

Cellular IP - A Local Mobility Protocol

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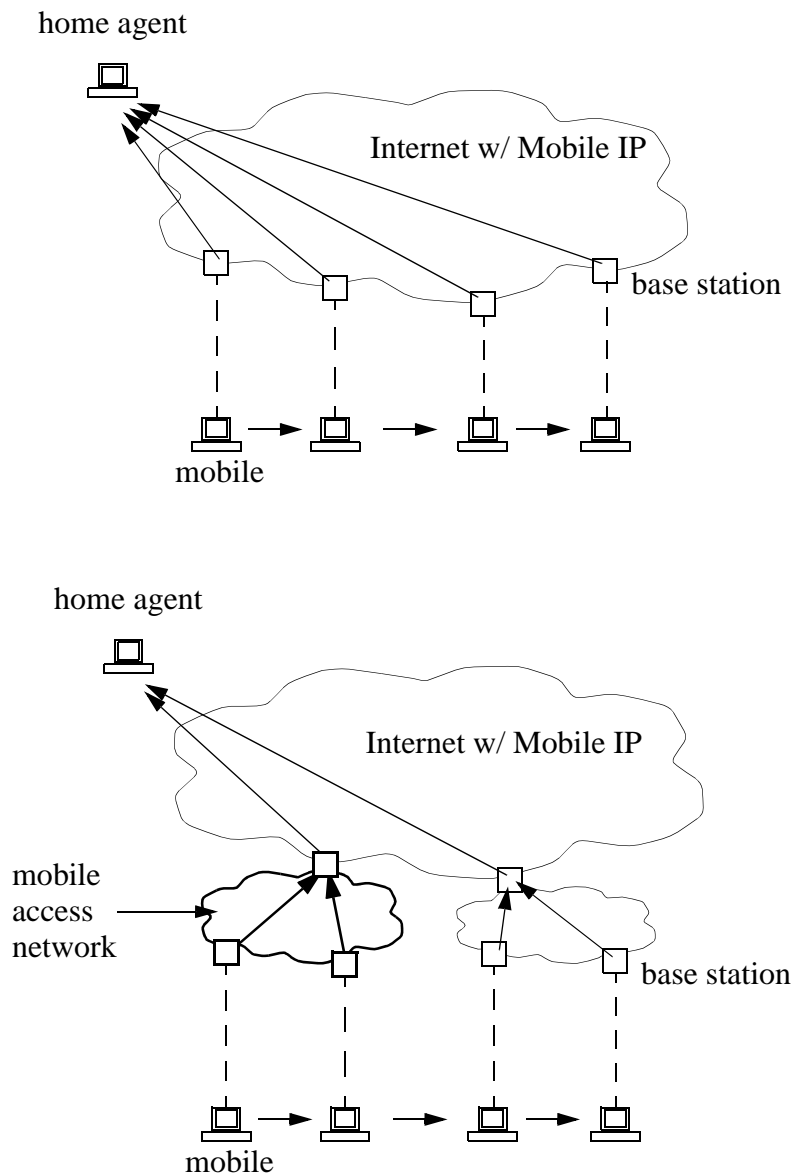
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"One can think of Mobile IP as solving the "macro" mobility management problem. It is less well suited for more "micro" mobility management applications -- for example, handoff amongst wireless transceivers, each of which covers only a very small geographic area. ..."

Mobile IP vs. Hierarchical mobility management



- faster handoffs within a mobile access network
- less load in the global Internet

Requirements for a mobile access network protocol:

