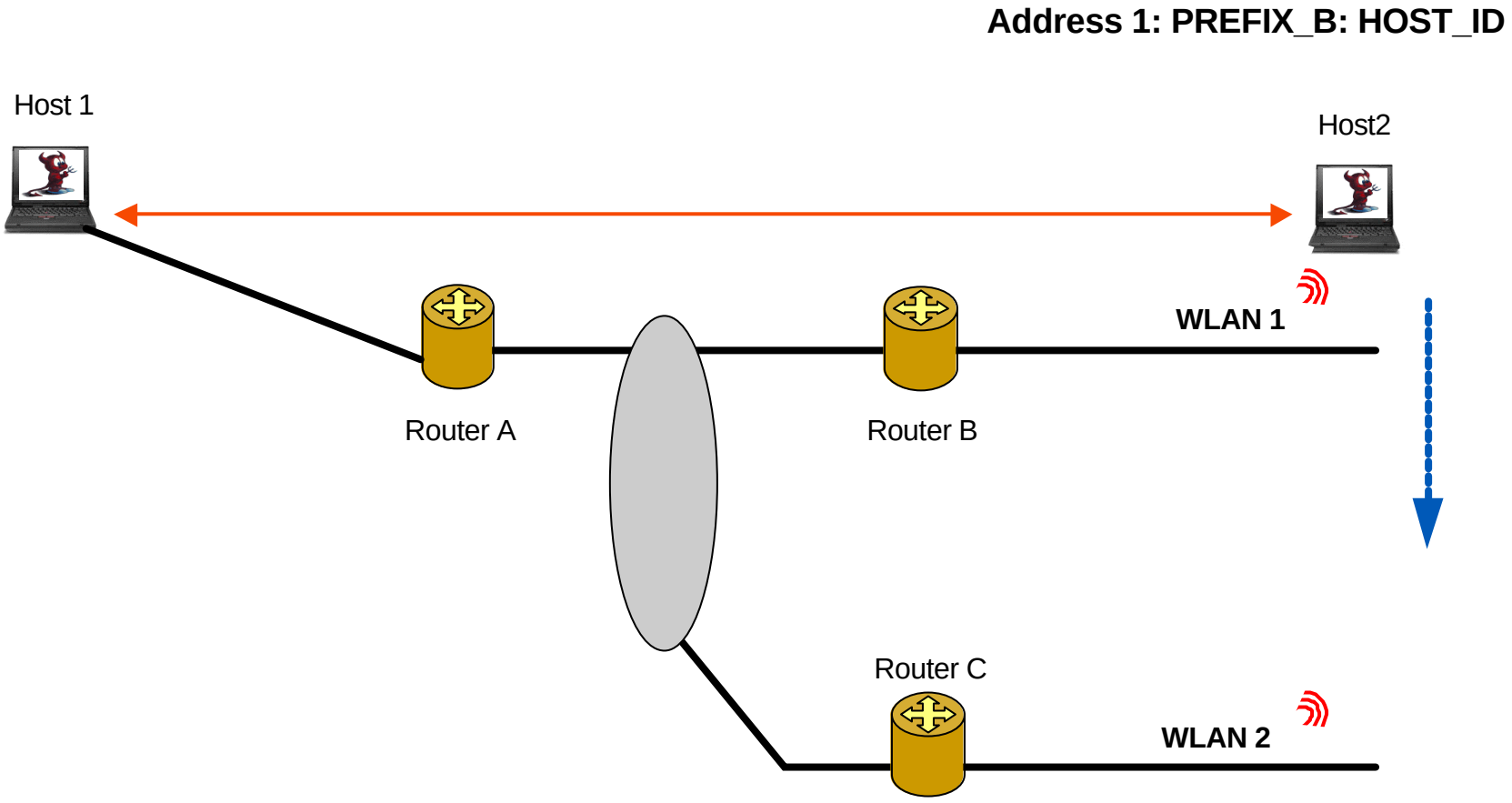
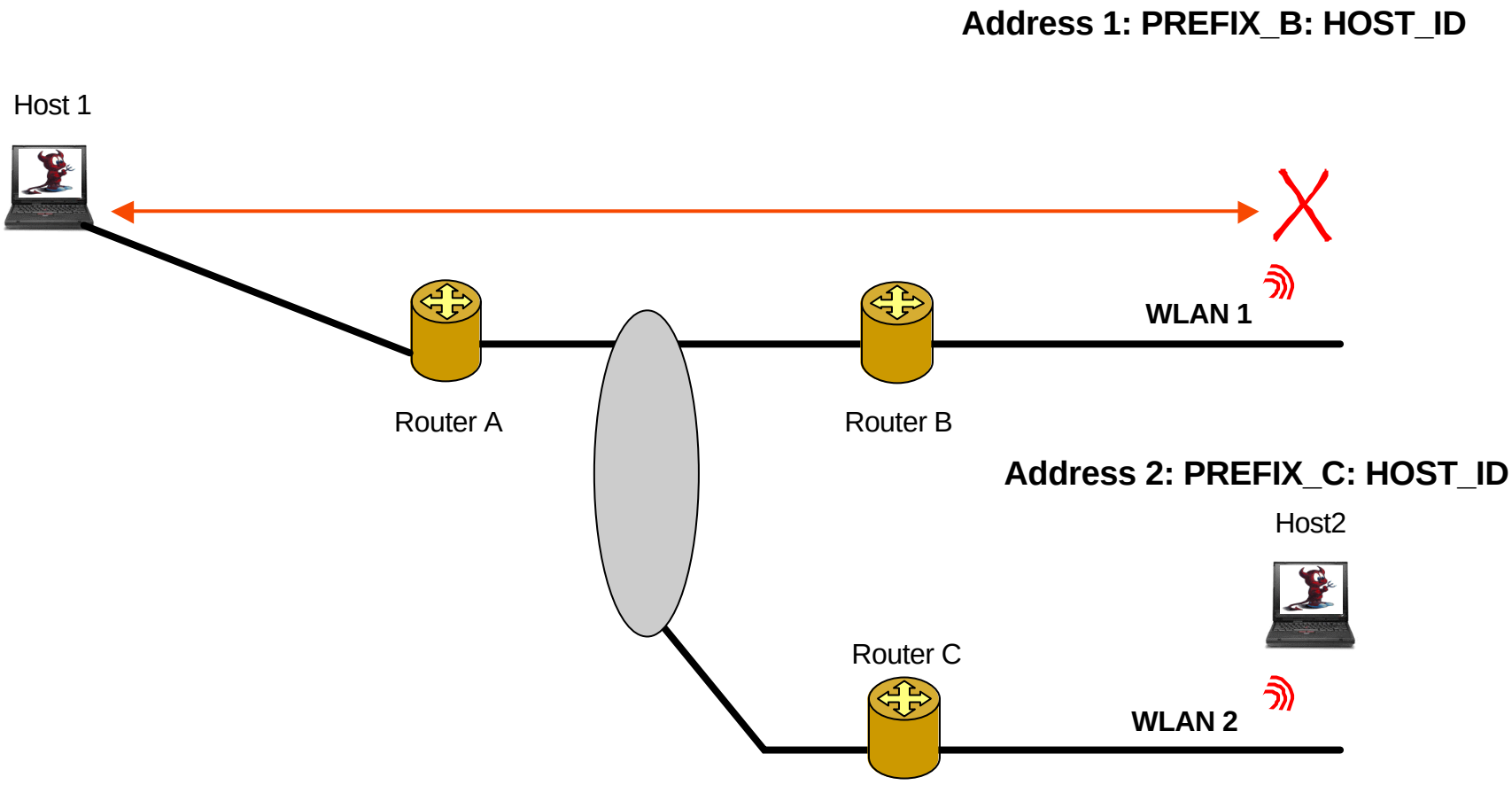
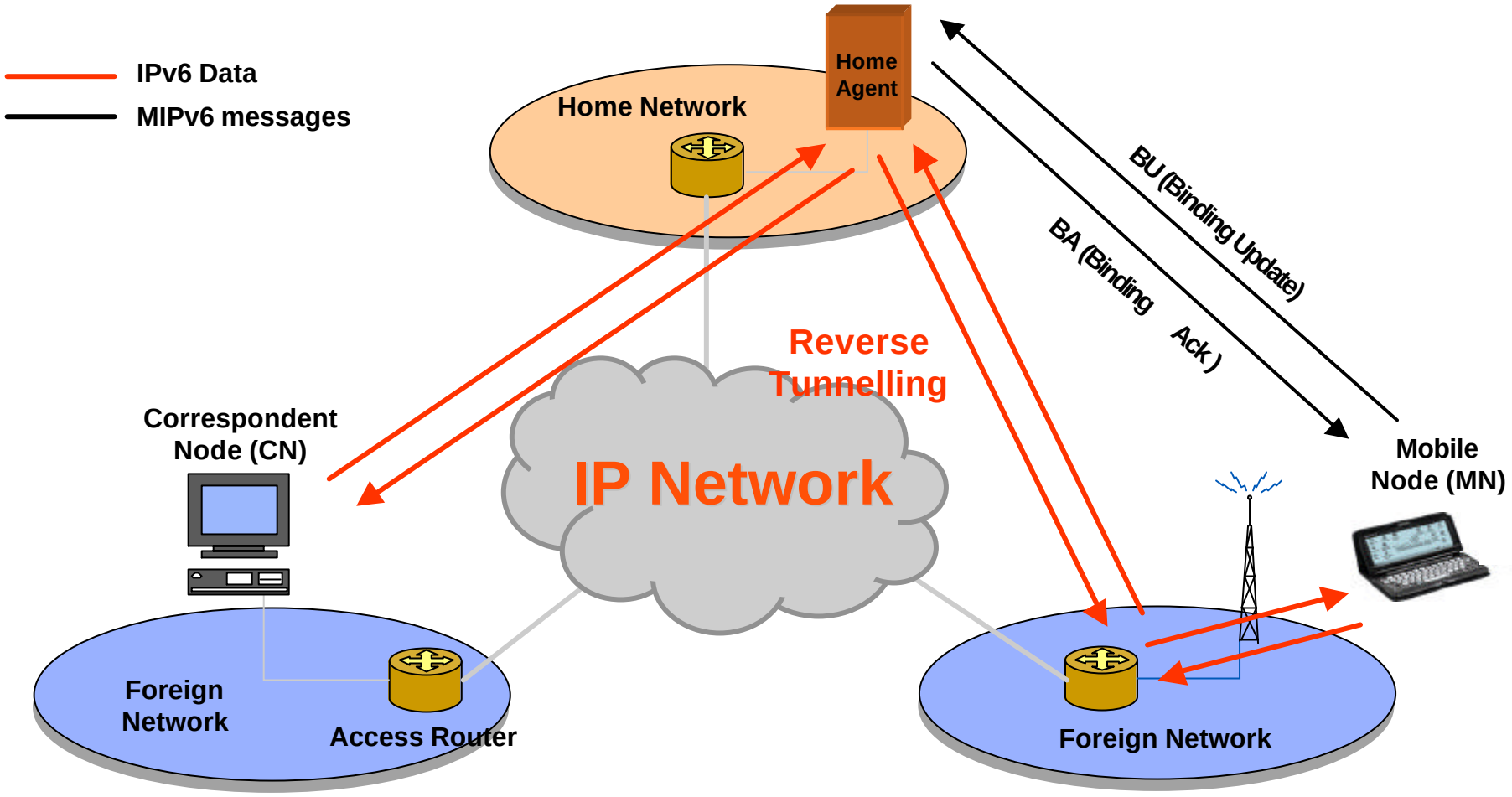
Why IP mobility?



