Mobile IP Minutes
Monday Meeting

- Opening
  - Meeting agenda goes forward as is.
  - MIPv6 version 12 goes to the IESG for approval, then onward to the RFC editor queue
  - FAC draft -- mired in IANA/IESG problems. The URL is not correct to some new number. The authors state they do not know how to write the section. This draft is later discussed at the IETF plenary. The IESG tells Charles Perkins that a single sentence needed to be added. Charles Perkins agrees that such a sentence shall be added.
  - The Vendor Extension draft has the same IANA problem
  - The Generalized Extensions draft is now through WG last call
  - Reverse tunneling 2344bis in last call now
  - 3Gext draft has problems with references and must, therefore, be repaired
  - Route optimization and regional registrations. There is a dispute whether regional registrations is or is not ready for last call.

- RFC2002bis (Charles Perkins)
  - VJ Header Compression is eliminated from the draft
  - MN-HA authentication not the only authentication, it could be the MN-AAA authentication (which is placed to a home AAA server)
  - MN is allowed to look at status code to determine if the failure is from the FA or the HA
  - The MN should be choose the first COA in the list of addresses in the advertisements
  - Extension numbers are consolidated in a table for ease of readers
  - SUN Microsystems asks for an update to the multi-cast section; there is no specific input
  - The draft is ready for WG last call

- MIPv6 Regional registration (Jari Malinen)
  - The location update is processed in the visited domain; the mobile registers a fixed COA at the top of the hierarchy (called the GMA)
  - Security issue with the draft's proposal: The swapping of addresses as the packet moves through the hierarchy breaks end to end security due to the fact that AH includes these addresses.
  - Routers below the GMA are assumed to have the same Security Association so they can register on behalf of the mobile. The way that the shared SA is configured into hierarchy routers and the mobiles must be specified. One suggestion is that AAA based key distribution could provide a solution AAA.
  - Another issue: The 32 bit domain identifier needs to be globally unique: This is an administrative problem.
  - The Chairs state that the authors must address these questions.

- INRIA HMIPv6 Proposal (Claude Castelluccia)
  - The draft defines a mobility network as a local network that is attached to a router entity that contains or is associated with an anchor-like entity similar to a HA. The mobility network has an associated address space. The anchor is referred to as a Mobile Server.
  - Two COAs are configured to the MN, one for the mobile host itself, and one for the Mobile Server. The MN updates the Mobility Server COA to the HA and/or CN, and updates its COA to the Mobility Server. This allows the Mobility Server to encapsulate packets to the MN that are received from the HA, implying end to end security is not impacted. In the reverse direction, normal routing to a Correspondent Node is used. For the case of communication with nodes exclusively within the mobility network, there is no need for a second binding update to the HA.
  - Packets may be double encapsulated over the air since the HA encapsulates to the Mobility Server and it the encapsulates that to the MN. Header compression would probably be required for some applications, e.g. public cellular.

- The MN needs to distinguish local CNs vs. CNs outside the mobility network to know when to do the second update. That is, the mobile only updates local nodes with the COA of the Mobility Server, not the COA of the HA. So, the fact that there are two kinds of addresses (i.e. ones within the local network and those outside) implies there would be changes to the MIPv6 client. The authors agree.

- Hierarchical MIPv6 and fast handoffs (Hesham Soliman and Karim El Malki)
  - draft-soliman-hmipv6-00.txt
  - The proposal supports fast handoffs between access routers. The access routers involved with a handoff may be associated with of the same type of access network, or with different types of access networks. The proposal takes advantage of hierarchical agents. An entity called the Mobility Anchor Point provides an alternative COA to the HA or CNs. This MAP may exist at any level of a hierarchy. An assumption is that a level 2 indication anticipates a handoff and starts the process. Updates are made to the MAP, so that this proposal reduces Mobile IP signaling outside the hierarchy, i.e. reduces signaling to the HA. The MN updates the MAP only so long as it moves in the hierarchy supported by the particular MAP. The MN updates all CNs and the HA with the COA of the MAP entity.
  - To achieve low interruption handoffs, the MAP duplicates packets to "previous" and "new" agents in the hierarchy. The draft points out that even though two access routers receive duplicate copies, the MN may only receive one packet if the level 2 link involved does not allow connectivity to both access routers.
  - The draft proposes router advertisements to effect with dynamic MAP discovery. The MAP identity is propagated via the hierarchy to the access routers.
  - The draft clarifies the interaction with AAA: The AAA transfers the mobile security keys to the new access router when the mobile moves
  - Clarified the possible handoff scenarios and when bicasting is required
  - IPR notice stated.