Simple, cheap base stations

Simple algorithms in mobile hosts

Fast handoff

Smooth interworking with Mobile IP

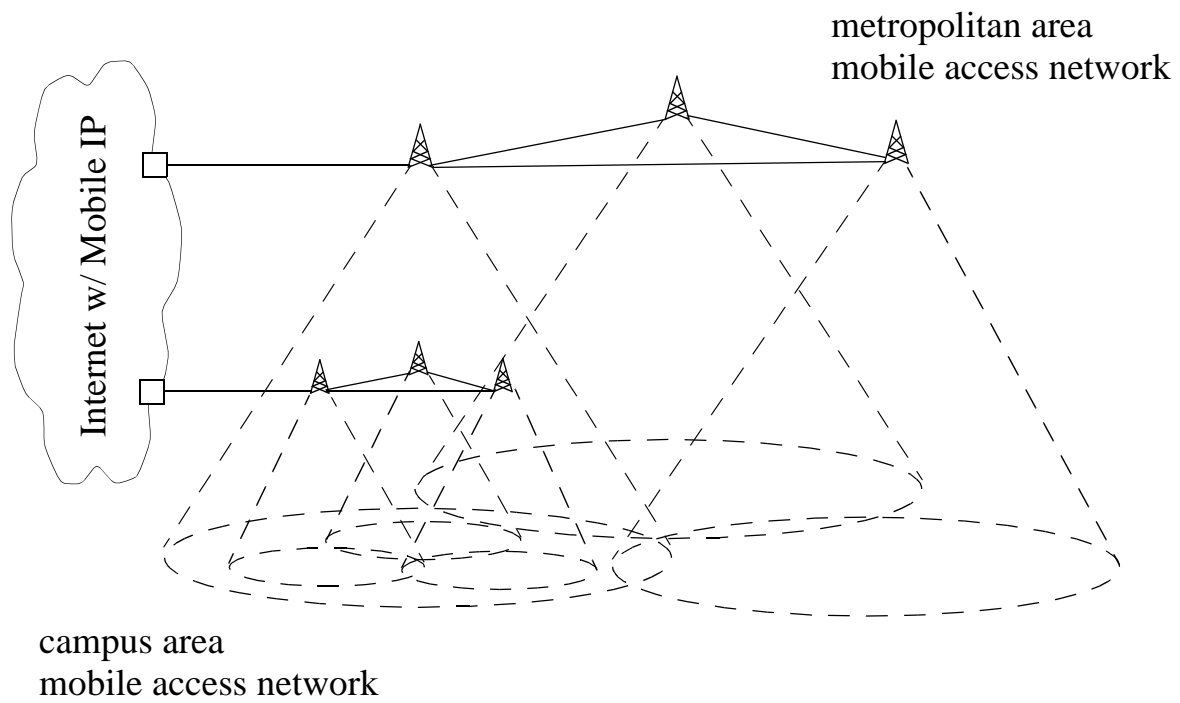
Robustness (failures and radio channel problems)

Efficient use of the radio resource

Little load by location management of idle mobile hosts

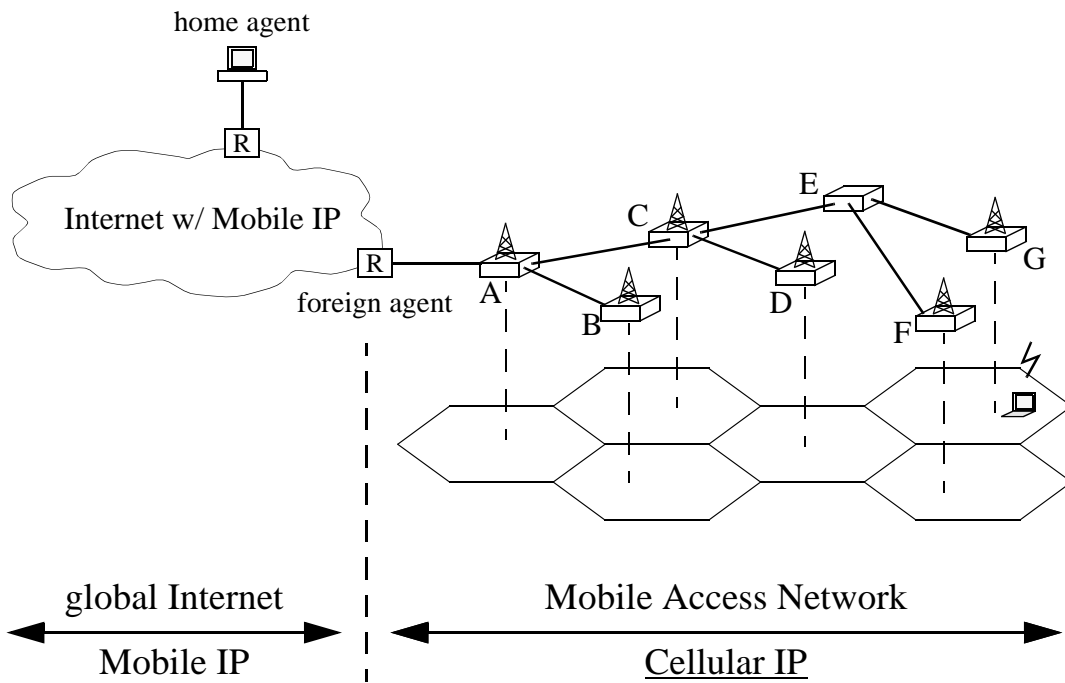
Scalability and “vertical handoffs”