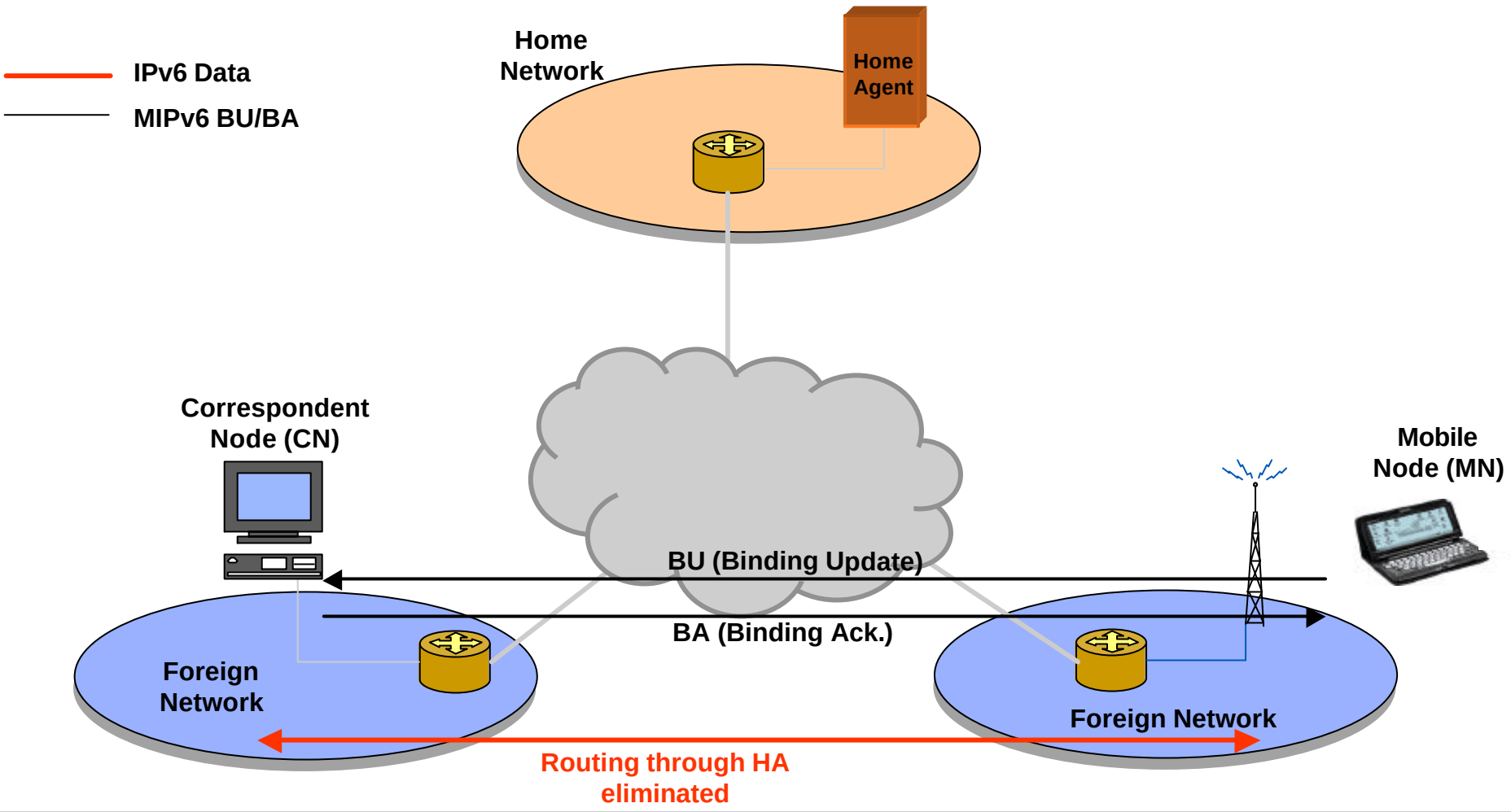
Why IP mobility?



