Route Optimization in Mobile IP

David B. Johnson
Charles Perkins
Andrew Myles

Route Optimization

Problem with basic protocol:

All packets ***always*** go through home agent

Causes unnecessary network overhead

Causes unnecessary packet delivery latency

Route optimization allows a correspondent host to

- Learn current location of mobile host,
- Cache this location in ***location cache***, and
- Tunnel own packets directly there

Route Optimization Challenges

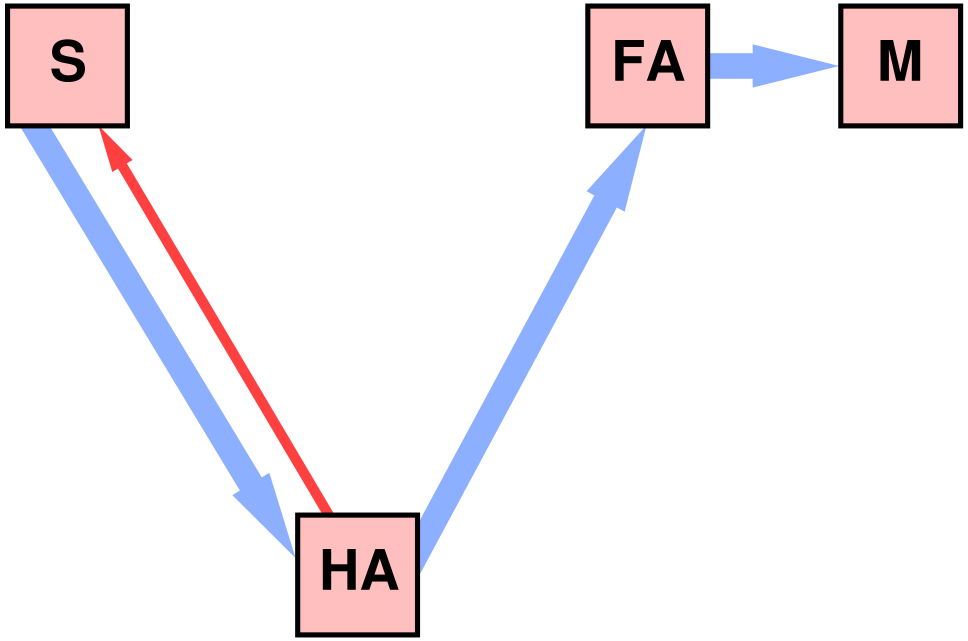
Cache is out-of-date after mobile host moves:

- Must solve ***cache consistency***
- Dynamically update cache when next used

Authentication is much harder than in basic protocol:

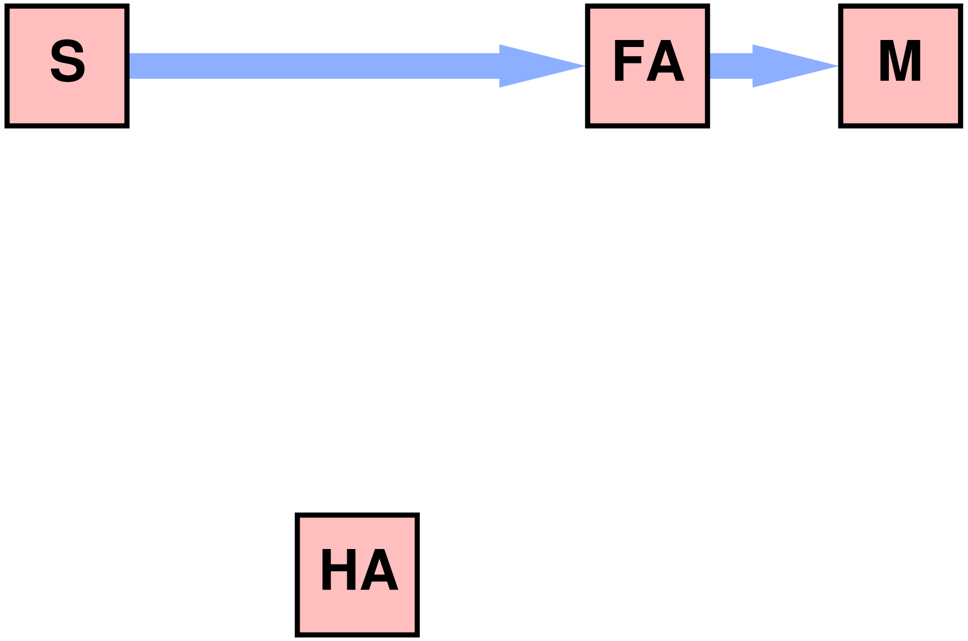
- Location cache probably owned by different organization
- No general Internet authentication available
- Interim solution: require security association with home agent (not needed with each individual mobile host)

