GRE Extension for Mobile IPv4

draft-yegani-gre-key-extension-00.doc

Parviz Yegani　　**pyegani@cisco.com**

Gopal Dommety
Avi Lior
Kuntal Chowdhury
Jay Navali

The Draft

=> Specifies a new extension for GRE Key for use by MIPv4 FA

=> This new extension option allows an FA to request GRE tunneling without disturbing the HA behavior defined in RFC 3344

=> GRE tunneling provides an advantage that allows operator's private home networks to be overlaid and allows the HA to provide overlapping home addresses to different subscribers

=> The GRE Key format defined in RFC 3344. This extension must be added after the MN-HA and MN-FA Challenge and MN-AAA extensions (if any) and before the FA-HA Auth extension (if any)
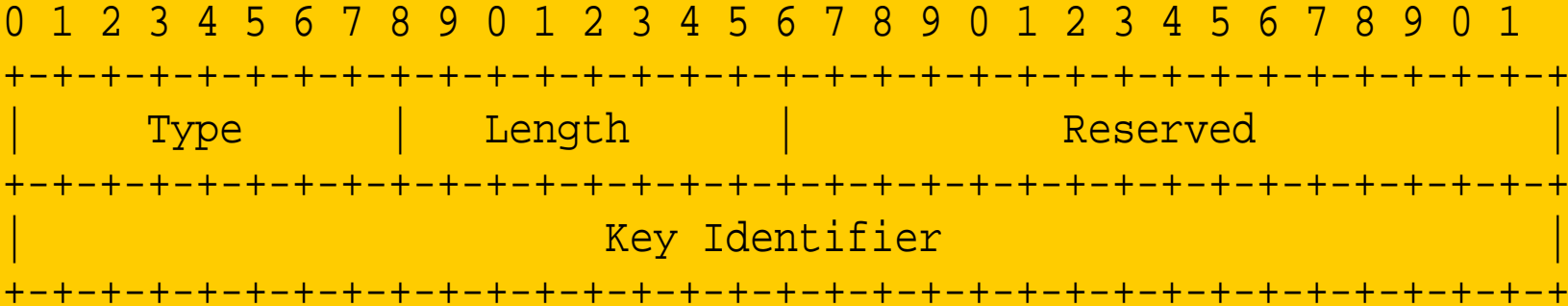
Example – Usage Scenario

=> When the tuple (CoA, HoA and HA addr) is the same across multiple subscriber sessions, GRE tunneling will provide a means for the FA and HA to identify data streams for the individual sessions based on the GRE key

=> In the absence of this key ID, the data streams cannot be distinguished from each other, a significant drawback when using IP-in-IP tunneling

=> GRE tunneling support for Mobile IP will permit asymmetric GRE keying i.e., the FA and HA assign separate keys for use in different directions

=> Once the GRE keys have been exchanged, the FA uses the HA-assigned key in the FA-to-HA direction while the HA uses the FA-assigned key in the HA-to-FA direction

GRE Key Extn Format

```
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|       Type        |     Length      |          Reserved         |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                        Key Identifier                          |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

Key (4 octet)- assigned in the Registration and inserted in every GRE frame. Value to be assigned by IANA.

Note - The GRE key assignment is outside the scope of this document.

FA Behavior ...

=> If the FA supports GRE encapsulation, it should set the 'G' bit before sending the Agent Advertisement message to the MN during the Mobile IP session establishment

=> If the MN does not set the 'G' bit, the FA may fall back to using IP-in-IP encapsulation for the session per RFC 3344

=> If the MN does not set the 'G' bit, and the local policy allows the FA to override the 'G' bit setting received from the MN, the FA must include the GRE Key Extn as defined in this draft in the RRQ to request GRE encapsulation for the session

=> If the FA does not support GRE encapsulation, the FA must reset the 'G' bit in the Agent Advertisement message. In this case, if the MN sets the 'G' bit in the RRQ, the FA returns an RRP to the MN with code 'Requested Encapsulation Unavailable' (0x48) per RFC 3344

FA Behavior

=> If the FA allows GRE encapsulation, and either the MN requested GRE encapsulation or local policy dictates using GRE encapsulation for the session, the FA must include the GRE Key Extn in all Mobile IP RRQs (including initial, renewal and de-registration requests) before forwarding the request to the HA

HA Behavior ...

=> If the HA receives the GRE Key Extn in an RRQ and does not recognize it, it must send an RRP with code 'Unknown CVSE (0x8D)' per RFC 3344

=> If the HA receives the GRE Key Extn in an RRQ and recognizes it but is not configured to support GRE encap, it must send an RRP with code 'Requested Encapsulation Unavailable (0x8B)'

=> If the HA receives an RRQ with the 'G' bit set but without the GRE Key Extn, it must send an RRP with code 'Poorly Formed Request (0x86)'

=> If the HA receives an RRQ with a GRE Key Extn but without the 'G' bit set, the HA should treat this as if 'G' bit is set in the RRQ i.e., the presence of GRE Key Extn indicates a request for GRE encapsulation

=> If the HA receives the GRE Key Extn in an RRQ and recognizes it as well as supports GRE encapsulation, it should accept the RRQ and send an RRP with code 'Accepted (0)'. The HA must assign a GRE key and include the GRE Key Extn in the RRP before sending it to the FA

=> The HA must include the GRE Key Extn in all RRPs in response to any RRQ that included GRE Key Extn, when a GRE key is available for the registration

MN Behavior

=> No changes to the MN behavior

Next Step

=> Comments?

=> Should this be a WG draft?