Mobile IPv6 – Routing through HA



Mobile IPv6 – Route Optimisation



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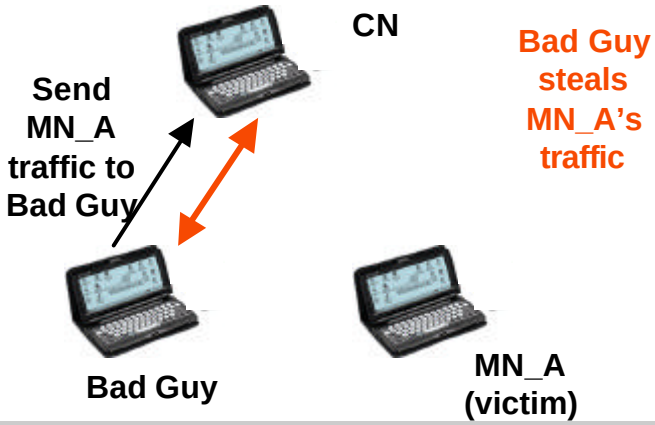
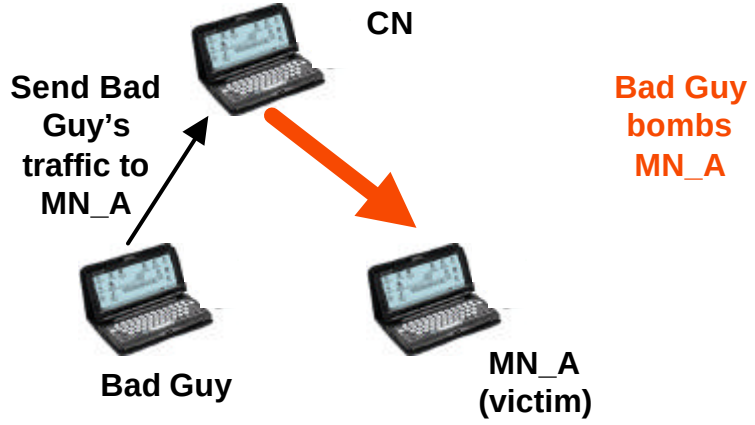
Securing Route optimisation signalling