Sending the First Packet to a Mobile Host



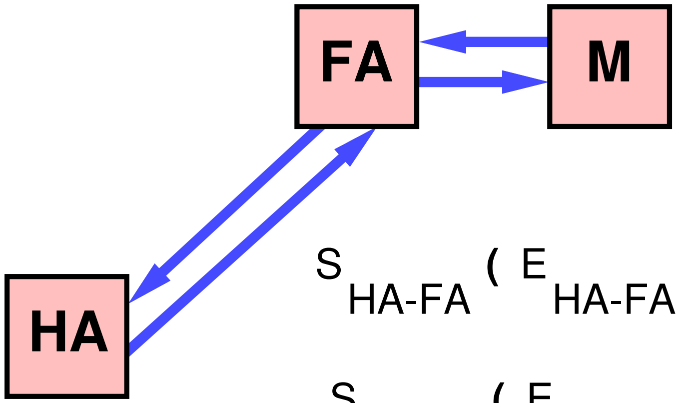
Home agent returns authenticated ***binding update*** to sender

Once Sender Has a Location Cache



Packets are tunneled directly to current foreign agent

Registration with New Foreign Agent



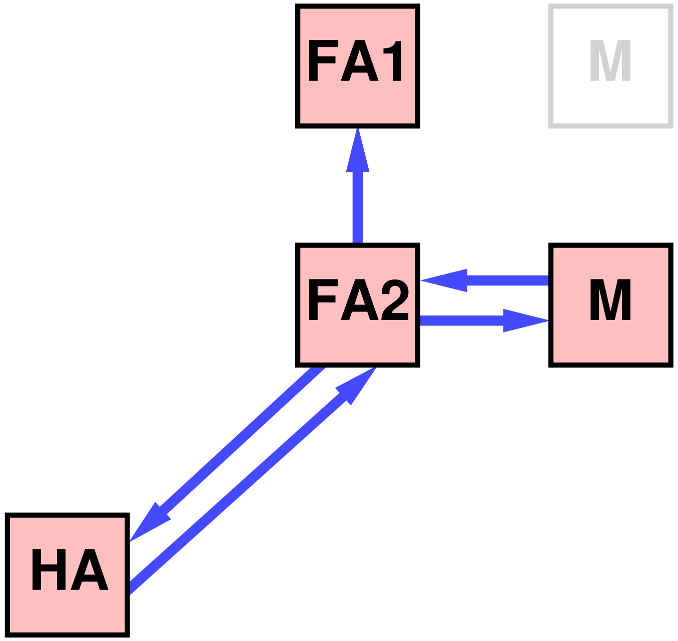
$$S_{\text{HA-FA}}\left(E_{\text{HA-FA}}\{\,\text{key}\,\}\right)$$

$$S_{\text{HA-M}}\left(E_{\text{HA-M}}\{\,\text{key}\,\}\right)$$

Mobile host registers new binding with home agent

Home agent returns new registration ***session key*** to both

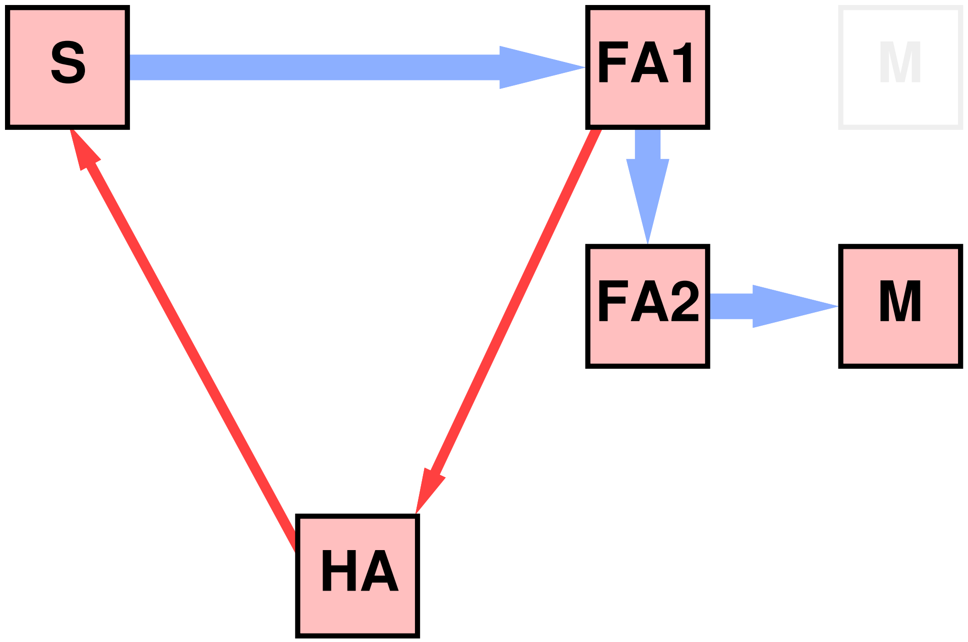
Notifying Previous Foreign Agent



Mobile host notifies previous foreign agent

Uses session key from previous registration

Sending First Packet After Movement



Previous foreign agent cache acts is forwarding pointer

(If FA1 has no cache entry, FA1 forwards packet to home agent)