Generic Delivery Functions

draft-zzhang-intarea-generic-delivery-functions

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Observation & Proposal

• Some IP Functions can be viewed as independent of IP
  • Fragmentation/reassembly
  • ESP/AH
  • In-Situ OAM?

• What if we extract them out and apply to any layer?
  • IP, MPLS, BIER, Ethernet
  • “Generic Delivery Functions”
    • Between two points at a L2/L2.5/L3/whatever layer
      • Two Ethernet nodes
      • LSP ingress/egress
      • BIER ingress/egress
      • IP source/destination nodes
        • For future GDFs that are applicable to both IP and other layers
GDFH

| 0 0 0 0 | resvd | Header Len | This Header | Next Header |

Variable field per “this header type”

Generic Delivery Function Header

- “This header” uses its own number space – for different GDFs
- “Next header” comes from “IP Protocol” number space
  - It could point to another GDFH
- Outer header indicates that a GDFH follows
  - MPLS label, BIER proto field, IP “next header”, EtherType
- In case of MPLS:
  - 0000 nibble prevents it from being mistaken as IP header
  - Currently the GDFH indicator label is a signaled regular label
  - A special label may be warranted if the GDF concept is accepted
Generic Fragmentation Header

<table>
<thead>
<tr>
<th>0 0 0 0</th>
<th>reserved</th>
<th>Header Len</th>
<th>Frag hdr type</th>
<th>Next Header</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fragment Offset</td>
<td>R</td>
<td>S</td>
</tr>
<tr>
<td>---------</td>
<td>----------</td>
<td>------------------</td>
<td>----</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>Identification (optional/variable)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# IOAM (implemented as GDF)

```
| 0 0 0 0| resvd | Header Len | IOAM hdr type | Next Header |
```

```
| Reserved | Block Number | IOAM-OPT-Type | IOAM HDR Length |
```

```
|   |   | O | A |
```

```
~ IOAM Option and Data Space ~ M |
```

```
|   |   |   |
```

MPLS + IOAM + GDF + PW w/ G-ACH

Two independent label stacks separated by GDFHs

Having two independent label stacks is nothing new
- A BIER header could separate transport/bier labels and payload labels
- An MPLS network on top of PWs implemented on another infrastructure

MPLS network on top of

A BIER header could
GDF and G-ACh

• GDF is for Generic Delivery Functions
  • Over different layers – MPLS is just one use-case
  • Supporting different stackable functions
  • Applicable to both user and control traffic

• G-ACh was designed for MPLS control channel purpose
  • GAL and G-ACh are not to be used for user traffic
  • G-ACh structure does not have “next” concept
What if G-Ach/GAL is allowed for user traffic?

• *Note: we’re not promoting this – this is just a “what if”*

• The first GDFH could be treated as a G-ACh “channel”
  • Just to make use of GAL in case of MPLS
  • GDFH structure would not change
    • “this header” and “next header” concept is critical for extensibility
    • Especially for non-MPLS case

• What if we extend G-ACh to provide GDF?
  • Keeping old name does not make sense
    • Not even for MPLS
    • Let alone for BIER/Ethernet/other layers
  • Developing GDFH is a better option and it is not re-inventing wheels