

DMM WG
Internet-Draft
Intended status: Standards Track
Expires: August 9, 2017

D. Patki
S. Gundavelli
Cisco
J. Lee
Sangmyung University
Q. Fu
China Mobile
L. Bertz
Sprint
February 5, 2017

LMA Controlled MAG Session Parameters
draft-ietf-dmm-lma-controlled-mag-params-03.txt

Abstract

This specification defines a new extension, LMA-Controlled-MAG-Session-Params to Proxy Mobile IPv6. This option can be used by the local mobility anchor (LMA) in Proxy Mobile IPv6 (PMIPv6) signaling for notifying the mobile access gateway (MAG) to conform to various parameters contained in this extension.

Status of This Memo

This Internet-Draft is submitted in full conformance with the provisions of [BCP 78](#) and [BCP 79](#).

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF). Note that other groups may also distribute working documents as Internet-Drafts. The list of current Internet-Drafts is at <http://datatracker.ietf.org/drafts/current/>.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

This Internet-Draft will expire on August 9, 2017.

Copyright Notice

Copyright (c) 2017 IETF Trust and the persons identified as the document authors. All rights reserved.

This document is subject to [BCP 78](#) and the IETF Trust's Legal Provisions Relating to IETF Documents (<http://trustee.ietf.org/license-info>) in effect on the date of

Internet-Draft LMA Controlled MAG Session Parameters February 2017

publication of this document. Please review these documents carefully, as they describe your rights and restrictions with respect to this document. Code Components extracted from this document must include Simplified BSD License text as described in Section 4.e of the Trust Legal Provisions and are provided without warranty as described in the Simplified BSD License.

Table of Contents

| | | |
|------------------------|---|--------------------|
| 1. | Introduction | 2 |
| 2. | Conventions and Terminology | 3 |
| 2.1. | Conventions | 3 |
| 2.2. | Terminology | 3 |
| 3. | Protocol Extension | 3 |
| 3.1. | Format of the LCMP Sub-Options | 4 |
| 3.1.1. | Binding Re-registration Control Sub-Option | 5 |
| 3.1.2. | Heartbeat Control Sub-Option | 6 |
| 4. | Protocol Configuration Variables | 6 |
| 4.1. | Local Mobility Anchor - Configuration Variables | 6 |
| 5. | Protocol Considerations | 8 |
| 5.1. | Local Mobility Anchor Considerations | 8 |
| 5.2. | Mobile Access Gateway Considerations | 9 |
| 6. | IANA Considerations | 9 |
| 7. | Security Considerations | 10 |
| 8. | Acknowledgements | 10 |
| 9. | References | 10 |
| 9.1. | Normative References | 10 |
| 9.2. | Informative References | 11 |
| | Authors' Addresses | 11 |

[1.](#) Introduction

A large PMIPv6 deployment, such as residential deployment, can have tens of thousands of MAGs spread across geographical locations. While it can be operationally challenging to manage such a large number of MAGs, it can also be very difficult to ensure configuration consistency across all the MAGs if they are not centrally managed. Configuring aggressive values of parameters such as re-registration timeout and heartbeat interval can potentially create considerable signaling load on the LMA. This document provides a new option to enable the LMA to control various parameters on the MAG such as the re-registration frequency [[RFC5213](#)] and heartbeat frequency [[RFC5847](#)]. With this option, the configuration of these tunable

Type

8-bit unsigned integer indicating the type of the LCMP sub-option. This specification defines the following types:

- 0 - Reserved
- 1 - Binding Refresh Control Sub-Option
- 2 - Heartbeat Control Sub-Option

Length

8-bit unsigned integer indicating the number of octets needed to encode the Option Data, excluding the LCMP Type and LCMP Length fields of the sub-option.

[3.1.1.](#) Binding Re-registration Control Sub-Option

The Binding Re-registration Control Sub-Option is a mobility sub-option carried in the LCMP mobility option defined in [Section 3.1](#). This sub-option carries re-registration related timer values. There MUST be no more than a single instance of this sub-option in LCMP option. The format of this sub-option is defined below.

