

(Flow Related) DLEP Extensions Update

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Update Summary

- 4 Extensions
 - 2017-10-30 draft-ietf-manet-dlep-da-credit-extension-02
 - 2017-10-30 draft-ietf-manet-dlep-latency-extension-01
 - 2017-10-30 draft-ietf-manet-dlep-multi-hop-extension-01
 - 2017-10-30 draft-ietf-manet-dlep-pause-extension-02
 - See <https://github.com/loubergerger/dlep-extensions>
- MIT-LL DLEP code published on github
 - DLEP stack code: <https://github.com/mit-ll/LL-DLEP>
 - Wireshark Dissector Plugin:
<https://github.com/mit-ll/dlep-wireshark-dissector>

DLEP Multi-Hop Forwarding

- Reporting and control of multi-hop forwarding
- Draft-ietf-manet-dlep-multi-hop-extension-01

- Updates references

- Open issues

1. Inclusion of reserved fields

- Currently allows for more flags to be added without changing the DI Type

⚭ Keep or reduce/eliminate?

- Proposed by Henning Rogge on list

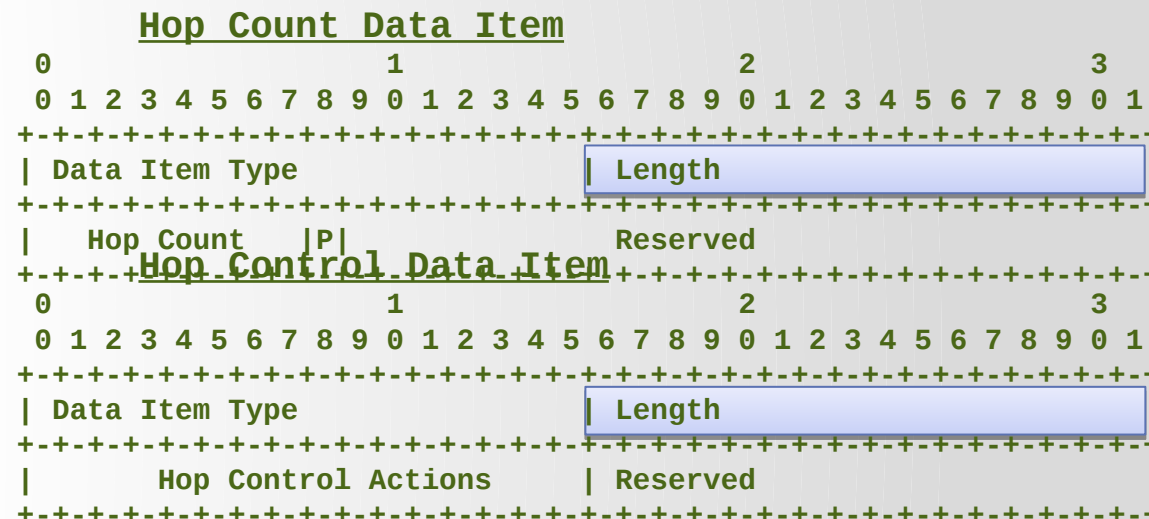
2. Planned change: Carry Hop Control DI in Link Characteristics Request Message

- Proposed by Henning Rogge on list

- Next steps

- Resolve open issues

- Last call?

