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Trace Control Support for Proxy Mobile IPv6
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Abstract

In some Proxy Mobile IPv6 (PMIPv6) [[RFC5213](#)] deployments, a mobility session needs to be traced by the back-end network manager for network diagnosis, troubleshooting, new service testing, etc. This document defines a Trace Session option for PMIPv6 protocol to control and manage (activation and de-activation) a trace session associated with a mobility session of the mobile node. This option is sent by the mobile access gateway in Proxy Binding Update message to request the local mobile anchor to activate the trace session. When the local mobile anchor successfully processes the Proxy Binding Update, it then activates the trace session and starts to record/report the traced mobility session based on the corresponding trace parameters.

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1. Introduction

In some Proxy Mobile IPv6 (PMIPv6) [[RFC5213](#)] deployments, a mobility session of the mobile node needs to be traced by the back-end network manager for network diagnosis, troubleshooting, new service testing, etc. If a mobility session of the mobile node is being traced, the MAG and the LMA should firstly activate trace session associated with the mobility session of the mobile node respectively and then start to record/report the traced mobility session based on the corresponding trace parameters to the back-end network manager. In this case, the trace session is used to configure trace parameters and identify the time interval through activation and de-activation operations. In order to synchronize starting trace session between the MAG and the LMA, the interaction between the MAG and the LMA is required. However there is no relevant works to discuss how the trace session is propagated from the mobile access gateway to the local mobile anchor.

This document defines a new mobility option, i.e., trace session option. This option is used by the MAG to carry trace parameter to the LMA and activate the trace session associate with the mobility session of the mobile node.

2. Conventions used in this document

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](#) [[RFC2119](#)].

3. Protocol Overview

This document defines a new extension for PMIPv6 protocol to control and manage (activation and de-activation) a trace session associated with a special mobility session of the mobile node by using the Trace Session option.

When the mobile node is attached to the mobile access gateway, the AAA server propagates the trace parameters to the mobile access gateway after the mobile node is successfully authenticated and authorized. And then the MAG stores the trace parameters in the mobile node's binding cache entry and activates the trace session.

The mobile access gateway further propagates the trace parameters encapsulated into the Trace Session option in the Proxy Binding

Update message to the mobile node's local mobile anchor. When the local mobility anchor successfully processes the Proxy Binding Update message, it then stores the trace parameters in the mobile node's binding cache entry and activates the trace session.

[4.](#) Mobile Access Gateway Considerations

[4.1.](#) Extensions to the Conceptual Data Structure

The binding update list (defined in [section 6.1 of \[RFC5213\]](#)) maintained on the mobile access gateway should be extended with following additional fields in this document.

- 0 Session Identifier, the identifier of the trace session. This identifier is used to identify a unique trace session of a mobile node and can be acquired when the trace session is activated.
- 0 Trace Parameters, the parameters of the trace session. These parameters are acquired when the trace session is activated and are used to determine what and when the mobility session of the mobile node is recorded and reported, etc.

[4.2.](#) Signaling Consideration

- 0 If the mobile access gateway determines that a mobility session of a mobile node needs to be traced, it sends a Proxy Binding Update message with the Trace Session option to the local mobility anchor. In the Trace Session option, following parameters should be set.
 - The session identifier of the trace session to be activated. It is assigned by the mobile access gateway or acquired from policy server.

- The A-flag is set to 1.
 - Trace parameters the trace session to be activated. They are acquired from policy server.
- 0 If the mobile access gateway determines that a trace session of a mobile node needs to be stopped, it sends a Proxy Binding Update message with the Trace Session option to the local mobility anchor. In the Trace Session option, following parameters should be set.
- The session identifier of the trace session to be de-activated.

- A-flag is set to 0.

[5.](#) Local Mobile Anchor Consideration

[5.1.](#) Extensions to the Conceptual Data Structure

The binding update list (defined in [section 5.1 of \[RFC5213\]](#)) maintained on the local mobile anchor should be extended with following additional fields in this document.

- 0 Session Identifier, the identifier of the trace session. This identifier is used to identify a unique trace session of a mobile node and can be acquired when the trace session is activated and
- 0 Trace Parameters, the parameters of the trace session. These parameters are acquired when the trace session is activated and are used to determine what and when the mobility session of the mobile node is recorded and reported, etc.

[5.2.](#) Signaling Consideration

If the local mobility anchor successfully processes a Proxy Binding Update message with the Trace Session option, it must perform the following actions.

- 0 If the A-flag is set to 1 and the session identifier is firstly presented, the local mobile anchor MUST store the session identifier and trace parameters in the corresponding BCE and activate the trace session of the mobility session.

- 0 If the A-flag is set to 1 and the session identifier is re-presented (matching the session identifier in the corresponding BCE), the local mobile anchor MUST update trace parameters in the corresponding BCE and re-activate the trace session of the mobility session.
- 0 If the A-flag is set to 0 and the session identifier matches an existing session identifier of the trace session, the local mobile anchor MUST stop the trace session of the mobility session and delete the session identifier and the trace parameters of the trace session.
- 0 If the A-flag is set to 0 and the session identifier matches an existing session identifier of the trace session, the local mobile anchor MUST stop the trace session of the mobility session and delete the session identifier and the trace parameters of the trace session.

After the Proxy Binding Update message is successfully processed, the local mobility anchor MUST respond with a successful Proxy Binding Acknowledgement with the Trace Session option. The option is only included with the A-flag and the session identifier which are set with the same values in the corresponding Trace Session option of the Proxy Binding Update message.

[6. Message Format](#)

[6.1. Trace Session option](#)

The Trace Session option contains a unique session identifier, a flag to indicate activation or de-activation of a trace session and the trace parameters which are configured on the MAG and the LMA to indication start and stop of recording the traced mobility session and further reporting the record information to the back-end server.

The format of the option is:

0										1										2										3									
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										Session Id										A Reserved									

| Trace Parameters ...
+---+---+---+---+---+---+---+---+---+

Type

<IANA>

Length

8-bit unsigned integer, indicating the length in octets of the option excluding the type and length fields.

Session Identifier

8-bit unsigned integer, the session identifier is unique for each mobility session. One mobile node may have one or more than one session identifiers.

A Flag

This flag indicates that the trace session of the mobile node mobility session needs to be activated. When this flag is

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cleared, it means the trace session of the mobile node mobility session is requested to be de-activated.

Reserved

These fields are unused. They MUST be initialized to zero by the sender and MUST be ignored by the receiver.

Trace Parameters

This field is variable length field. These parameters indicate the detailed content of the trace session, which is defined out of scope of this document.

[7.](#) Security Considerations

TBD

[8.](#) IANA Considerations

Trace Session option-type

[9](#). References

[9.1](#). Normative References

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997.

[RFC5213] Gundavelli, S., Leung, K., Devarapalli, V., Chowdhury, K., and B. Patil, "Proxy Mobile IPv6", [RFC 5213](#), August 2008.

[9.2](#). Informative References

[10](#). Acknowledgments

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