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S. Krishnan
Ericsson
S. Gundavelli
Cisco
M. Liebsch
NEC
H. Yokota
KDDI
J. Korhonen
Nokia Siemens Networks

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Update Notifications for Proxy Mobile IPv6
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Abstract

Proxy Mobile IPv6 (PMIPv6) is a network based mobility management protocol that enables IP mobility for a host without requiring its participation in any mobility-related signaling. This document proposes a mechanism for the Local Mobility Anchor to asynchronously notify the Mobile Access Gateway about changes related to the mobility session.

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1. Introduction

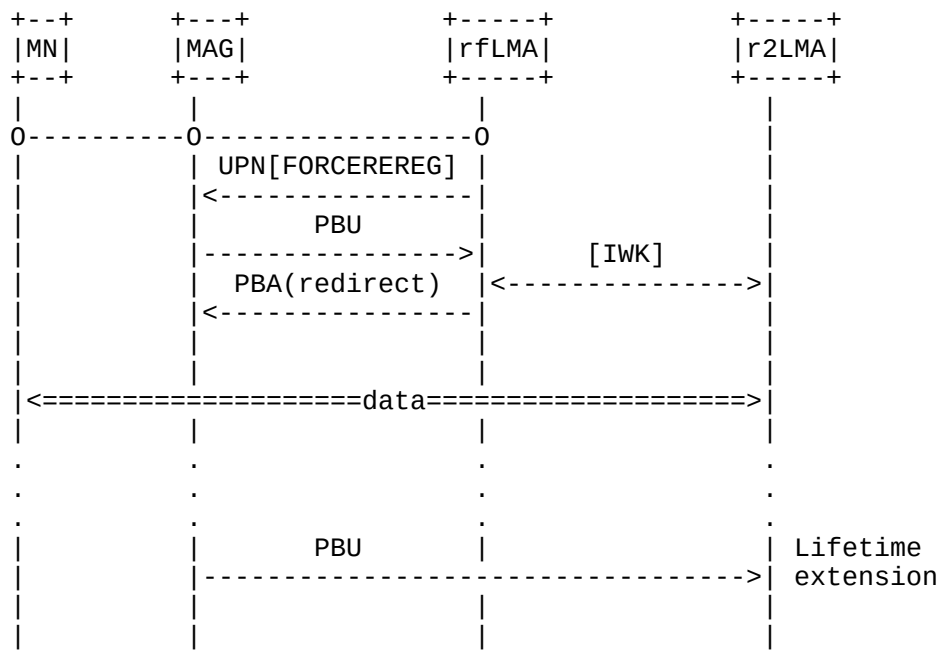
Proxy Mobile IPv6 [RFC5213] describes the protocol operations to maintain reachability and session persistence for a Mobile Node (MN) without the explicit participation from the MN in signaling operations at the Internet Protocol (IP) layer. In order to facilitate such network-based mobility, the PMIPv6 protocol defines a Mobile Access Gateway (MAG), which acts as a proxy for the Mobile IPv6 [RFC6275] signaling, and the Local Mobility Anchor (LMA) which acts similar to a Home Agent. The setup of the mobility session is initiated by the MAG by sending a PBU message and confirmed by the LMA in the PBA message. Once the mobility session is set up for a given lifetime, the LMA has no mechanism to inform the MAG about changes to the mobility session or any parameters related to the mobility session.

One such scenario where such a mechanism is needed is when the LMA wants to inform the MAG that it needs to reregister. It is possible to achieve a similar effect by using a much shorter lifetime for the mobility sessions but in several networks this results in an unacceptable, and mostly unnecessary, increase in the signaling load and overhead.

This document defines a new mobility header message for performing notifications and a corresponding mobility header message for the MAG to acknowledge the notification. While it is possible to use an existing mobility header type for this purpose, for instance the PMIPv6 Heartbeat message [RFC5847], the existing messahes do not provide the required semantics. e.g. The Heartbeat message does not provide a reason why it was sent.

2. Example use case

Consider an use case where an LMA (rfLMA) wants to move over one or more mobility sessions from a given MAG to a different LMA (r2LMA) using [RFC6463]. e.g. In order to allow planned maintenance. The LMA could send an update notification to the MAG to force a re-registration for one or more MNs. The MAG tries to register and gets a redirect from the rfLMA towards the r2LMA.



3. LMA Behavior

The LMA sends the Update Notification message in response to a condition that is specified in the Notification Reason field. If the LMA requires an acknowledgement from the MAG concerning the UPN message, it MUST set the A bit to 1. If not it MUST set the A bit to 0. The LMA MAY retransmit the UPN messages if reliability is required for the specific Notification reason. If the UPN message is retransmitted, the LMA MUST reuse the same sequence number as the original message. If the LMA receives an UPA message with a failure Status (Status value >127) it SHOULD log an error.