- Why do we need to secure it?
  - The BU orders the receiver to send traffic to a different IP address (e.g. Packets intended for address X should be sent to Y)
  - Attackers can:
    - Direct a MN's traffic to themselves (steal traffic)
    - Direct a MN's traffic somewhere else (Bombing attacks)
    - Deny a MN from communicating with other nodes (DoS attacks).
    - More attacks are possible.





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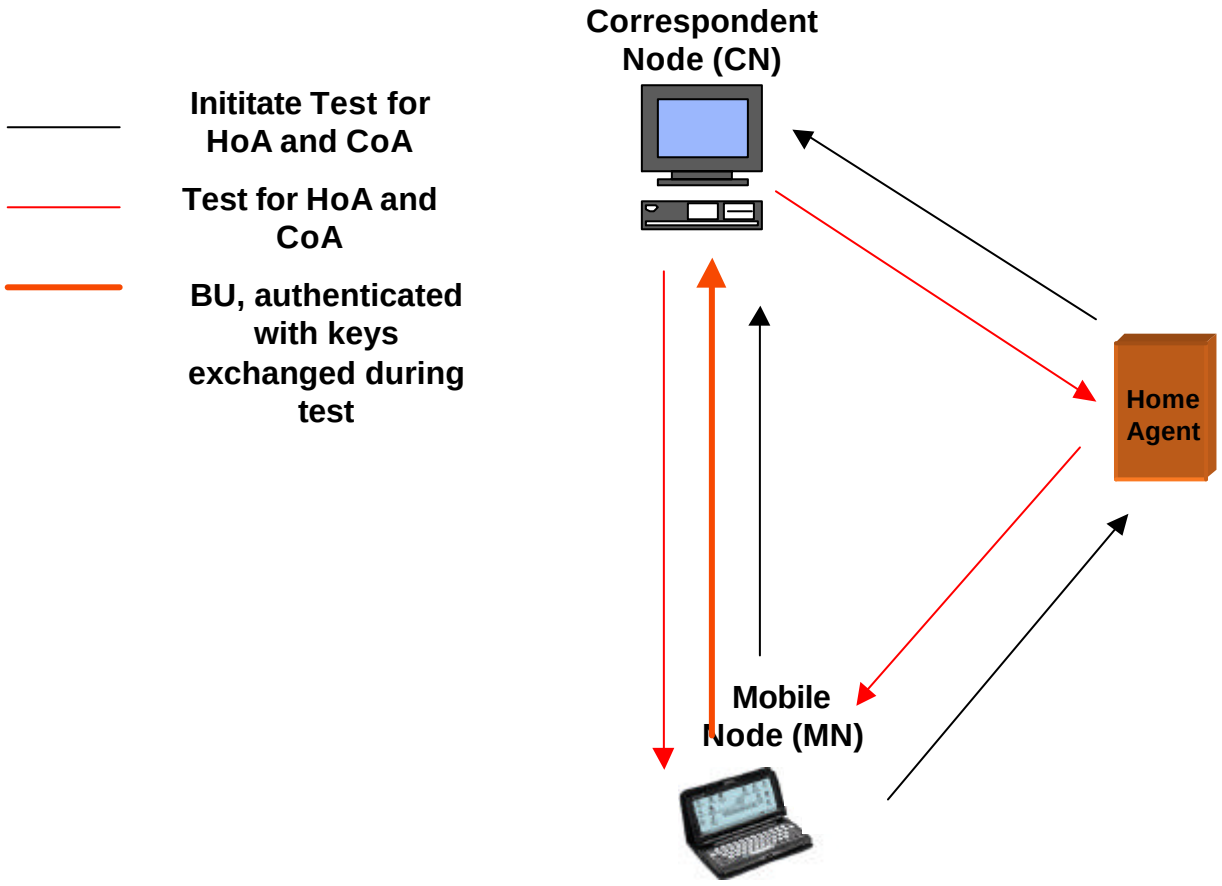
Securing Route optimisation signalling…cont

- What type of security is needed?
  - The CN needs to determine whether the MN has the right to send the BU
  - To do this the MN must prove that it owns both Home Address and Care-of Address
  - Encryption is not required, no confidential information.

- Is a proof of identity enough?
  - Proof that a user is Person@ericsson.com does not mean that Person owns home address X or CoA Y.
  - Certificate including Home Address could be used but can be complex to set up in practice (i.e. who gives out these special certificates, global PKI)

MIPv6 security – Return Routability



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Current and future Mobile IPv6 optimisations

- Localised Mobility Management (LMM)
- Fast handovers
- Granularity of movement:
  - Flow movement
- Network mobility