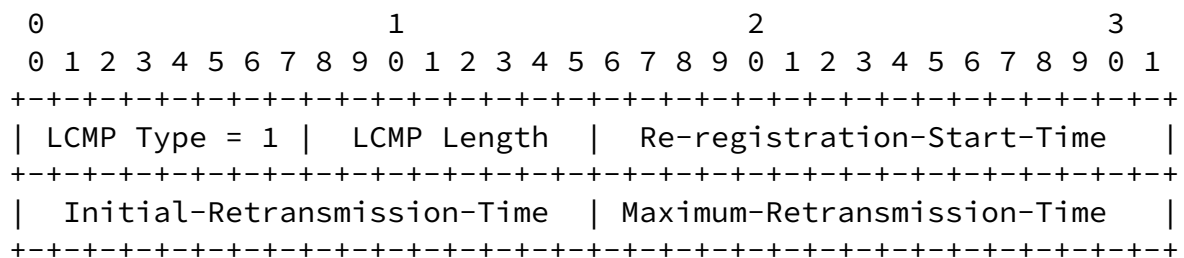


Figure 3: Binding Re-registration Control Sub-Option

LCMP Type

2 for Heartbeat Control Sub-Option

LCMP Length

6

HB-Interval

16-bit unsigned integer indicating heartbeat interval, i.e. time delay in seconds after a successful heartbeat exchange (heartbeat request followed by response) when the next heartbeat exchange can be triggered.

HB-Retransmission-Delay

16-bit unsigned integer indicating minimum time delay in seconds before a heartbeat message is retransmitted.

HB-Max-Retransmissions

16-bit unsigned integer indicating maximum number of heartbeat retransmissions.

[4.](#) Protocol Configuration Variables

[4.1.](#) Local Mobility Anchor - Configuration Variables

The LMA MUST allow the following variables to be configured by the system management. The configured values for these protocol variables MUST survive server reboots and service restarts.

EnableLCMPSubOptReregControl

This flag indicates the operational state of the Binding Re-registration Control sub-option support. The default value for this flag is set to (0), indicating that support for the Binding Re-registration Control sub-option is disabled.

EnableLCMPSubOptHeartbeatControl

This flag indicates the operational state of the Heartbeat Control

sub-option support. The default value for this flag is set to (0), indicating that support for the Heartbeat Control sub-option is disabled.

The following variables MAY be defined at various granularities such as per binding, per peering MAG, per cluster of MAGs or any other custom grouping. Regardless of the granularity of this configuration, the LMA MUST be able to determine the value of these variables on an individual binding basis by way of configuration hierarchy.

LCMPReregistrationStartTime

This variable is used to set the minimum time interval in number of seconds before the expiry of the PMIPv6 binding lifetime when the registration refresh process SHOULD be activated. The default value is 10 units, where each unit is 4 seconds.

LCMPInitialRetransmissionTime

This variable is used to set the minimum delay in seconds before the first PBU retransmission of the exponential back-off process. This variable is same as INITIAL_BINDACK_TIMEOUT mentioned in [Section 6.9.4 of \[RFC5213\]](#). The default value is 1 second.

LCMPMaximumRetransmissionTime

This variable is used to set the maximum delay in seconds before the last PBU retransmission message of the exponential back-off process. This variable is same as MAX_BINDACK_TIMEOUT mentioned in [Section 6.9.4 of \[RFC5213\]](#). The default value is 32 seconds.

LCMPHeartbeatInterval

This variable is used to set the time delay in seconds after a successful heartbeat exchange (heartbeat request followed by response) when the next heartbeat exchange can be triggered. The default value is 60 seconds. It SHOULD NOT be set to less than 30 seconds or more than 3600 seconds. The value of this variable MAY

[Section 5 of \[RFC5847\]](#) if configured on the LMA.

