

Internet Engineering Task Force
Internet-Draft
Intended status: Standards Track
Expires: July 28, 2018

D. Lewis
Cisco
J. Lemon
Broadcom
P. Agarwal
Innovium
L. Kreeger

P. Quinn
M. Smith
N. Yadav
F. Maino, Ed.
Cisco
January 24, 2018

LISP Generic Protocol Extension
draft-ietf-lisp-gpe-00

Abstract

This draft describes extending the Locator/ID Separation Protocol (LISP), via changes to the LISP header, to support multi-protocol encapsulation.

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 July 28, 2018.

Copyright Notice

Copyright (c) 2018 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 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](#)
- [1.1.](#) Conventions [3](#)
- [1.2.](#) Definition of Terms [3](#)
- [2.](#) LISP Header Without Protocol Extensions [3](#)
- [3.](#) Generic Protocol Extension for LISP (LISP-GPE) [3](#)
- [4.](#) Backward Compatibility [5](#)
- [4.1.](#) Type of Service [5](#)
- [4.2.](#) VLAN Identifier (VID) [5](#)
- [5.](#) IANA Considerations [5](#)
- [6.](#) Security Considerations [6](#)
- [7.](#) Acknowledgements [6](#)
- [8.](#) References [6](#)
- [8.1.](#) Normative References [6](#)
- [8.2.](#) Informative References [7](#)
- Authors' Addresses [7](#)

1. Introduction

LISP, as defined in [[RFC6830](#)] and extended in [[I-D.ietf-lisp-rfc6830bis](#)], defines an encapsulation format that carries IPv4 or IPv6 (henceforth referred to as IP) packets in a LISP header and outer UDP/IP transport.

The LISP header does not specify the protocol being encapsulated and therefore is currently limited to encapsulating only IP packet payloads. Other protocols, most notably VXLAN [[RFC7348](#)] (which defines a similar header format to LISP), are used to encapsulate L2 protocols such as Ethernet.

This document defines an extension for the LISP header, as defined in [[I-D.ietf-lisp-rfc6830bis](#)], to indicate the inner protocol, enabling the encapsulation of Ethernet, IP or any other desired protocol all the while ensuring compatibility with existing LISP deployments.

A flag in the LISP header, called the P-bit, is used to signal the presence of the 8-bit Next Protocol field. The Next Protocol field,

when present, uses 8 bits of the field allocated to the echo-nonce and map-versioning features. The two features are still available, albeit with a reduced length of Nonce and Map-Version.

1.1. Conventions

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].

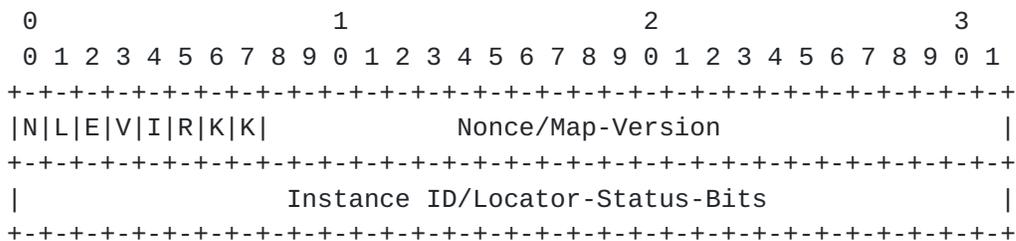
1.2. Definition of Terms

This document uses terms already defined in [I-D.ietf-lisp-rfc6830bis].

2. LISP Header Without Protocol Extensions

As described in the introduction, the LISP header has no protocol identifier that indicates the type of payload being carried. Because of this, LISP is limited to carry IP payloads.

The LISP header [I-D.ietf-lisp-rfc6830bis] contains a series of flags (some defined, some reserved), a Nonce/Map-version field and an instance ID/Locator-status-bit field. The flags provide flexibility to define how the various fields are encoded. Notably, Flag bit 5 is the last reserved bit in the LISP header.



LISP Header

3. Generic Protocol Extension for LISP (LISP-GPE)

This document defines the following changes to the LISP header in order to support multi-protocol encapsulation:

P Bit: Flag bit 5 is defined as the Next Protocol bit. The P bit MUST be set to 1 to indicate the presence of the 8 bit next protocol field.

4. Backward Compatibility

LISP-GPE uses the same UDP destination port (4341) allocated to LISP.

A LISP-GPE router MUST not encapsulate non-IP packets to a LISP router. A method for determining the capabilities of a LISP router (GPE or "legacy") is out of the scope of this draft.