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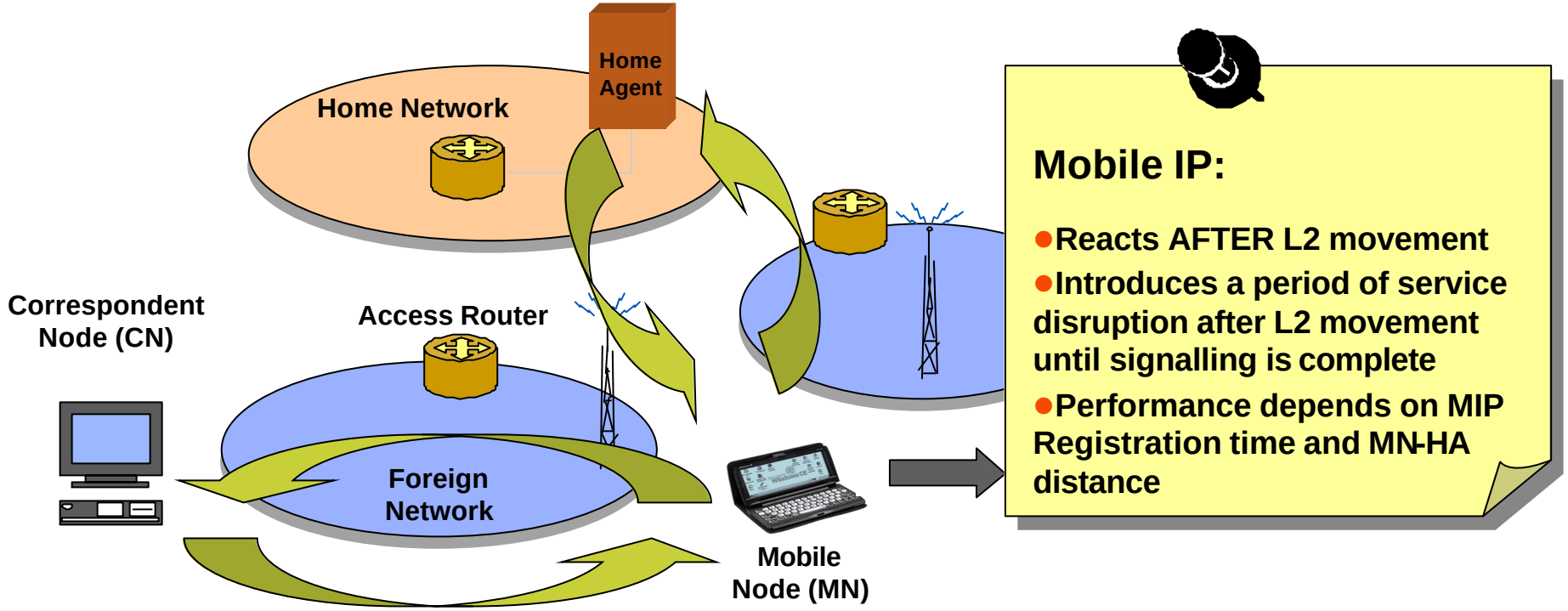
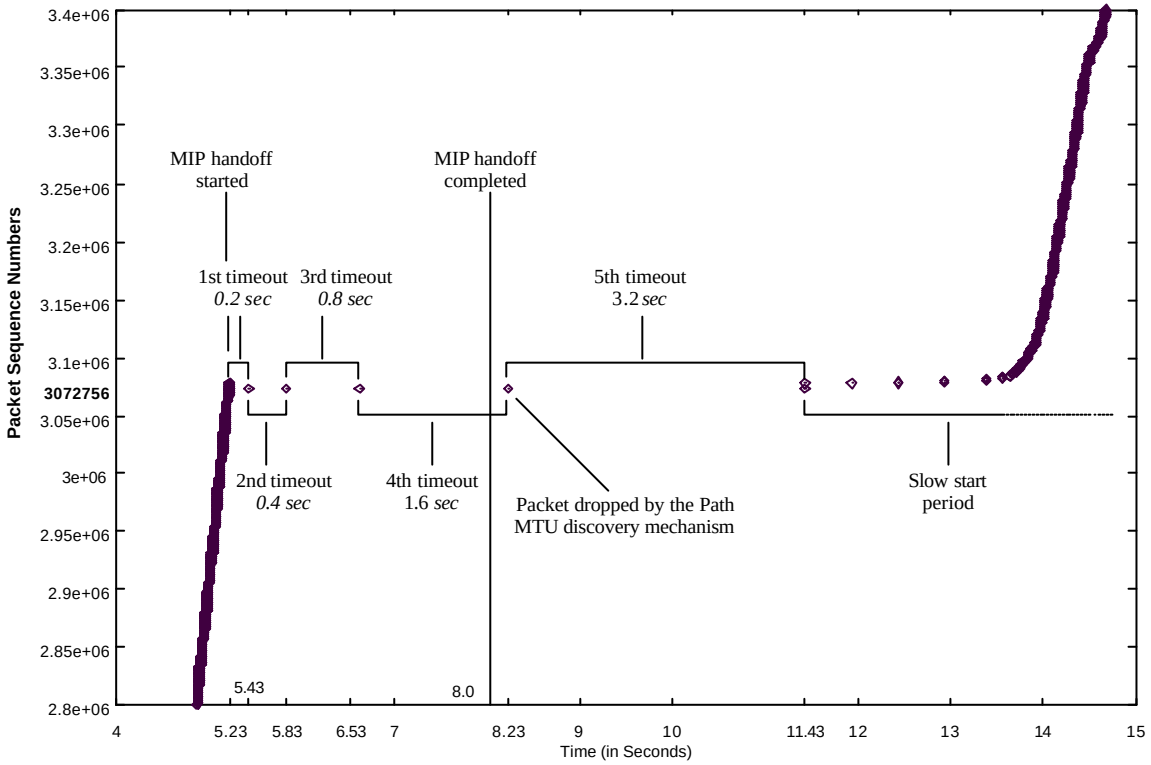
Why are “Fast” & “Local” Mobility important?