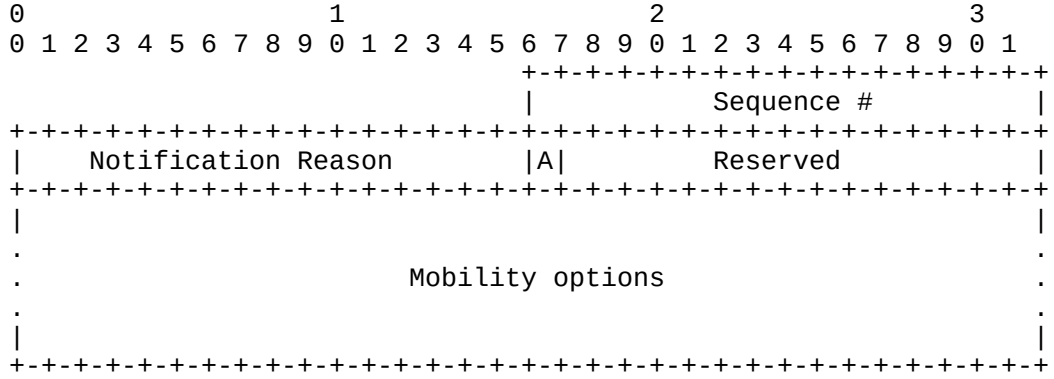
4. MAG Behavior

If a received Update Notification message has the A bit set to 1, the MAG MUST create and transmit an Update Notification Acknowledgement message in response to the UPN message. The sequence number of the UPA message MUST be copied from the UPN message that is being responded to. Depending on whether the message was processed successfully or not, the MAG MUST set the Status value in the UPA message to an appropriate value. The actual processing required on the MAG is out of the scope of this document and will be specified for each Notification reason.

5. Message Formats

5.1. Update Notification(UPN)

The LMA sends an UPN message to a MAG to notify the MAG that some information regarding the mobility session or parameters related to the mobility session has changed.



Sequence Number: A monotonically increasing integer. Set by the LMA and retained for retransmissions.

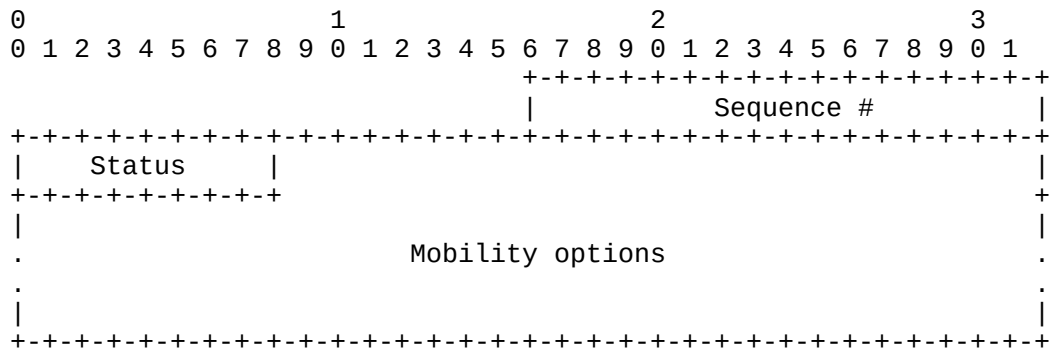
Acknowledgement Requested (A): If this bit is set, the MAG MUST send an UPA message in response to the received UPN message.

Notification Reason: Contains the code corresponding to the reason that caused the LMA to send the Update Notification to the MAG. This field does not contain any structure and MUST be treated as an enumeration.

Mobility Options: Contains a set of mobility options for the MAG to act upon. The set of mobility options that can be present in the message is related to the Notification Reason field in the message.

5.2. Update Notification Acknowledgement(UPA)

The MAG sends an UPA message to a LMA in order to acknowledge that it has received an UPN message with the A bit set.



Sequence Number: Copied from the UPN message being acknowledged.

Status: Specifies the result of the MAG's processing of the UPN message. The status codes between 0 and 127 signify successful processing of the UPN message and codes between 128 and 255 signify that an error occurred during processing of the UPN message.

Mobility Options: Contains a set of mobility options used to provide context to the LMA. The set of mobility options that can be present in the message is related to the Status field in the message.

6. Security Considerations

The protocol specified in this document uses the same security association as defined in [RFC5213] for use between the LMA and the MAG to protect the UPN messages.Support for integrity protection using IPsec is REQUIRED, but support for confidentiality is NOT REQUIRED .

7. IANA Considerations

The Update Notification message require a single Mobility Header Type (TBA1) from the Mobility Header Types registry at http://www.iana.org/assignments/mobility-parameters

The Update Notification Acknowledgement message require a single Mobility Header Type (TBA2) from the Mobility Header Types registry at http://www.iana.org/assignments/mobility-parameters

This document creates a new registry for Notification Reasons. The

allocation policy for this field is First Come, First Served.

This document creates a new registry for Status codes in the UPA message. The allocation policy for this field is First Come, First Served.

8. Acknowledgements

The authors would like to thank Basavaraj Patil, Rajeev Koodli and other members of netext working group for their valuable comments to improve this document.

9. References

9.1. Normative References

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Authors' Addresses

Suresh Krishnan
Ericsson
8400 Blvd Decarie
Town of Mount Royal, Quebec
Canada

Phone: +1 514 345 7900 x42871
Email: suresh.krishnan@ericsson.com

Sri Gundavelli
Cisco
170 West Tasman Drive
San Jose, CA 95134
USA

Email: sgundave@cisco.com

Marco Liebsch
NEC

Email: marco.liebsch@nw.neclab.eu

Hidetoshi Yokota
KDDI

Email: yokota@kddilabs.jp

Jouni Korhonen
Nokia Siemens Networks
Linnoitustie 6
FI-02600 Espoo
Finland

Email: jouni.nospam@gmail.com