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M. Boucadair  
C. Jacquenet  
Orange  
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Retrieving Multiple LISP Records  
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## Abstract

This document extends Locator/ID Separation Protocol (LISP) with a capability to retrieve multiple records using the same LISP request.

This document updates [RFC6830](#).

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Internet-Draft

LISP Multiple Records

October 2017

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[1.](#) Introduction

Locator/ID Separation Protocol (LISP, [[RFC6830](#)] ) operation relies upon a mapping mechanism that is used by ingress/egress Tunnel Routers (xTR) to forward traffic over the LISP network. This document extends LISP with a capability for bulk mappings retrieval. It does so by defining new LISP messages that are meant to facilitate state recovery of mapping tables and improve Ingress Tunnel Routers (ITR) recovery times, in particular.

The base LISP specification does not define how a requestor may ask for multiple EIDs. Indeed, the current LISP specification [[RFC6830](#)] states the following:

Support for requesting multiple EIDs in a single Map-Request message will be specified in a future version of the protocol.

The document defines a backward compatible extension of the LISP Map-Request message to request multiple records ([Section 3](#)).

A more reliable method for bulk retrieval is defined in [[I-D.boucadair-lisp-bulk](#)]. It does so by using TCP ([[RFC0793](#)]) as a transport protocol for exchanges the bulk retrieval messages.

[2.](#) Requirements Language

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 [RFC 2119](#) [[RFC2119](#)].

### 3. Map-Request with Multiple Records

As mentioned in [Section 1](#), [\[RFC6830\]](#) does not specify how an ITR can request for multiple EIDs using the same Map-Request message. This document fills that void.

Figure 1 shows the difference between the Map-Request message format as defined in [\[RFC6830\]](#) and the new format that includes the proposed extension. This extension is meant to allow an ITR to request multiple EID records by using the same Map-Request.

The proposed design is backward compatible since it aligns the additional requested EID records at the end of the Map-Request message.

As specified in [[RFC6830](#)], a mapping system must be prepared to receive a request for multiple EID records in a Map-Request message. A receiver relies upon the content of the "Record Count" field of the Map-Request message to detect whether one or multiple records are carried in the request.

OLD:

```

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=1 |A|M|P|S|p|s|      Reserved      |   IRC   | Record Count |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                                     Nonce . . .                                     |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                                     . . . Nonce                                     |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|          Source-EID-AFI          |   Source EID Address   ...   |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|          ITR-RLOC-AFI 1          |   ITR-RLOC Address 1   ...   |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                                     ...                                     |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|          ITR-RLOC-AFI n          |   ITR-RLOC Address n   ...   |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
/ |   Reserved   | EID mask-len |          EID-Prefix-AFI          |
Rec +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
\ |                                     EID-Prefix   ...                                     |

```

```

+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|                                     Map-Reply Record ...                                     |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+

```

NEW:

```

      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=1 |A|M|P|S|p|s|      Reserved      |   IRC   | Record Count |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|                                     Nonce . . .                                     |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+

```

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```

|                                     . . . Nonce                                     |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|      Source-EID-AFI      | Source EID Address ... |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|      ITR-RLOC-AFI 1      | ITR-RLOC Address 1 ... |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|                                     ...                                     |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|      ITR-RLOC-AFI n      | ITR-RLOC Address n ... |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
/ |      Reserved      | EID mask-len |      EID-Prefix-AFI      |
Rec 1 +---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
\ |      EID-Prefix ... |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|      Map-Reply Record ... |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
/ |      Reserved      | EID mask-len |      EID-Prefix-AFI      |
Rec 2 +---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
\ |      EID-Prefix ... |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
:                                     ...                                     :
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
/ |      Reserved      | EID mask-len |      EID-Prefix-AFI      |
Rec m +---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
\ |      EID-Prefix ... |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+

```

Figure 1

The description of the fields of the updated Map-Request message is exactly the same as in [RFC6830], except the additional records that are prepended after the "Map-Reply Record" . The structure of a record is exactly the same as in [RFC6830].

When extracting the records included in a Map-Request message, a Map-Resolver replies with the list of mappings that match these records. One or multiple Map-Reply messages may be required to carry the mapping records that match the requested EIDs included in a Map-Request.

An ITR MUST be prepared to receive multiple Map-Reply messages from a Map-Resolver as a response to a bulk Map-Request message that it originally sent to that Map-Resolver.

In order to inform an ITR that subsequent Map-Reply messages will follow (or not) , a dedicated flag bit is defined for this purpose: it is called the M-bit (more-map-reply bit).

When set, the M-bit (more-map-reply bit) flag indicates this is not the last Map-Reply message to be received by the requesting ITR; additional Map-Reply messages follow. An implementation uses this bit to decide when to terminate a request/response transaction.

If multiple Map-Reply messages are required to respond to a Map-Request message, a Map-Resolver MUST set the M-bit flag for all Map-Reply messages except for the last Map-Reply message.

OLD:

```

      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=2 |P|E|S|               Reserved                        |Record Count |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|                               Nonce . . .                    |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|                               . . . Nonce                     |
+-> +---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|   |   |                       Record TTL                      |
|   +---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
R   | Locator Count | EID mask-len | ACT |A|                   Reserved

```

```

e  +---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
c  | Rsvd  |  Map-Version Number  |          EID-Prefix-AFI          |
o  +---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
r  |                                     EID-Prefix                                     |
d  +---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|  /|    Priority    |    Weight    |  M Priority    |    M Weight    |
|  L +---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|  o |          Unused Flags          |L|p|R|          Loc-AFI          |
|  c +---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|  \|                                     Locator                                     |
+-> +---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+

```

NEW:

```

      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=2 |P|E|S|M|          Reserved          | Record Count |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|                                     Nonce . . .                                     |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|                                     . . . Nonce                                     |
+-> +---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|  |                                     Record TTL                                     |
|  +---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
R  | Locator Count | EID mask-len | ACT |A|          Reserved          |
e  +---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+

```

```

c  | Rsvd  |  Map-Version Number  |          EID-Prefix-AFI          |
o  +---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
r  |                                     EID-Prefix                                     |
d  +---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|  /|    Priority    |    Weight    |  M Priority    |    M Weight    |
|  L +---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|  o |          Unused Flags          |L|p|R|          Loc-AFI          |
|  c +---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|  \|                                     Locator                                     |
+-> +---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+

```

#### 4. Security Considerations

This document adheres to the security considerations discussed in

[RFC6830] and [RFC6833].

## 5. IANA Considerations

This document does not require any IANA action.

## 6. Acknowledgments

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Many thanks to S. Secci and Chi Dung Phung for the comments.

## 7. References

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#### Authors' Addresses

Mohamed Boucadair  
Orange  
Rennes 35000  
France

EMail: mohamed.boucadair@orange.com

Christian Jacquenet  
Orange  
Rennes 35000  
France

EMail: christian.jacquenet@orange.com