- Local Mobility Agents in IPv6 (Gopal Dohmity, M. Subbarao, R, Patil)
  - draft-dommety-mobileip-lma-ipv6-00.txt
  - Gopal summarizes the reasons for latency in Mobile IP handoffs: These are, getting an address, performing duplicate address detection, sending updates, establishing security with a HA
  - There are two types of mobility agents, a LC-LMA (link connected mobility agent) and a H-LMA (no link connectivity mobility agent). The H-HMA is similar to the Gateway Foreign Agent
  - The mobile performs two binding updates, first to the H-LMA and then that goes onward to the CN. The MN uses the address of the LC-LMA for binding update to the H-LMA. The CN/HA sends traffic to the H-LMA and the H-LMA then encapsulates to the L-LMA
  - Must be able to send binding updates that are encapsulated within another packet
  - Neighbor discovery extensions proposed to propagate the H-LMA addresses

- Extending MIPv6 to support a mobile network
  - draft-ernst-mobileip-v6-netework-00.txt
  - A mobile network is a mobile router plus the attached nodes
  - Mobility for nodes within the mobile network is automatic, states Dave Johnson, but he authors state that there are missing pieces
  - Scenario: MN attaches to a mobile router and registers with an HA
  - CN send packet to mobile network node, but there is no way to direct the packet
  - Binding updates with a network prefix of the new attachment point
  - How is motion detected? Answer: we need to get a block of address and renumber the network

- Mobility support for IPv4 and IPv6 interconnected networks based on dual stack
  - This meeting scribe did not get complete notes for this presentation
  - Receiving packets when moving from IPv4 to IPv6 networks or from IPv6 to IPv4
  - Dual stack model proposed
  - Question: Will the routers support dual stacks --- the answer is no, not for the case of IPv6

- Key ideas:
- An address mapper associates IPv4 and IPv6 COA (and vice verse)
- Redirect MIP messages in MN protocol stack
- How does the mobile find the address of the mapper? The scribe was typing and did not record an answer

- Monday night handoff discussion:
  - Goal is to reduce the number of proposals
  - There will be a one document for v4 and v6 each; each includes all aspects we agree to solve
  - There is a trigger from the wireless domain that starts Mobile IP actions
  - Various scenarios must have no perceived interruption:
  - Single wireless technology for intra- and interdomain
  - Multiple wireless technology for intra- and interdomain
  - The WG will communicate within the IETF to determine how much should be done in MIP or elsewhere in the IETF. For example, some information must be transferred
  - Comment: link layer mobility may be applied and the IETF does not need to address this problem

Wednesday meeting

- Breakout team
- Handoff meeting drafts by September
- MIPv6 status
  - Status: home link prefixes -- combining multiple prefixes in advertisements and then tunneling to the mobile in the foreign network. This will now be supported. Phil Roberts requests Dave Johnson to not make major changes as the document is in almost approved by IESG
  - Home Link Prefixes: how do we give the MN a consistent view of the home network prefixes?
    - What about configuring home address
  - Recovering after a crash
    - What if HA crashes & loses MN's current binding?
      - Recovery could occur on next periodic BU
      - What about sequence numbers? How to reinitialize?
      - Could do it during IPSec establishment, but difficult
    - What about registering with a different HA after MN crash?
      - Old HA is still defending the address
  - Home address option processing vs AH
    - Problem: AH should be based on home address. HA option should be processed before AH
    - Two suggestions now:
      - Swap Home Address option with Source Address
      - Keep a pointer to appropriate source address if needed (MS does this)
      - Could also replace the IPv6 Source Address only
      - These alternatives result in different packet contents for AH processing
      - These are viewed as clarifications by the Chair, however, the Microsoft Mobile IPv6 implementation will have to be changed, says Dave Johnson, and this change is therefore more than just a clarification.
  - Leaving home agent's link layer address
    - Mobile needs a way to learn home agents link layer address; this may not be included in usual advertisement. A new approach may be appropriate by which the mobile is able to request the link layer address directly.

