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Redirecting Proxy Binding Updates in PMIPv6
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Abstract

This document specifies a new LMA Redirect mechanism, where an initially contacted LMA can let the MAG know that it needs to connect to an alternate LMA to get mobility services, either for overload prevention and/or load balancing purposes. This document proposes a new error code for the proxy binding acknowledgement message and a new mobility option to be carried on the binding acknowledgement message for this purpose.

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1. Requirements notation

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [[RFC2119](#)].

2. Introduction

In PMIPv6 [[PMIPv6](#)], LMAs are responsible for the registration of mobile nodes in the home network, intercepting packets destined for them, and tunneling these packets to their proxy care-of address hosted on a MAG. When the LMA has to support a large number of mobile nodes and actively tunnel traffic to them, it could become overloaded, leading to dropped packets and connections.

An LMA might not want to accept any new bindings of mobile nodes other than the ones it is currently supporting, for various reasons. i.e., it might be overloaded, it wants to achieve better load balancing with another known LMA in the same network, or it has some scheduled maintenance coming up soon.

[RFC5142] provides a mechanism that allows a Home Agent to signal the Mobile Node that it should contact a new Home Agent, but it is not clear if this mechanism can be used for PMIPv6 in the interaction between the MAG and the LMA.

3. Proposed method

When an LMA receives a PBU message from a MAG and is not able to serve the MN specified in the PBU, it sends a PBA message back with an error code describing the cause for why it cannot accept the binding. Along with the status code, the LMA optionally includes a mobility option called the Alternate LMA list, that contains a list of LMA addresses that the MAG can contact to obtain mobility service

for the MN. The method by which the alternate LMA list is created on the LMA is out of scope of this document.

A new status code is defined in this document. The PMIPv6-LMA-REDIRECT status code is used when the LMA wishes to redirect the MAG.

[4.](#) Alternate LMA List Option

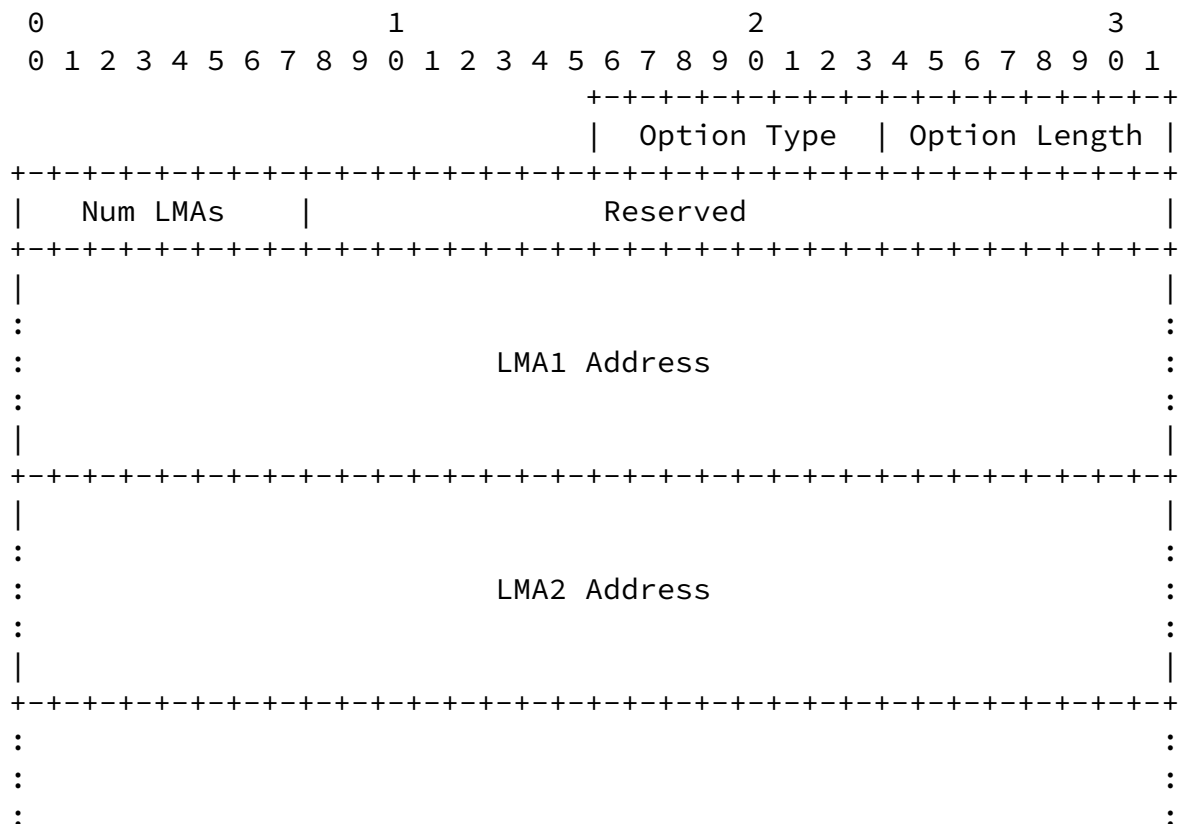
This document defines a new mobility option called the Alternate LMA List Option. This option MUST be used only in PBA messages sent from a LMA towards the MAG. This option SHOULD be present if the status