Mobile Access Networks as “Wireless Overlay Networks”



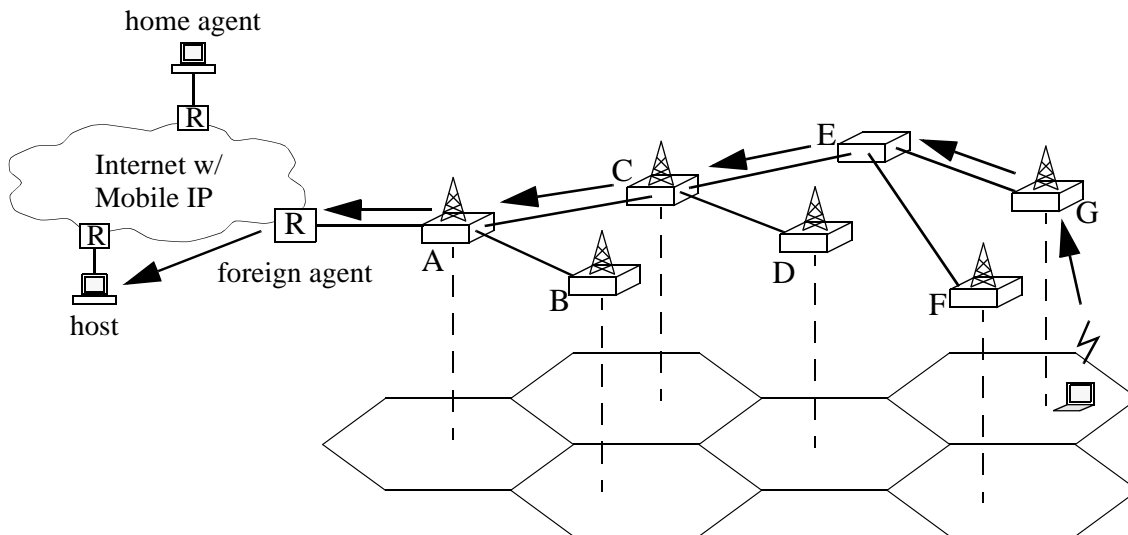
Mobile Access Networks will typically overlap allowing users to select the access network that actually gives best performance.