- MIP Regional Paging (H. Haverinen, J. Malinen)
  - Lowest FAs (LFA) advertise advertising capability
  - MN enters idle mode by performing an explicit idle mode registration
  - Paging FA (PFA) keeps track of idle mobiles and are able to multicast an Unsolicited Advertisement with Idle mode option to the mobile

- A key idea is that these paging advertisements are sent at particular times (periodic) and the mobile only listens at these times.
- Comments: some wireless technologies do not have an idle state; this is complicated and inefficient way just to have the mobile wake up to receive a layer 3 packet

- SIM based authorization (H. Haverinen, J. Malinen)
  - Use of credentials on a GSM SIM card to provide way to derive MN-HAAA key
  - The MN creates an MN-HAAA authentication extension based on this shared key in the RRQ. Then the HA can use an AAA infrastructure that knows the key, e.g. GSM AAA infrastructure
  - One comment is that this will not work in the dual authentication system of 3GPP2

- Transient tunneling (Sandy Thule)
  - Addresses running DHCP from a remote mobile where DHCP is in the home network
  - The mobile obtains a COA and then obtains a class10 address from the HA as part of registration. The mobile requests reverse tunneling
  - The mobile then does a DHCP discover to the home network, using the class 10 address as a source address, over a reverse tunnel
  - The DHCP server then unicasts a response to the mobile. This response contains a new address, network mask, etc. This approach avoids the DHCP server from broadcasting through the Home Agent. Such broadcast would cause problems for other mobiles who wanted broadcasts.
  - The mobile can then re-register using the new address as its home address, thereby releasing the class 10 home address
  - A comparison of transient tunneling with embedded agent and proxy agent is provided. The transient tunneling has higher latency (more round trips) but claims to have lower complexity in the HA.
  - The DIAMETER drafts offered a single round trip for home address assignment, but some applications may need the additional information and so transient tunneling and DHCP is appropriate

- DHCP in Mobile IP (Steve Glass)
  - Use the HA as a DHCP proxy
  - The HA sends a Discover and receives and Offer, then makes a request. It uses the NAI in the RRQ as the client ID in the DHCP Discover
  - Only affects the HA, not FA or MN
  - This approach is orthogonal to MIP, it does not have any real MIP or DHCP interaction
  - Is the Client ID large enough for the NAI? Yes. Can the HA get multiple addresses from the DHCP server. Yes. How is the lease renewed? The HA does this. What if the HA crashes? A proposal is to allow the MN request DHCP server, so as to obtain the DHCP address, mask, and lifetime. In this case, the HA crash will be moot
  - Summary: does not require reverse tunneling, but affects the HA. Could benefit from optional "DHCP extensions" within MIP.

- Minimal Paging in Mobile IP (zhang with others from Columbia U, Fujitsu and Broadcom)
  - (P-MIP)
  - Problem space is that most of the time most of wireless devices are idle
  - This implies we need to reduce signaling in MIP to achieve salability. Paging from cellular systems is understood in the context of voice calls with longish holding times. For packet service, the hold time is meaningless. Therefore: to page or not to page
  - Cellular IP, Hawaii, MIRP, P-MIP are examples of paging approaches. Hierarchical foreign agents appear to work well for paging.
  - Goal is to allow MIP to distinguish active and idle mobile in order to reduce registrations as the mobile moves while it is idle. The usual reasons a mobile registers are due to movement, end of MIP registration lifetime, etc
  - Draft addresses paging areas, paging, movement detection
  - This is how to solve the problem at layer 3 and does not assume the FA can not trigger a layer 2 paging mechanism as will be found in a cellular system

- The exact details of the paging mechanism are in the draft

- Multicast micromobility (Vinod Kumar)
  - Motivation: take advantage of level 2 and 3 interaction; transparent to mobile node; take advantage of multcast routing, apply to IPv6 and IPv4, based on make before break style handoff
  - Base Station: two caches -- binding cache, probably cache/ single multicast address per mobile node, single COA per MN. The author is challenged to define a base station. The architecture amounts to a infrastructure below the level of the FA
  - The basestation is able to join a multicast group. The higher level router is able to encapsulate and send via multicast to the base stations. The base stations then decapsulate. The base stations join proactively.
  - Question: How does the multicast information be distributed to the various routers quickly enough?

- Hawaii (Ram Ramjee)
  - Ram requests that some combinations of HMIP/Hawaii/CIP be pursued
  - The presentation is terminated by the Chairs due to lack of time

- Two other items on the agenda are not presented due to lack of time. The two agenda items are :
  - Mobile IP and MPLS – M. Wren
  - Mobile VPNs – E. Sanchez
  - An intra-domain Mobility management protocol – A. Misra