RPL adaptation for asymmetrical links

IETF 82 status

`draft-thubert-roll-asymlink`

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draft Status

- -00 published in October.
- Expects Bi-directionality but not metrics symmetry
- Based on early discussions in the mailing list
  - PLC
  - Radios
- Triggered by the industrial applicability work
  - Cascading from PCE-computed DAG to classical RPL DAG.

Operations

- Associates 2 RPL instances (DAGs), “up” and “down”
  - Both use bidirectional links
  - “upwards” DAG optimized for metrics up
  - “downwards” DAG optimized for metrics down

- Packets can jump from “upwards” to “downwards”
  - Default routing initially occurs along “upwards” DAG,
  - Longer match looked up on “downwards” DAG at each hop
  - If found, the packet continues on the “downwards” DAG

- More cascading is allowed
  - E.g. into a default spanning DAG

DODAG Information Object (DIO)

```
 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
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| RPLInstanceID |Version Number |             Rank              |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|G|D| MOP | Prf |     DTSN      |     Flags     |   Reserved    |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                                                               |
+                                                               +
|                                                               |
+                            DODAGID                            +
|                                                               |
+                                                               +
|                                                               |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|   Option(s)...
+-+-+-+-+-+-+-+-+
```

D flag and MOP relationship

- Directional (D):
  - The Directional (D) flag is set to indicate that the instance is intended for directional operation, and reset otherwise.

- When ‘D’ is set,
  - A MOP of 0 indicates the upwards direction
  - All other values of MOP will be considered downwards unless explicitly specified otherwise.

Enough need / interest to progress this work

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