Mobile Access Network

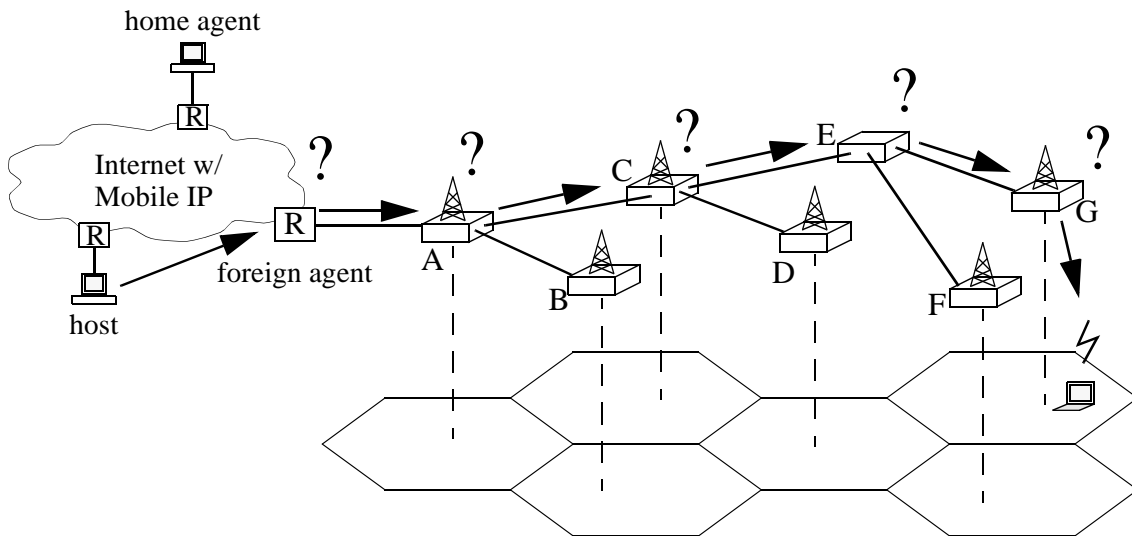
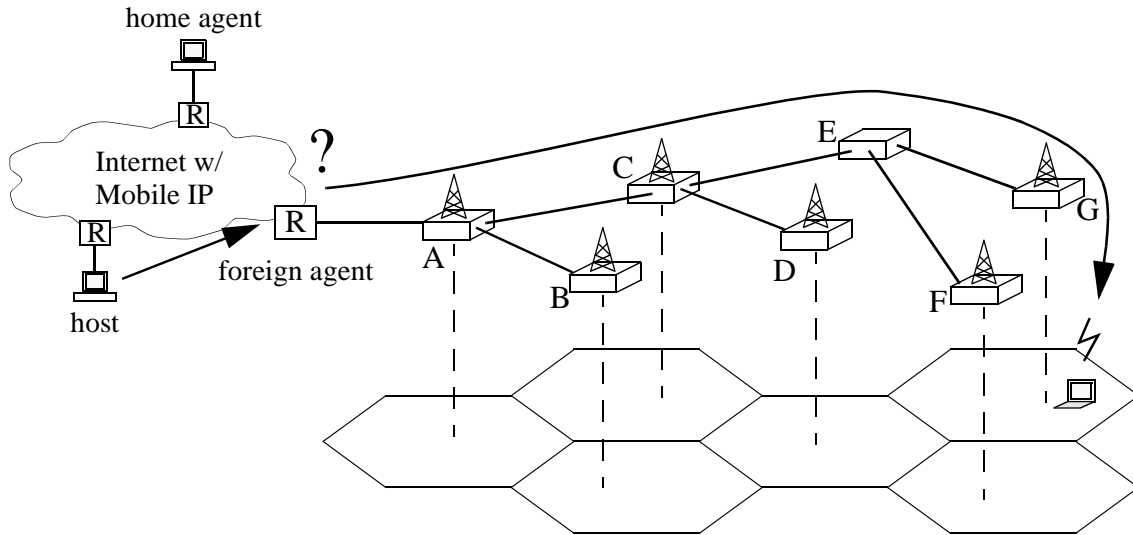