- Fast Handoffs: Anticipates Mobile IP messaging (before L2 movement)
- Local Mobility: Reduces Mobile to Home network roundtrip delay
- Local Mobility: Reduces number of messages (radio transm. efficiency)

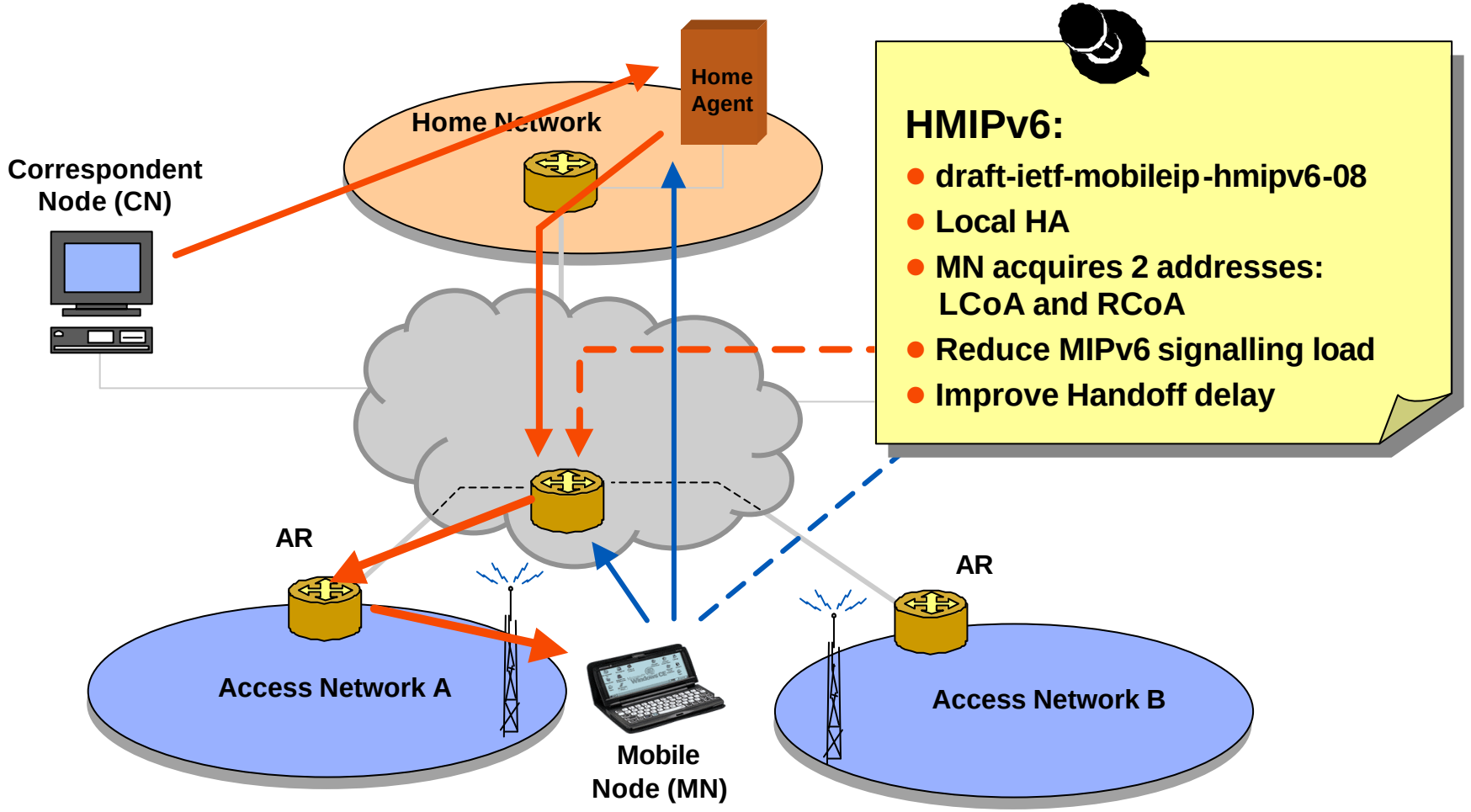
Mobile IP Handover performance



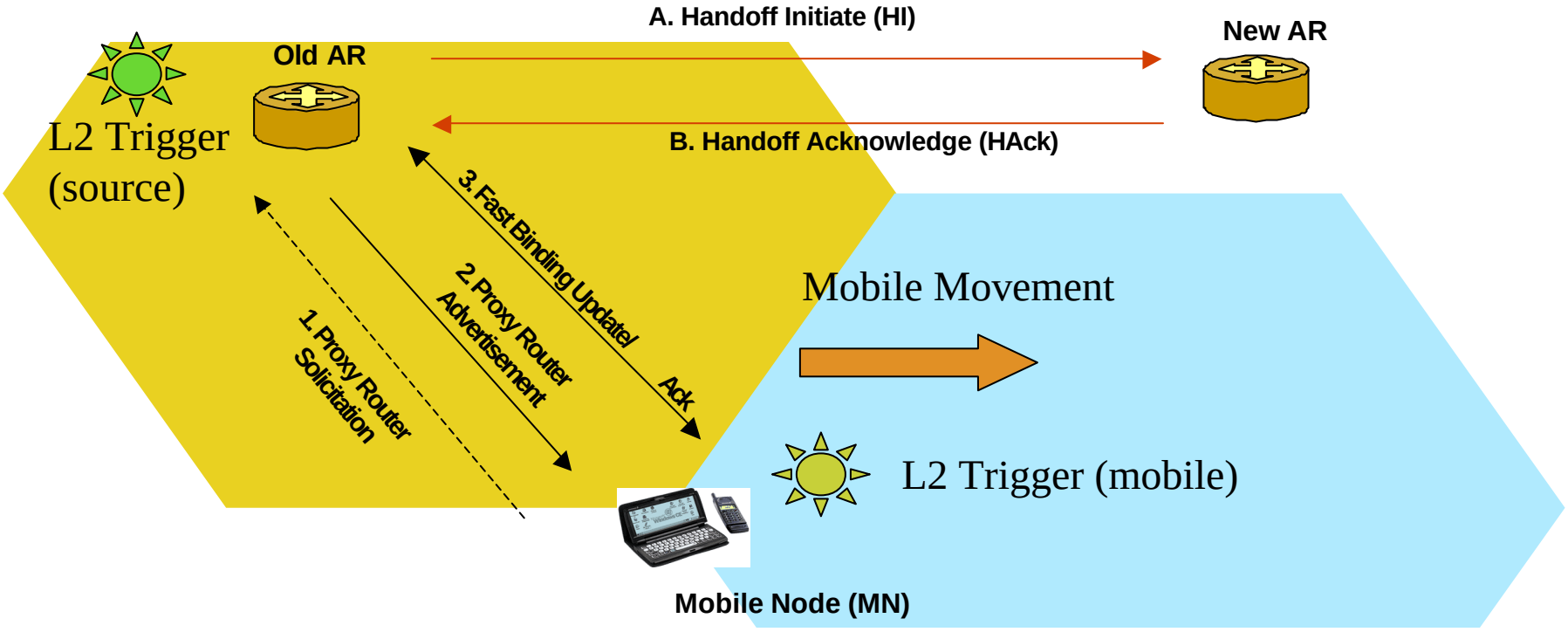
From ” Performance Evaluation of TCP over Mobile IP, PIMRC 1999, Fikouras, El Malki et al.