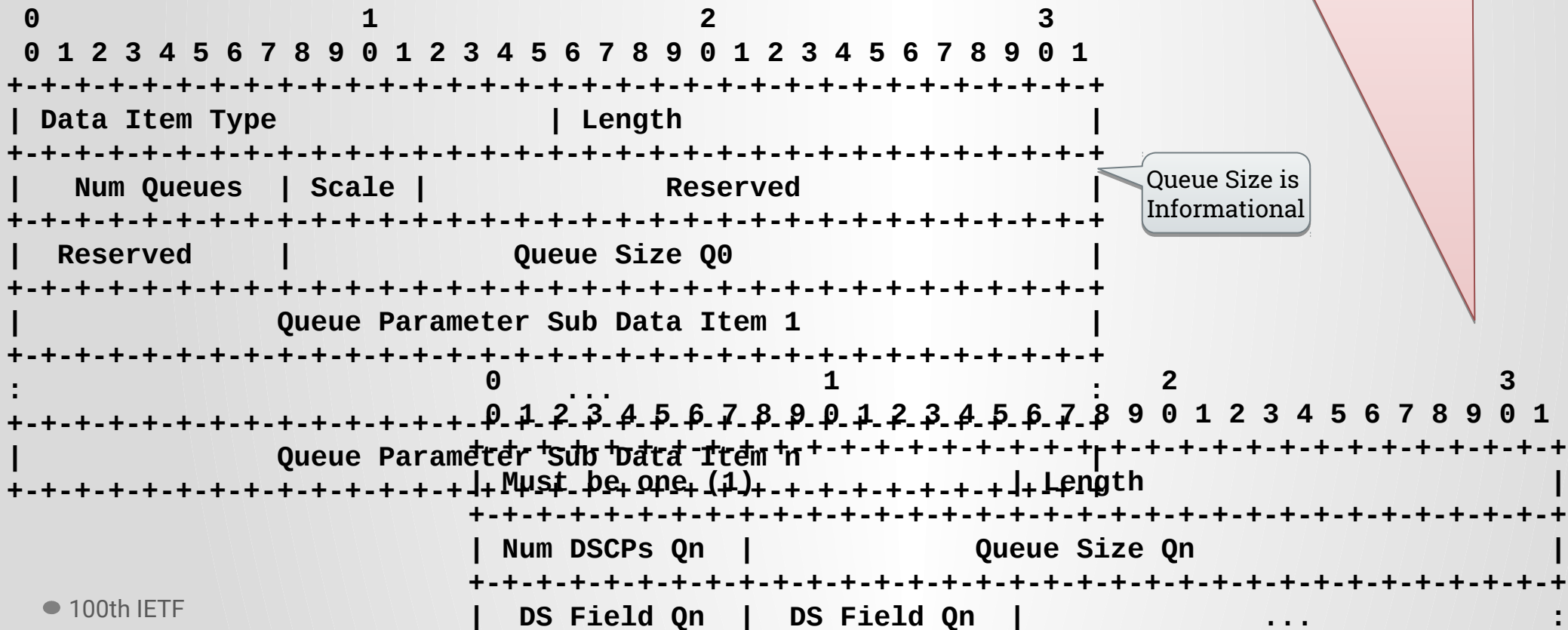


Extension

- draft-ietf-manet-dlep-pause-extension-02
- A simple ***control plane*** based flow control mechanism
 - Modem can send DLEP messages to *pause* and *restart* traffic on a *per-session* basis
 - Useful when a simple control plane “xon/xoff” capability is good enough
 - May be DSCP specific
 - Somewhat equivalent to Ethernet PFC, but without requiring use of C-Tags (VLANs)
- Lots of feedback at IETF 98
 - Led to draft-ietf-manet-dlep-pause-extension-01 changes
 - Introduced Sub Data Item encoding
 - Based on Rick Taylor’s idea
 - Encoding is changed, function is the same
 - Published before IETF 99

Pause Extension New Encoding

- 1 new Extension Type
 - *Control Plane Pause*
- 3 new Data Item Values
 - Queue Parameters



New:

- Sub-Item encoding of {Queue, DSCP list} seems "complex"

Queue Size is Informational

Discussion

- Some recent discussion on list

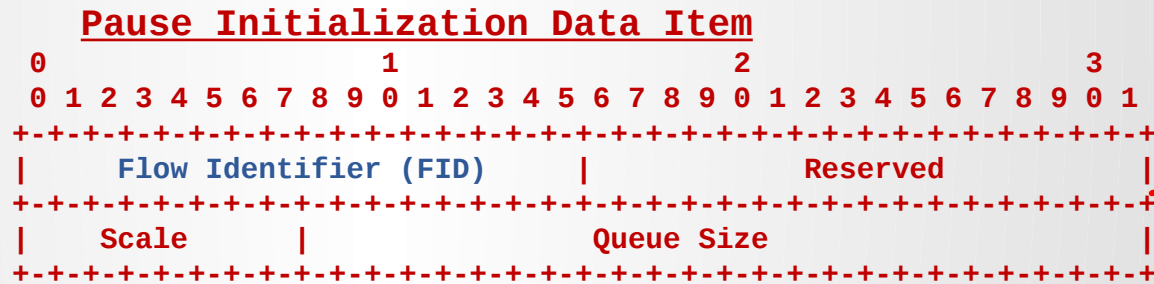
1. Do we need both Pause and Credit?

- Different use cases: simple vs complex
- Credit also enables more sophisticated router behaviors

2. Should we unify traffic and queue identification between credit and pause?

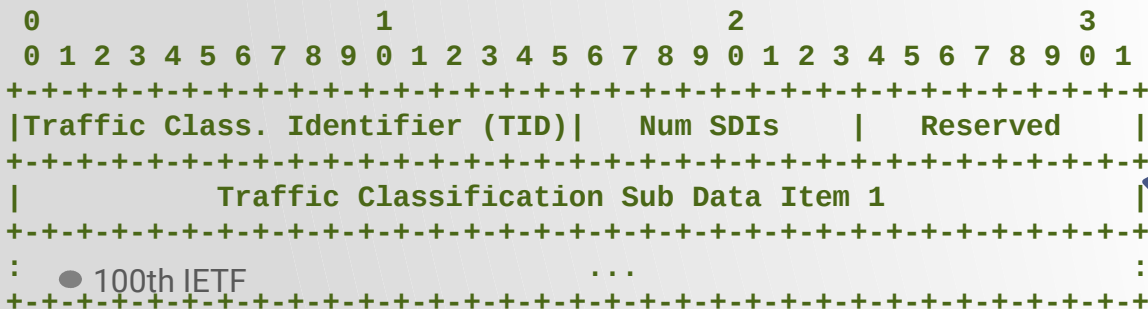
- Notional formats:

Common

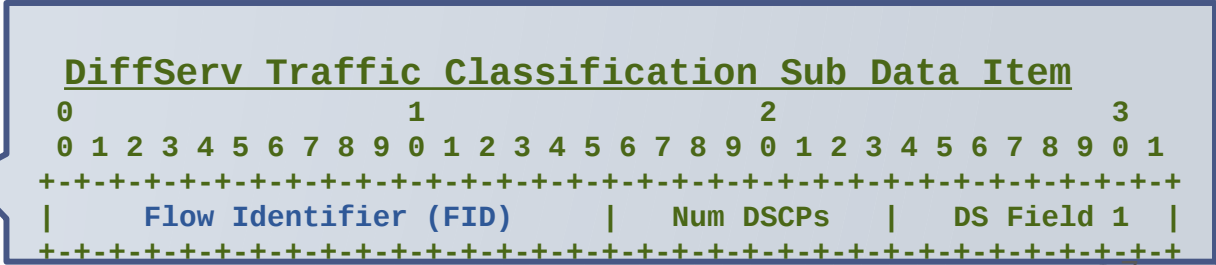


Pause Specific

Traffic Classification Data Item



• 100th IETF



Pause Extension Next Steps

- Resolve open discussions
- LC

DiffServ Aware Credit Windowing Extension

- draft-ietf-manet-dlep-da-credit-extension-02
- A **DiffServ** aware credit-windowing scheme
 - More sophisticated flow control, for a wide range of applications
 - Flow control in one direction router ⇐ modem
- 00 ⇐ 01
 - Clarified data *cannot* be sent when credit window is empty
 - Added Appendix A: Open and Resolved Issues
 - <https://tools.ietf.org/html/draft-ietf-manet-dlep-da-credit-extension-01#appendix-A>
- 01 ⇐ 02
 - Major change in encoding and semantics
 - Credit window control is separated from traffic flow identification
 - Arbitrary credit window sharing is now supported

Credit Windowing Mechanisms

- 1 new Extension Type – *DiffServ Aware Credit Windowing*
- 2 new Messages
 - Credit Control and Credit Control Response
 - Modem ⇆ Router – credit increment
 - Router ⇆ Modem – status response, credit request
- 6 new Data Items
 - Credit Window Initialization – CID: identifies a credit window, set initial size
 - Credit Window Traffic Classification – TID: identifies a map of DSCP ⇆ CIDs
 - Credit Window Association – Per destination, identification TID usage
 - Credit Window Grant
 - Credit Window Status
 - Credit Request

Information Relationship

Traffic Classification

- MAC+DSCP \Rightarrow CID (FID)

Destination Up/Update Message

MAC Address Data Item

```

+-----+
|          MAC Address          :
+-----+
: MAC Address : (if EUI-64 used) |
+-----+
| Data Item Type | Length (2) |
+-----+
|Traffic Class Identifier (TID)|
+-----+
  
```

Credit Window

- CID (FID) \Rightarrow Credit Window

Session Initialization Response/Update Message

Traffic Classification Data Item

```

+-----+
| Flow Identifier (FID) | Num SDIs | Reserved |
+-----+
| Traffic Classification Sub Data Item 1 |
+-----+
:
+-----+
| Traffic Classification Sub Data Item n |
+-----+
|Traffic Class. Identifier (TID)| Num SDIs | Reserved |
+-----+
| Traffic Classification Sub Data Item 1 |
+-----+
:
+-----+
|DiffServ Traffic Classification Sub Data Item|
+-----+
| Flow Identifier (FID) | Num DSCPs | DS Field 1 |
+-----+
| DS Field 2 | ... | DS Field n |
+-----+
  
```

Credit Window Maintenance

- Credit Grants
 - Destination Up, Destination Announce Response, Destination Update Messages
 - But not destination specific
 - Credit Control Messages, and Credit Control Response Messages
- Credit Status
 - Destination Up Response Message or Credit Control Response Messages
- Credit Window Request
 - Credit Control Messages

Credit Window Grant Data Item

```
+-----+
| Credit Window Identifier (CID)|           Reserved           |
+-----+-----+
|                               Additional Credits              :
+-----+-----+
:                               Additional Credits              |
+-----+
```

Credit Window Status Data Item

```
+-----+
| Credit Window Identifier (CID)|           Reserved           |
+-----+-----+
|                               Credit Window Size              :
+-----+-----+
:                               Credit Window Size              |
+-----+
```

Credit Window Request Data Item

```
+-----+
```

Issue: Supporting Router Limits

- Routers may have limits, and there is no way for such to be reported to modems
 1. Routers may support fewer credit windows than a modem
 2. Routers may not support per destination credit windows, i.e., only support DSCP based credit windows
- Other error cases are possible too
 3. Most are handled as typical for DLEP \Rightarrow session termination
- Some options for discussion
 - For {1, 2} – router provides capabilities during session establishment
 - For 3 – Error in Credit Control message, or just log
 - ??? – any other ideas?

Next Steps

- Update as discussed
- Resolve open issues