- IP compatible
- simple
- scalable
- robust

Uplink packets: shortest path

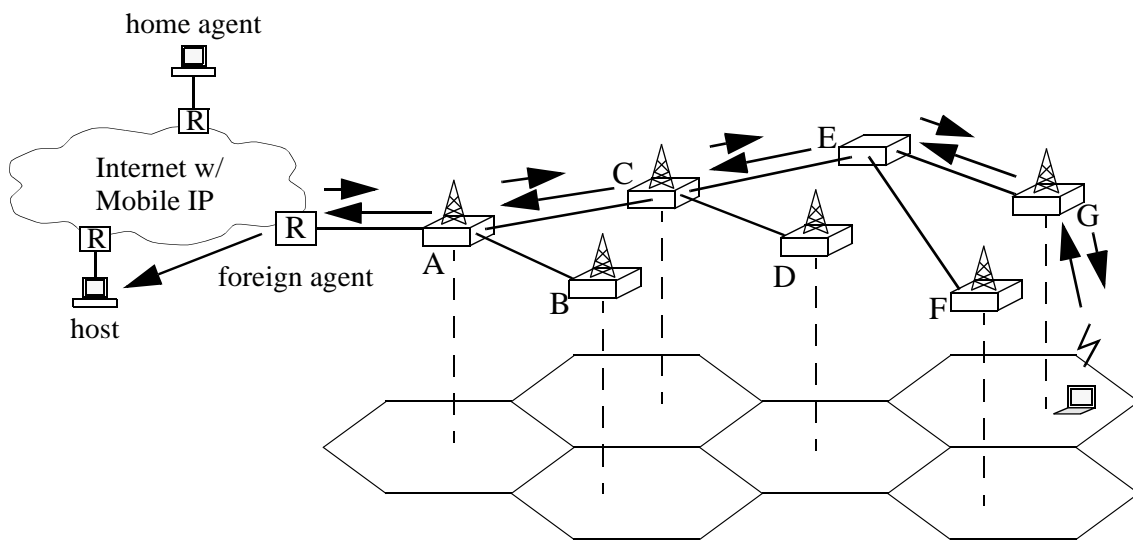


Downlink packets: centralized location management approach vs.
Cellular IP's distributed data bases

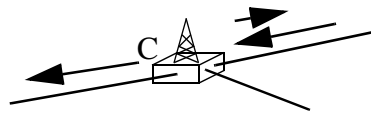


- no tunnelling
- nodes need no network-level view
- control messaging minimized

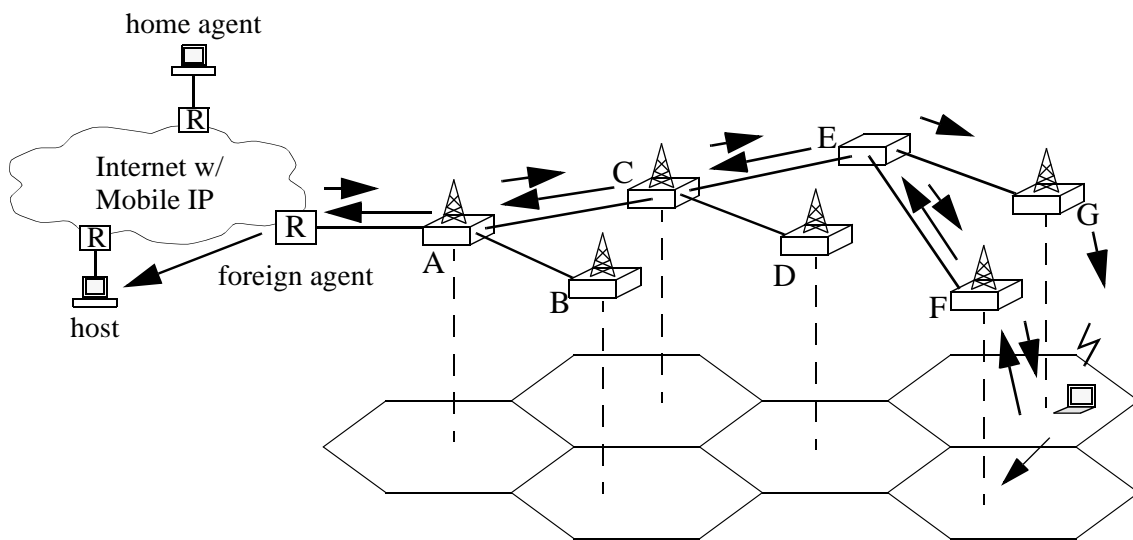
Cellular IP: Uplink packets create location information