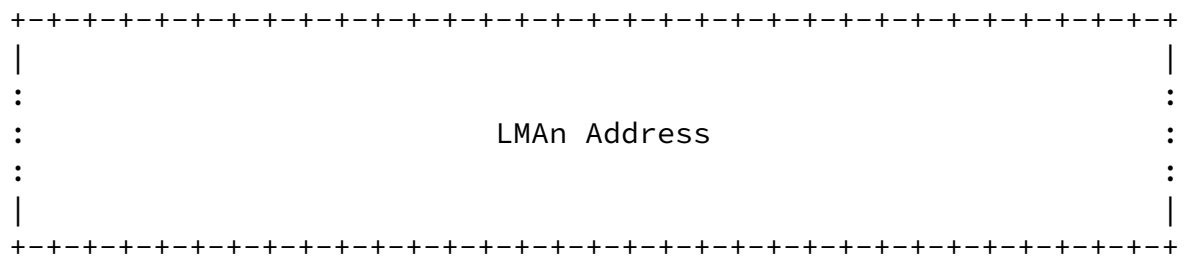
code is PMIPv6-LMA-REDIRECT. It MUST NOT be present if the status code is not PMIPv6-LMA-REDIRECT.

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Option Type

TBA3

Option Length

Length of the Alternate LMA List mobility option.

Num LMAs

Number of LMA addresses in the following list

Reserved

This field **MUST** be set to zero and ignored on reception

LMA1 Address

128 bit address of the first LMA

LMAn Address

128 bit address of the nth LMA

Figure 1: Alternate LMA List Option Format

5. LMA Operation

Upon receiving a Proxy Binding Update message from a MAG, the LMA may reject the binding and provide a list of alternate LMAs. This may be done for various reasons like administrative, load balancing, or policy reasons as described earlier.

The LMA MUST prepare a Proxy Binding Acknowledgment message, as described in [PMIPv6], with a status code PMIPv6-LMA-REDIRECT. The LMA needs to be aware of alternate LMAs that can serve the MN, and it MUST include an Alternate LMA List option containing the addresses of the alternate LMAs.

6. MAG Operation

Upon receiving the Proxy Binding Acknowledgment from the LMA with the status code set to PMIPv6-LMA-REDIRECT, the MAG SHOULD parse the Alternate LMA List Option, and extract the IPv6 addresses of the LMA(s).

The MAG MUST then send a Proxy Binding Update message to the first LMA address received in the Alternate LMA List Option, containing the same information as the initial PBU message.

If the connection to the alternate LMA fails and the Status code is not PMIPv6-LMA-REDIRECT, the Mobile node MUST select, if available, the next LMA address received in the initial PBA message. This process continues until the exhaustion of the list of LMAs.

If the MAG receives a Proxy Binding acknowledgment message from an alternate LMA with status code PMIPv6-LMA-REDIRECT, then this newly received list of LMAs MUST override the previously received one. The MAG MUST select the first LMA in the newly received list, and send it a Proxy Binding Update message.

In general, each time a new redirect is received by the MAG it will override the previously received redirect(s) if any and the MAG always acts only upon the latest Alternate LMA List.

7. Operational Considerations

In case the Redirect Mobility Option is used for redirect purposes, the potential LMA that can be returned to a MAG MUST be able to

handle the Home Prefix of the Home Address of the Mobile Node.

There could be a limit to how many redirects can be accepted by a MAG before it gives up. This can be configured on the MAG. This doesn't preclude the LMA from sending the Redirect Mobility Option.

It is possible that two or more LMAs can send redirects that can send an MAG on a loop. This can be avoided by careful configuration of

the network. A protocol based solution is possible but will unnecessarily complicate the MAG.

8. IANA Considerations

This document requests the assignment of the following status code from the Mobile IPv6 parameters Status Codes registry located at <http://www.iana.org/assignments/mobility-parameters> .

TBA2 PMIPv6-LMA-REDIRECT

This also requests the assignment of the following option code from the Mobile IPv6 parameters Mobility Options registry located at <http://www.iana.org/assignments/mobility-parameters> .

TBA3 Alternate LMAA List

9. Security Considerations

This document specifies an option in the proxy binding acknowledgement message that redirects the MAG towards another LMA. A malicious or compromised LMA can send this message to redirect an MAG towards a possibly unavailable set of LMA addresses.

10. Normative References

- [PMIPv6] Gundavelli, S., "Proxy Mobile IPv6", [draft-ietf-netlmm-proxymip6-11](#) (work in progress), March 2007.
- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997.
- [RFC5142] Haley, B., Devarapalli, V., Deng, H., and J. Kempf, "Mobility Header Home Agent Switch Message", [RFC 5142](#), January 2008.

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