LCMPHeartbeatRetransmissionDelay

This variable is used to set the minimum time delay in seconds before a heartbeat message is retransmitted. The value of this variable SHOULD be less than LCMPHeartbeatInterval. The default value is 5 seconds.

LCMPHeartbeatMaxRetransmissions

This variable is used to set the maximum number of heartbeat retransmissions. The default value for this variable is 3. The value of this variable MAY be derived from the variable MISSING_HEARTBEATS_ALLOWED defined in [Section 5 of \[RFC5847\]](#) if configured on the LMA.

5. Protocol Considerations

The following considerations apply to the LMA and the MAG.

The conceptual Binding Cache Entry data structure maintained by the LMA, described in [Section 5.1 of \[RFC5213\]](#) and the conceptual Binding Update List entry data structure maintained by the MAG, described in [Section 6.1 of \[RFC5213\]](#), MUST be extended to store the LCMP option related information elements associated with the current session. Specifically the following parameters MUST be defined:

- o LCMPReregistrationStartTime
- o LCMPInitialRetransmissionTime
- o LCMPMaximumRetransmissionTime
- o LCMPHeartbeatInterval
- o LCMPHeartbeatRetransmissionDelay
- o LCMPHeartbeatMaxRetransmissions

5.1. Local Mobility Anchor Considerations

On receiving a PBU message [\[RFC5213\]](#) from a MAG, the LMA MUST check if the variable EnableLCMPSubOptReregControl is configured and set to (1). If yes, and if all of LCMPReregistrationStartTime, LCMPInitialRetransmissionTime and LCMPMaximumRetransmissionTime are set to NON_ZERO values, then it MUST include Binding Re-registration

Control Sub-Option in the LCMP mobility option which is in turn included in the PBA message. If the variable `EnableLCMPSubOptReregControl` is configured and set to (1) and if any of `LCMPReregistrationStartTime`, `LCMPInitialRetransmissionTime` and `LCMPMaximumRetransmissionTime` is set to ZERO value, then the LMA MUST report a configuration error and reject the binding request by sending a PBA message with status code '128-Reason Unspecified' [[RFC5213](#)].

The LMA MUST also check if variable `EnableLCMPSubOptHeartbeatControl` is configured and set to (1). If yes, and if all of `LCMPHeartbeatInterval`, `LCMPHeartbeatRetransmissionDelay` and `LCMPHeartbeatMaxRetransmissions` are set to NON_ZERO values, then it MUST include Heartbeat Control Sub-Option in the LCMP mobility option which is in turn included in the PBA message. If the variable `EnableLCMPSubOptHeartbeatControl` is set to (1) and if any of `LCMPHeartbeatInterval`, `LCMPHeartbeatRetransmissionDelay` and `LCMPHeartbeatMaxRetransmissions` is set to ZERO value, then the LMA MUST report a configuration error and reject the binding request by sending a PBA message with status code '128-Reason Unspecified' [[RFC5213](#)].

[5.2.](#) Mobile Access Gateway Considerations

If the PBA message [[RFC5213](#)] received from the LMA contains the LCMP mobility option and the Binding Re-registration Control Sub-Option, then the MAG MUST overwrite the binding re-registration related timer parameters configured locally on the MAG with the parameters received in Binding Re-registration Control Sub-Option. If any of the parameters in the Binding Re-registration Control Sub-Option is ZERO, then the PBA message MUST be ignored and an error message SHOULD be logged.

Similarly, if the LCMP mobility option contains the Heartbeat Control Sub-Option, then the MAG MUST overwrite the heartbeat related timer parameters configured locally on the MAG with the parameters received in the Heartbeat Control Sub-Option. If any of the parameters in the Heartbeat Control Sub-Option except `HB-Retransmission-Delay` is ZERO, then the PBA message MUST be ignored and error message SHOULD be logged.

[6.](#) IANA Considerations

This document requires the following IANA actions in the "Mobile IPv6 Parameters" registry.