Node is "self-sufficient":

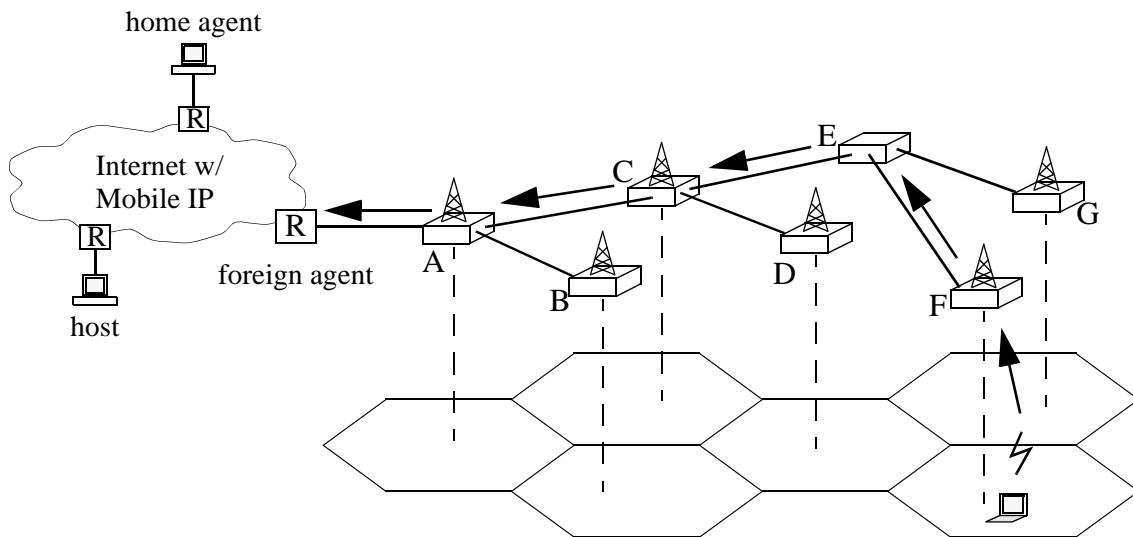


Cellular IP: Handoff is automatic



- Redirected uplink packets create new downlink path
- Optimal reuse of previous path
- No handoff control messaging

Control packets in uplink if no data



- Control packets are regular IP packets with no payload
- They update routing entries
- Discarded before reaching the Internet

