## DLEP DiffServ Aware Credit Window Extension
### draft-ietf-manet-dlep-da-credit-extension-07

Abstract

   This document defines an extension to the DLEP protocol that enables
   a DiffServ aware credit-window scheme for destination-specific and
   shared flow control.

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## 1.  Introduction

   The Dynamic Link Exchange Protocol (DLEP) is defined in [RFC8175].
   It provides the exchange of link related control information between
   DLEP peers.  DLEP peers are comprised of a modem and a router.  DLEP
   defines a base set of mechanisms as well as support for possible
   extensions.  This document defines one such extension.

   The base DLEP specification does not include any flow control
   capability.  There are various flow control techniques theoretically
   possible with DLEP.  This document defines a DLEP extension which
   provides a DiffServ-based flow control mechanism for traffic sent
   from a router to a modem.  Flow control is provided using one or more
   logical "Credit Windows", each of which will typically be supported
   by an associated virtual or physical queue.  Traffic sent by a router
   will use traffic flow classification information provided by the
   modem to identify which traffic is associated with each credit
   window.  Credit windows may be shared or dedicated on a per flow
   basis.  See [I-D.berger-manet-dlep-ether-credit-extension] for an
   Ethernet-based version of credit window flow control.

   This document uses the traffic classification and credit window
   control mechanisms defined in
   [I-D.ietf-manet-dlep-traffic-classification] and
   [I-D.ietf-manet-dlep-credit-flow-control] to provided credit window
   based flow control based on on DLEP destination and DiffServ
   [RFC2475] DSCPs (differentiated services codepoints).  The defined
   mechanism allows for credit windows to be shared across traffic sent
   to multiple DLEP destinations and DSCPs, or used exclusively for
   traffic sent to a particular destination and/or DSCP.  The extension
   also supports the "wildcard" matching of any DSCP.

The extension defined in this document is referred to as "DiffServ
Aware Credit Window" or, more simply, the "DA Credit" extension.  The
reader should be familiar with both the traffic classification and
credit window control mechanisms defined in
[I-D.ietf-manet-dlep-traffic-classification] and
[I-D.ietf-manet-dlep-credit-flow-control].

This document defines a new DLEP Extension Type Value in Section 2
which is used to indicate support for the extension.

## 1.1.  Key Words

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT",
"SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and
"OPTIONAL" in this document are to be interpreted as described in BCP
14 [RFC2119] [RFC8174] when, and only when, they appear in all
capitals, as shown here.

## 2.  Extension Usage and Identification

The extension defined in this document is composed of the mechanisms
and processing defined in
[I-D.ietf-manet-dlep-traffic-classification] and
[I-D.ietf-manet-dlep-credit-flow-control].  To indicate that the
DiffServ Aware Credit Window Extension is to be used, an
implementation MUST include the DiffServ Aware Credit Window Type
Value in the Extensions Supported Data Item.  The Extensions
Supported Data Item is sent and processed according to [RFC8175].
Any implementation that indicates use of the DiffServ Aware Credit
Window Extension MUST support all Messages, Data Items, the DiffServ
Traffic Classification Sub Data Item, and all related processing
defined in [I-D.ietf-manet-dlep-traffic-classification] and
[I-D.ietf-manet-dlep-credit-flow-control].

The DiffServ Aware Credit Window Extension Type Value is TBA1, see
Section 5.

## 3.  Management Considerations

This section provides several network management guidelines to
implementations supporting the DiffServ Aware Credit Window
Extension.

The use of the extension defined in this document SHOULD be
configurable on both modems and routers.

Modems SHOULD support the configuration of DSCP to credit window
(queue) mapping.

Modems MAY support the configuration of the number of credit windows (queues) to advertise to a router.

Routers may have limits on the number of queues that they can support and, perhaps, even limits in supported credit window combinations, e.g., if per destination queues can even be supported at all.  When modem-provided credit window information exceeds the capabilities of a router, the router MAY use a subset of the provided credit windows.  Alternatively, a router MAY reset the session and indicate that the extension is not supported.  In either case, the mismatch of capabilities SHOULD be reported to the user via normal network management mechanisms, e.g., user interface or error logging.

## 4.  Security Considerations

This document defines a DLEP extension that uses base DLEP mechanisms and the credit window control and flow mechanisms defined in [I-D.ietf-manet-dlep-traffic-classification] and [I-D.ietf-manet-dlep-credit-flow-control].  The use of those mechanisms, and the introduction of a new extension, do not inherently introduce any additional threats above those documented in [RFC8175].  The approach taken to Security in that document applies equally to the mechanism defined in this document.

## 5.  IANA Considerations

This document requests one assignment by IANA.  All assignments are to registries defined by [RFC8175].

### 5.1.  Extension Type Value

This document requests 1 new assignment to the DLEP Extensions Registry named "Extension Type Values" in the range with the "Specification Required" policy.  The requested value is as follows:

```
+------+-----------------------------+
| Code | Description                 |
+------+-----------------------------+
| TBA1 | DiffServ Aware Credit Window |
+------+-----------------------------+
```
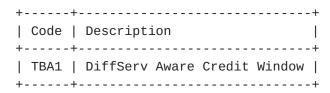
Table 1: Requested Extension Type Value

## 6.  References

6.1.  Normative References

   [I-D.ietf-manet-dlep-credit-flow-control]
              Cheng, B., Wiggins, D., Berger, L., and S. Ratliff, "DLEP
              Credit-Based Flow Control Messages and Data Items", draft-
              ietf-manet-dlep-credit-flow-control-03 (work in progress),
              August 2018.

   [I-D.ietf-manet-dlep-traffic-classification]
              Cheng, B., Wiggins, D., and L. Berger, "DLEP Traffic
              Classification Data Item", August 2018.

   [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>.

   [RFC8174]  Leiba, B., "Ambiguity of Uppercase vs Lowercase in RFC
              2119 Key Words", BCP 14, RFC 8174, DOI 10.17487/RFC8174,
              May 2017, <https://www.rfc-editor.org/info/rfc8174>.

   [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,
              <https://www.rfc-editor.org/info/rfc8175>.

6.2.  Informative References

   [I-D.berger-manet-dlep-ether-credit-extension]
              Wiggins, D. and L. Berger, "DLEP IEEE 802.1Q Aware Credit
              Window Extension", draft-berger-manet-dlep-ether-credit-
              extension-01 (work in progress), August 2018.

   [RFC2475]  Blake, S., Black, D., Carlson, M., Davies, E., Wang, Z.,
              and W. Weiss, "An Architecture for Differentiated
              Services", RFC 2475, DOI 10.17487/RFC2475, December 1998,
              <https://www.rfc-editor.org/info/rfc2475>.

Appendix A.  Acknowledgments

   The sub data item format was inspired by Rick Taylor's "Data Item
   Containers".  He also proposed the separation of credit windows from
   traffic classification at IETF98.  Many useful comments were received
   from contributors to the MANET working group.

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