- Real-time services are sensitive to Mobile IP delays
- Mobile IP delays DO affect non-real-time services
- Results would be worse if we considered Route Optimisation RR tests

Local Mobility using Mobile IPv6



Fast Handoffs Overview



- Detect Movement in Anticipation -> Update Old AR (before L2 mov.)
- Traffic is then forwarded from Old AR to New AR (non-optimal)
- The MN must then also update HA and CNs (for optimal routing)
- ”Bicasting” can improve performance

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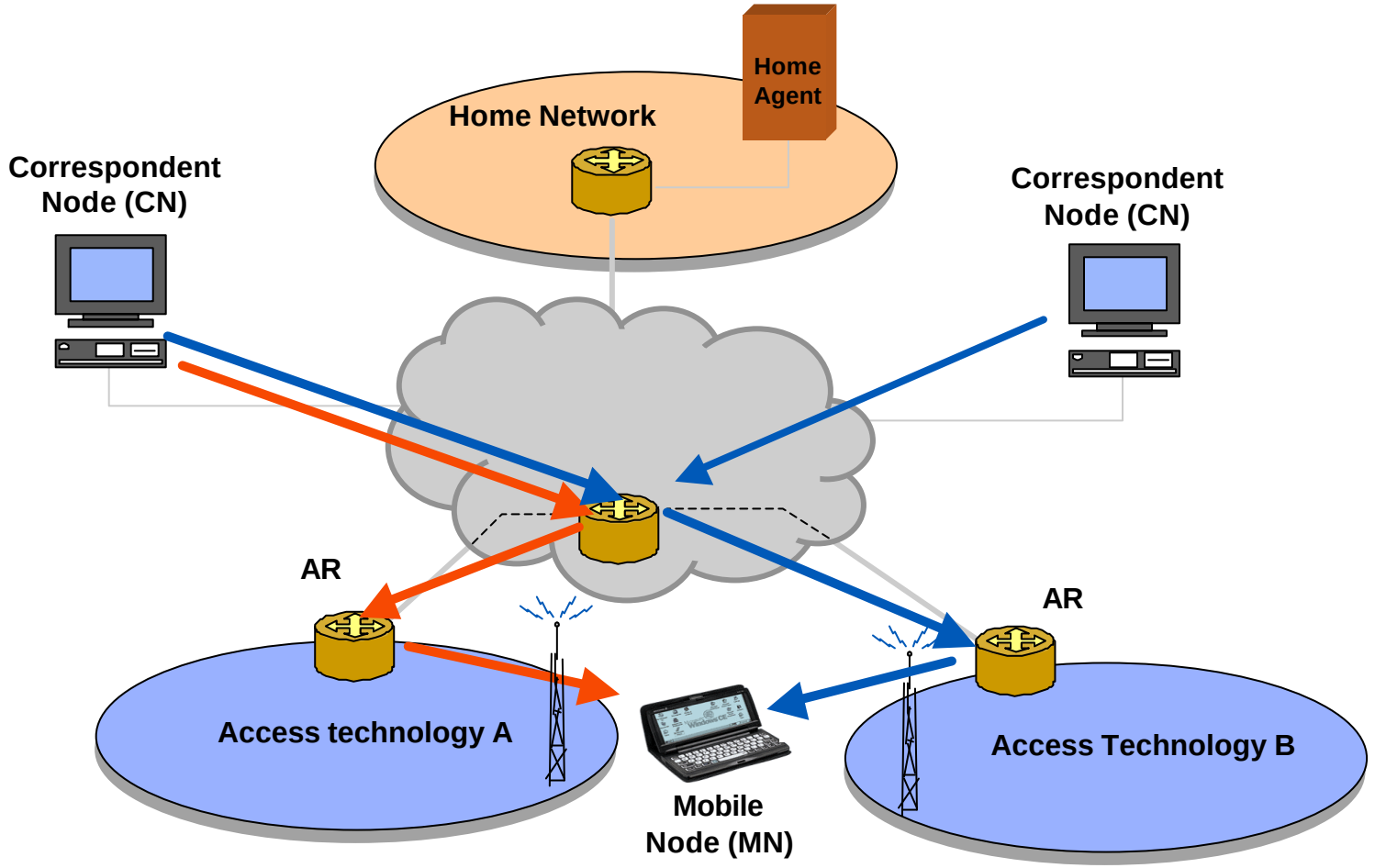
Flow movement