Cellular IP

Design principles

Location data base distributed

Location information gained from mobile originated packets

Soft state management

Advantages

Simple, self-sufficient nodes

Simple mobile: just send control packets when no data

No control messaging at handoff

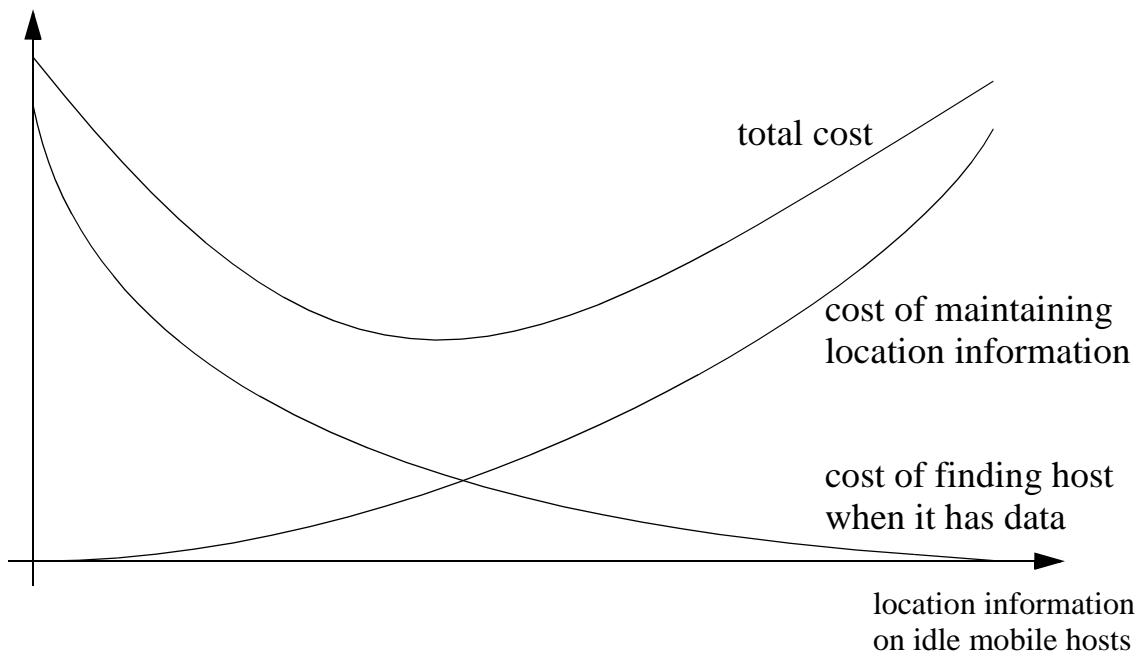
Soft states give built-in fault tolerance

Handoff or faults do not differ from normal operation

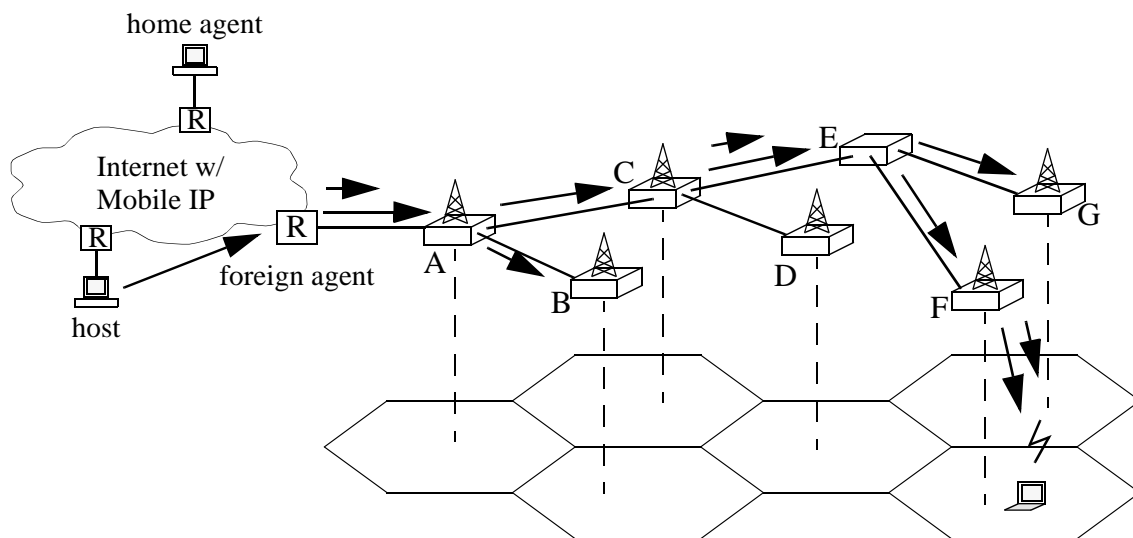
Problem (?)

Load from control packets

Idle host location management trade-off



Cellular IP: Location management of idle hosts



- Cache maintained in just some selected nodes
- Local broadcast where no location information
- Longer timeouts, less frequent control packets
- Complete routing information established asap

Cellular IP Summary

Distributed location data base

Location information established by uplink IP packets

Soft state management

Location management of idle hosts is separated from active hosts

Current research

Extension to ns2 ready, simulation studies now focus on performance

Testbed on BSD platform being implemented

Cellular IP draft to be presented at next IETF meeting