Heartbeat Mechanism for Proxy Mobile IPv6

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Vijay Devarapalli (vijay@wichorus.com)
Heeseon Lim (hlim@stoke.com)
Nishi Kant (nishi@stoke.com)
Suresh Krishnan (suresh.krishnan@ericsson.com)
Heartbeat Mechanism

- The MAG and the LMA manage routes for a mobile node in a PMIPv6 domain.
- If MAG or the LMA become unavailable, or if there is a path failure, it takes quite some time for this to be discovered.
  - MAG realizes that the LMA is not available only when it sends the next Proxy BU and gets no response.
  - LMA realizes that the MAG is not reachable only when it receives ICMP Destination Unreachable messages in response to tunneled MN traffic.
- Some of the interfaces where PMIPv6 is being planned for use in SDOs require path failure detection quickly.
  - Reaction could include finding alternate nodes or releasing resources.
Heartbeat Mechanism

- Described in draft-devarapalli-netlmm-pmipv6-heartbeat
- **Failure Detection**
  - Heartbeat messages exchanged periodically if there is an active binding cache entry at the LMA for a MN attached to the MAG
  - Failure/unreachability detection is based on the exchange of heartbeat messages
- **Re-start Detection**
  - Each node maintains a re-start counter in non-volatile memory
  - Every time the node re-starts and looses state, the re-start counter is incremented
  - Every PMIPv6 node stores the last known re-start counter value for each peer PMIPv6 node
  - The value in the re-start counter received in the Heartbeat messages is compared with the stored value – if there is a difference, it is assumed that the peer node had re-started
- Similar to the GTP path management mechanism developed by 3GPP
New Messages

- One new Mobility Header message for the Heartbeat request/reply
- One new mobility option for carrying the Restart Counter value
Extensions

- There is a new draft that proposes extensions
  - draft-koodli-netlmm-path-and-session-management-00
  - Ability to send unsolicited Heartbeat Response Message
  - Per-mobile node indications
  - Session Management to address partial failures