- o Action 1: This specification defines a new mobility header option, "LMA Controlled MAG Parameters". This mobility option is

described in [Section 3](#). The type value (IANA-1) for this option needs to be assigned from the same numbering space as allocated for the other mobility options, as defined in [\[RFC6275\]](#).

- o Action 2: This specification defines a new mobility sub-option format, the LCMP Parameters sub-option. The format of this mobility sub-option is described in [Section 3.1](#). This sub-option can be carried in the LCMP Parameters option. The type value for this sub-option needs to be managed by IANA, under the registry "LMA Controlled MAG Parameters Sub-Option Type Values". This specification reserves the following type values. Approval of new LCMP Parameters sub-option type values are to be made through IANA Expert Review.

| | |
|---|--|
| 0 | Reserved |
| 1 | Binding Re-registration Control Sub-Option |
| 2 | Heartbeat Control Sub-Option |

[7](#). Security Considerations

The LCMP Parameters option defined in this specification is for use in PBA message. This option is carried like any other mobility header option as specified in [\[RFC6275\]](#) and does not require any special security considerations.

[8](#). Acknowledgements

The authors would like to thank the DMM working group for all the comments and discussions on this document. The authors would also like to thank Suresh Krishnan and Ralph Droms for their review feedback.

[9](#). References

[9.1](#). Normative References

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), DOI 10.17487/RFC2119, March 1997, <<http://www.rfc-editor.org/info/rfc2119>>.

Patki, et al.

Expires August 9, 2017

[Page 10]

Internet-Draft LMA Controlled MAG Session Parameters February 2017

[RFC5213] Gundavelli, S., Ed., Leung, K., Devarapalli, V., Chowdhury, K., and B. Patil, "Proxy Mobile IPv6", [RFC 5213](#), DOI 10.17487/RFC5213, August 2008, <<http://www.rfc-editor.org/info/rfc5213>>.

[RFC5847] Devarapalli, V., Ed., Koodli, R., Ed., Lim, H., Kant, N., Krishnan, S., and J. Laganier, "Heartbeat Mechanism for Proxy Mobile IPv6", [RFC 5847](#), DOI 10.17487/RFC5847, June 2010, <<http://www.rfc-editor.org/info/rfc5847>>.

[RFC7563] Pazhyannur, R., Speicher, S., Gundavelli, S., Korhonen, J., and J. Kaippallimalil, "Extensions to the Proxy Mobile IPv6 (PMIPv6) Access Network Identifier Option", [RFC 7563](#), DOI 10.17487/RFC7563, June 2015, <<http://www.rfc-editor.org/info/rfc7563>>.

[9.2](#). Informative References

[RFC2460] Deering, S. and R. Hinden, "Internet Protocol, Version 6 (IPv6) Specification", [RFC 2460](#), DOI 10.17487/RFC2460, December 1998, <<http://www.rfc-editor.org/info/rfc2460>>.

[RFC6275] Perkins, C., Ed., Johnson, D., and J. Arkko, "Mobility Support in IPv6", [RFC 6275](#), DOI 10.17487/RFC6275, July 2011, <<http://www.rfc-editor.org/info/rfc6275>>.

Authors' Addresses

Dhananjay Patki
Cisco
Cessna Business Park SEZ, Kadubeesanahalli
Bangalore, Karnataka 560087

India

Email: dhpatki@cisco.com

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

Email: sgundave@cisco.com

Patki, et al.

Expires August 9, 2017

[Page 11]

Internet-Draft

LMA Controlled MAG Session Parameters

February 2017

Jong-Hyok Lee
Sangmyung University
31, Sangmyeongdae-gil, Dongnam-gu
Cheonan 330-720
Republic of Korea

Email: jonghyouk@smu.ac.kr

Qiao Fu
China Mobile
Xuanwumenxi Ave. No.32
Beijing
China

Email: fuqiao1@outlook.com

Lyle T Bertz
Sprint
Kansas
USA

Email: Lyle.T.Bertz@sprint.com