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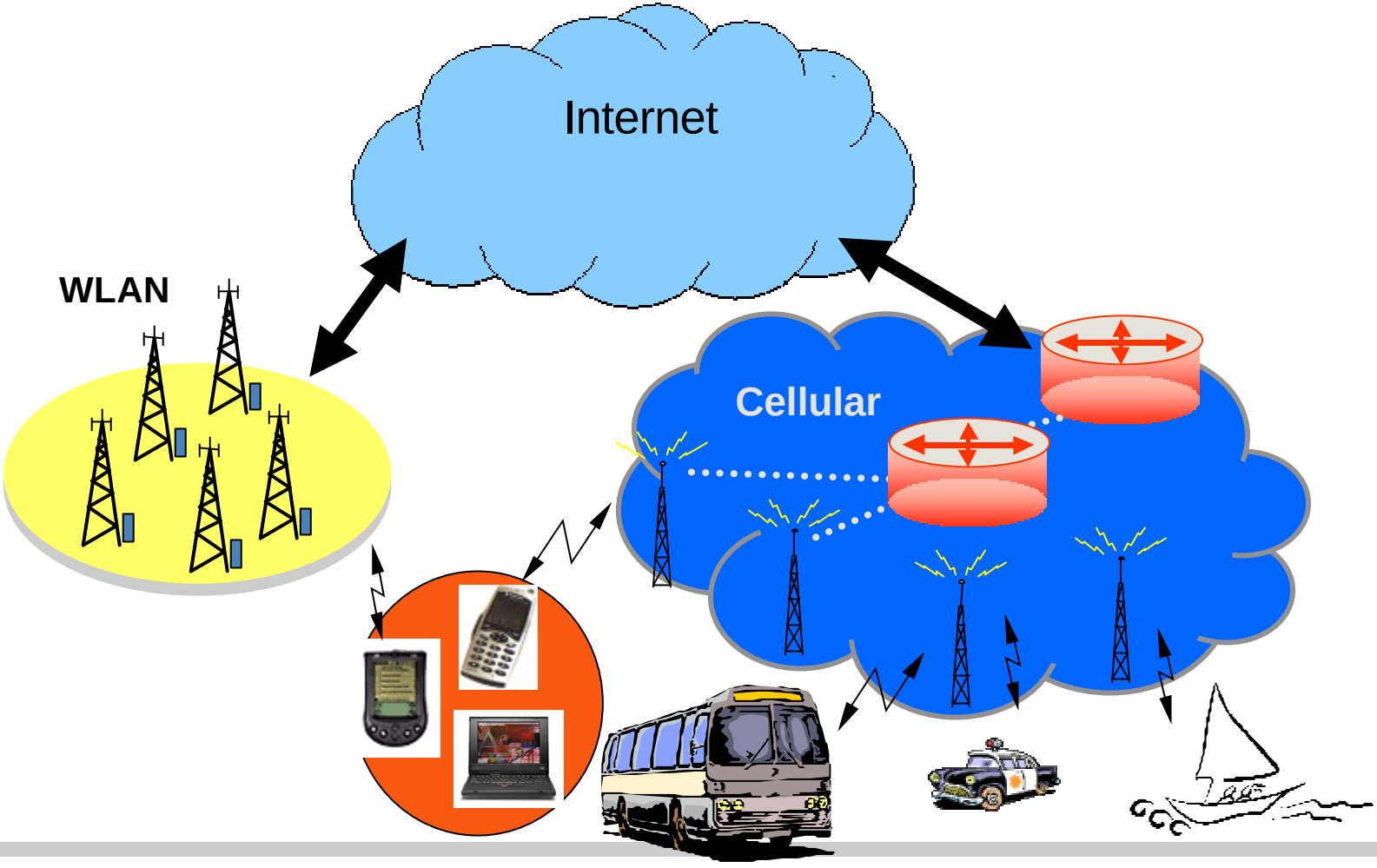
Where can we find mobile nets: Cars, PANs, Trains, Buses, multi-access technologies ..etc



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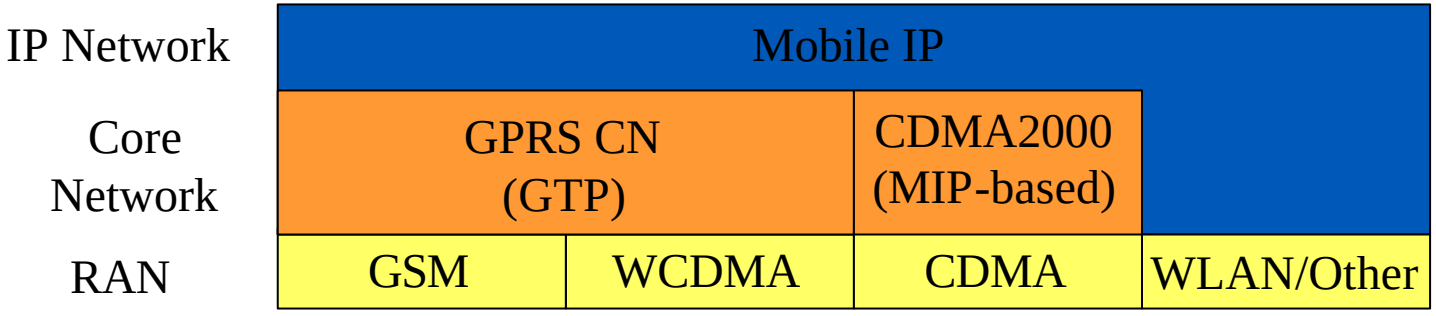
Mobile IPv6 in current wireless systems

- Why is it needed?
  - Session continuity
  - Access independence
  - Reachability => Permanent Public IP addresses

  - The role of Mobile IP in current wireless systems:



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