When encapsulating IP packets to a LISP "legacy" router the P bit MUST be set to 0.

4.1. Type of Service

When a LISP-GPE router performs Ethernet encapsulation, the inner 802.1Q [IEEE8021Q] priority code point (PCP) field MAY be mapped from the encapsulated frame to the Type of Service field in the outer IPv4 header, or in the case of IPv6 the 'Traffic Class' field.

4.2. VLAN Identifier (VID)

When a LISP-GPE router performs Ethernet encapsulation, the inner header 802.1Q [IEEE8021Q] VLAN Identifier (VID) MAY be mapped to, or used to determine the LISP Instance ID field.

5. IANA Considerations

IANA is requested to set up a registry of LISP-GPE "Next Protocol". These are 8-bit values. Next Protocol values in the table below are defined in this draft. New values are assigned via Standards Action [RFC5226].

Next Protocol	Description	Reference
0	Reserved	This Document
1	IPv4	This Document
2	IPv6	This Document
3	Ethernet	This Document
4	NSH	This Document
5	Reserved	
6	GBP	This Document
7	Reserved	
8..255	Unassigned	

6. Security Considerations

LISP-GPE security considerations are similar to the LISP security considerations documented at length in [I-D.ietf-lisp-rfc6830bis]. With LISP-GPE, issues such as dataplane spoofing, flooding, and traffic redirection may depend on the particular protocol payload encapsulated.

7. Acknowledgements

A special thank you goes to Dino Farinacci for his guidance and detailed review.

8. References

8.1. 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, <<https://www.rfc-editor.org/info/rfc2119>>.
- [RFC5226] Narten, T. and H. Alvestrand, "Guidelines for Writing an IANA Considerations Section in RFCs", [RFC 5226](#), DOI 10.17487/RFC5226, May 2008, <<https://www.rfc-editor.org/info/rfc5226>>.
- [RFC6830] Farinacci, D., Fuller, V., Meyer, D., and D. Lewis, "The Locator/ID Separation Protocol (LISP)", [RFC 6830](#), DOI 10.17487/RFC6830, January 2013, <<https://www.rfc-editor.org/info/rfc6830>>.
- [RFC6834] Iannone, L., Saucez, D., and O. Bonaventure, "Locator/ID Separation Protocol (LISP) Map-Versioning", [RFC 6834](#), DOI 10.17487/RFC6834, January 2013, <<https://www.rfc-editor.org/info/rfc6834>>.
- [RFC7348] Mahalingam, M., Dutt, D., Duda, K., Agarwal, P., Kreeger, L., Sridhar, T., Bursell, M., and C. Wright, "Virtual eXtensible Local Area Network (VXLAN): A Framework for Overlaying Virtualized Layer 2 Networks over Layer 3 Networks", [RFC 7348](#), DOI 10.17487/RFC7348, August 2014, <<https://www.rfc-editor.org/info/rfc7348>>.

8.2. Informative References

[I-D.ietf-lisp-rfc6830bis]

Farinacci, D., Fuller, V., Meyer, D., Lewis, D., and A. Cabellos-Aparicio, "The Locator/ID Separation Protocol (LISP)", [draft-ietf-lisp-rfc6830bis-08](#) (work in progress), January 2018.

[I-D.ietf-sfc-nsh]

Quinn, P., Elzur, U., and C. Pignataro, "Network Service Header (NSH)", [draft-ietf-sfc-nsh-28](#) (work in progress), November 2017.

[I-D.lemon-vxlan-gpe-gbp]

Lemon, J., Maino, F., and M. Smith, "Group Policy Encoding with VXLAN-GPE", [draft-lemon-vxlan-gpe-gbp-01](#) (work in progress), December 2017.

Authors' Addresses

Darrel Lewis
Cisco Systems

Email: darlewis@cisco.com

John Lemon
Broadcom
3151 Zanker Road
San Jose, CA 95134
USA

Email: john.lemon@broadcom.com

Puneet Agarwal
Innovium
USA

Email: puneet@acm.org

Larry Kreeger
USA

Email: lkreeger@gmail.com

Paul Quinn
Cisco Systems

Email: pquinn@cisco.com

Michael Smith
Cisco Systems

Email: michsmit@cisco.com

Navindra Yadav
Cisco Systems

Email: nyadav@cisco.com

Fabio Maino (editor)
Cisco Systems
San Jose, CA 95134
USA

Email: fmaino@cisco.com

