

Mobile Ad hoc Networks Working Group
Internet-Draft
Intended status: Standards Track
Expires: January 21, 2018

R. Taylor
Airbus Defence & Space
July 20, 2017

Link Identifier Extension to DLEP
draft-dlep-lid-01

Abstract

There exists a class of modems that wish to support the Dynamic Link Exchange Protocol (DLEP) [[RFC8175](#)] but do not present a single Layer 2 network domain as required by DLEP. Such devices may be:

- o Modems that maintain a varying link to some upstream backbone network infrastructure, where the ability to announce link state and DLEP metrics is desired, but the concept of a DLEP destination router for the backbone does not apply. Examples of such devices can include LTE modems, IEEE 802.11 stations not in ad-hoc mode, and some satellite terminals.
- o Modems that provide Layer 3 wide area network connectivity between devices, where individual DLEP destinations do exist, but are not directly reachable by MAC address.

This document introduces an optional extension to the core DLEP specification, allowing DLEP to be used between routers and modems that operate in this way.

Note:

- o This document is intended as an extension to the core DLEP specification, and readers are expected to be fully conversant with the operation of core DLEP.

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 January 21, 2018.

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 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.	Requirements	3
2.	Operation	3
2.1.	Identifier Restrictions	4
2.2.	Link Identifier Data Item	4
3.	Security Considerations	5
4.	IANA Considerations	5
4.1.	DLEP Link Identifier Flag	5
5.	References	6
5.1.	Normative References	6
5.2.	Informative References	6
	Author's Address	6

[1.](#) Introduction

The Dynamic Link Exchange Protocol (DLEP) [[RFC8175](#)] describes a protocol for modems to advertise the status of wireless links between reachable destinations to attached routers. The core specification of the protocol assumes that every modem in the radio network has an attached DLEP router, and the MAC address of the DLEP interface on the router is used to identify the destination in the network for

purposes of reporting the state and quality of the link to that destination.

This document describes a DLEP Extension allowing modems that do not meet the strict requirement that DLEP must be implemented on a single

Taylor

Expires January 21, 2018

[Page 2]

Internet-Draft

Link Identifier Extension to DLEP

July 2017

Layer 2 domain to use DLEP to describe link state and quality to one or more destinations reachable only at Layer 3.

To enable routers to take advantage of the DLEP protocol this extension adds a single enhancement to the DLEP protocol: A new Link Identifier Data Item. This Data Item replaces the use of the MAC Address Data Item whenever the DLEP destination does not have a router reachable by MAC address.

By using the Link Identifier Data Item, the modem implementation can announce the link state and quality to a uniquely identified destination in the network, either logical or physical, explicitly indicating that the destination is not reachable via a single Layer 2 domain. A router can use this knowledge to influence any routing or flow-control decisions regarding traffic to this destination, understanding that such decisions apply at Layer 3.

1.1. Requirements

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 [BCP 14](#), [RFC 2119](#) [[RFC2119](#)].

2. Operation

To use this extension, as with all DLEP extensions, the extension MUST be announced during DLEP session initialization. A router advertises support by including the value 'Link Identitifers' (TBD1) in the Extension Data Item within the Session Intitialization Message. A modem advertises support by including the value 'Link Identitifers' (TBD1) in the Extension Data Item within the Session Intitialization Response Message. If both DLEP peers advertise support for this extension then the Link Identifier Data Item MAY be used.

If a modem requires support for this extension in order to describe destinations, and the router does not advertise support, then the modem MUST NOT include a Link Identifier Data Item in any DLEP Message. However, the modem SHOULD NOT immediately terminate the DLEP session, rather it should use session-wide DLEP Data Items to announce general information about all reachable destinations via the modem. By doing this, a modem allows a router not supporting this extension to at least make a best guess at the state of any reachable network. A modem MUST NOT attempt to re-use the MAC Address Data Item to perform some kind of sleight-of-hand, assuming that the router will notice the DLEP Peer Type of the modem is special in some way.

Even when the Link Identifiers extension is in use for a DLEP session, both peers MUST support sending and receiving Messages concerning DLEP destinations using the standard DLEP MAC Address Data Item, as the use of this extension does not alter the representation of multicast logical destinations.

[2.1.](#) Identifier Restrictions

Within a single DLEP session, all identifiers used by this extension, both logical and physical, MUST be unique, and MUST be of the same octet length as the MAC address of the interface in use for the DLEP session, as per MAC Address Data Items. This removes the need for an extra LID length negotiation step during Session Initialization.

Identifiers MUST NOT be reused, i.e. an identifier that has been used to refer to one destination MUST NOT be recycled to refer to a different destination within the lifetime of a single DLEP session.

The method for generating identifiers is a modem implementation matter and out of scope of this document. Routers MUST NOT make any assumptions about the meaning of identifiers, or how identifiers are generated.

Router implementations MUST NOT assume that LIDs will not clash with any MAC Address Data Items also in use during the DLEP session, LIDs exist in a separate numbering space.

[2.2.](#) Link Identifier Data Item

The Link Identifier Data Item MAY be used whenever a MAC Address Data Item is defined as useable in core DLEP. A single Link Identifier Data Item MUST only be used in place of a single MAC Address Data Item. A Link Identifier Data Item MUST NOT appear in the same DLEP Message as a MAC Address Data Item.

```

      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
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
| Data Item Type                               | Length                     |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
| Flags                                         | Link Identifier...                :
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+

```

Data Item Type: TBD2

Length: Same as the MAC Address Data Item in use by the session.

Flags: Flags field, defined below.

Link Identifier: The unique identifier of the link destination. This identifier has no implicit meaning and is only used to discriminate between multiple links.

The Flags field is defined as:

```

    0 1 2 3 4 5 6 7
+---+---+---+---+---+---+
|   Reserved   |
+---+---+---+---+---+---+

```

Reserved: MUST be zero. Left for future assignment.

[3.](#) Security Considerations

As an extension to the core DLEP protocol, the security considerations of that protocol apply to this extension. This extension adds no additional security mechanisms or features.

None of the features introduced by this extension require extra consideration by an implementation.

4. IANA Considerations

Upon approval of this document, IANA is requested to:

- o Assign a new value (TBD1) from the Specification Required section of the DLEP Extensions Registry, named "Link Identifiers".
- o Assign a new value (TBD2) from the Specification Required section of the DLEP Data Item Type Values Registry, named "Link Identifier".

4.1. DLEP Link Identifier Flag

Upon approval of this document, IANA is requested to create a new DLEP registry, named "Link Identifier Flags".

The following table provides initial registry values and the [RFC5226] defined policies that should apply to the registry:

+-----+-----+	
Bit	Description/Policy
+-----+-----+	
0-7	Unassigned/Specification Required
+-----+-----+	

5. References

5.1. 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>>.
- [RFC8175] Ratliff, S., Jury, S., Satterwhite, D., Taylor, R., and B. Berry, "Dynamic Link Exchange Protocol (DLEP)", [RFC 8175](#), DOI 10.17487/RFC8175, June 2017, <<http://www.rfc-editor.org/info/rfc8175>>.

5.2. Informative References

[RFC5226] Narten, T. and H. Alvestrand, "Guidelines for Writing an IANA Considerations Section in RFCs", [RFC 5226](#), DOI 10.17487/RFC5226, May 2008, <<http://www.rfc-editor.org/info/rfc5226>>.

Author's Address

Rick Taylor
Airbus Defence & Space
Quadrant House
Celtic Springs
Coedkernew
Newport NP10 8FZ
UK

Email: rick.taylor@airbus.com