LDP extensions for Explicit Pseudowire to transport LSP mapping
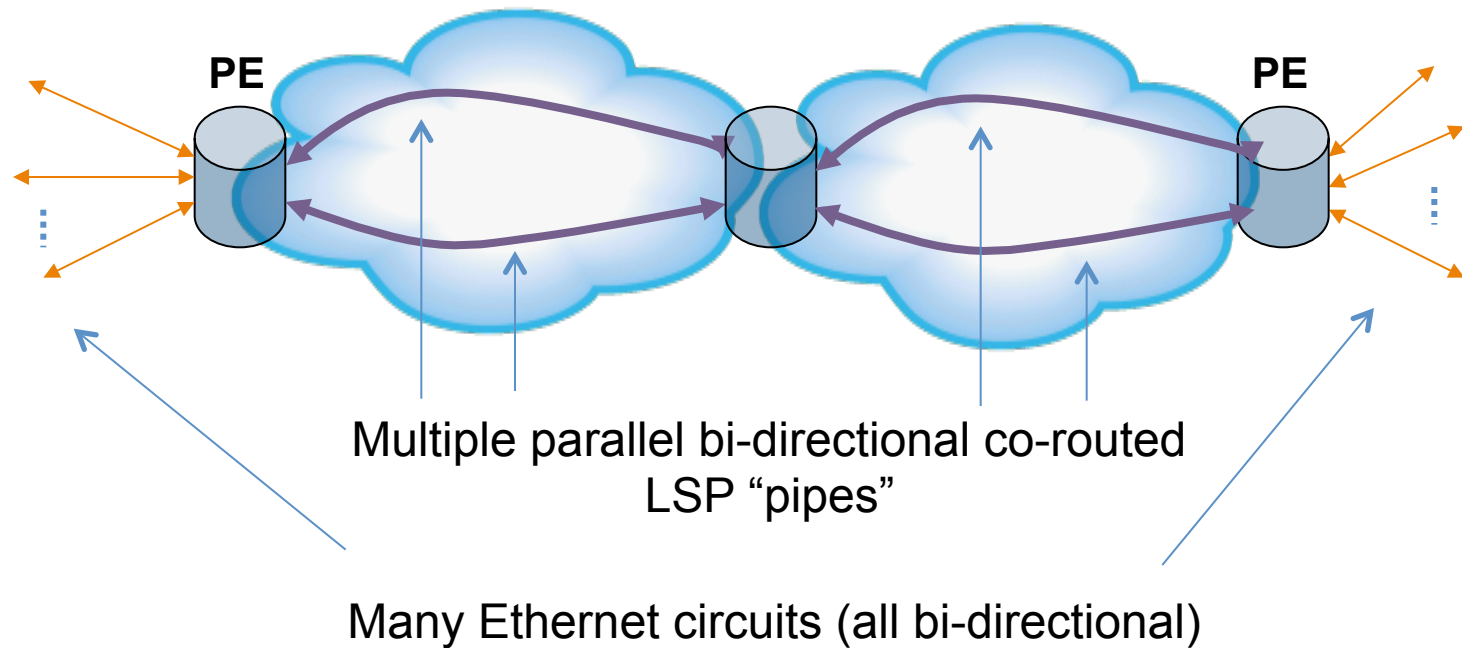
draft-cao-pwe3-mpls-tp-pw-over-bidir-lsp-05.txt

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Application and Motivation

Multiple parallel bi-directional co-routed LSP "pipes"
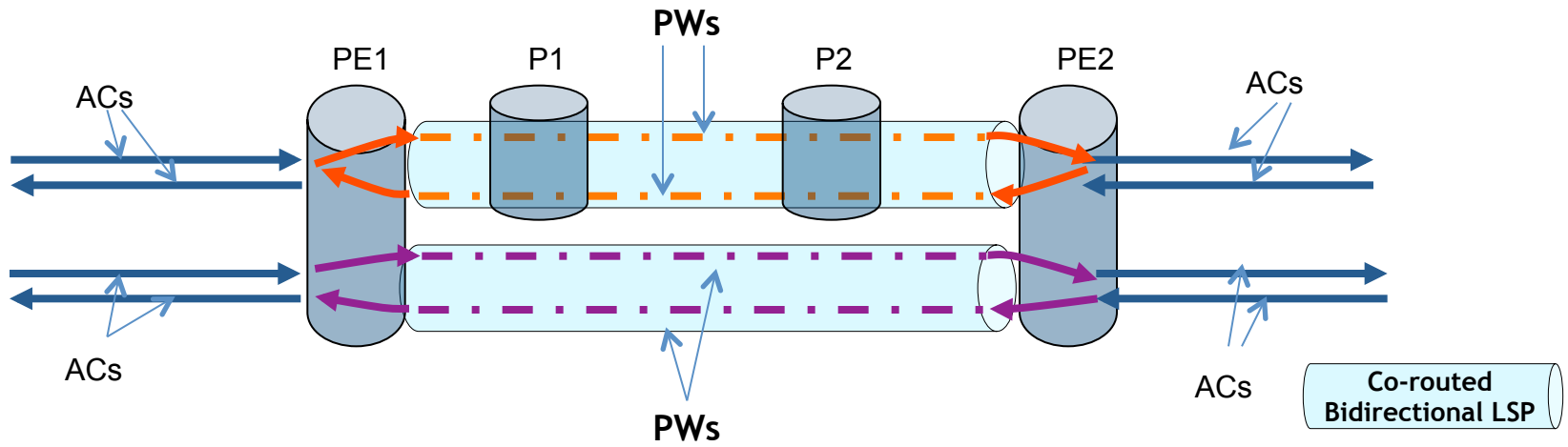
Many Ethernet circuits (all bi-directional)

It's desirable to aggregate user circuits into the same "pipes"

- Easy to manage (e.g. protection)
- Predictable service qualities (e.g. delay)
- Can deliver over multiple transport domains

Problems

- Essentially, this is a PW-LSP binding problem
  - PW's (fwd + reverse) → bi-dir co-routed LSP's
  - Be able to support MS PW's (a.k.a. FEC129)

- Issues today:
  - PEs select and bind PW's to uni-directional LSP's locally
  - → Difficult to manage for bi-directional LSP binding (especially, over multiple segments)

Solution Overview (Single-Hop)
(Strict Mode)

Setup Forward PW using PSN1;
Make sure Reverse PW using PSN 1

OK

or, NO!   Don't want to use PSN1

PE1   P1   P2   PE2

ACs   *Forward PW*   ACs

PSN 1

Reverse PW

ACs   **PSN 2**   ACs
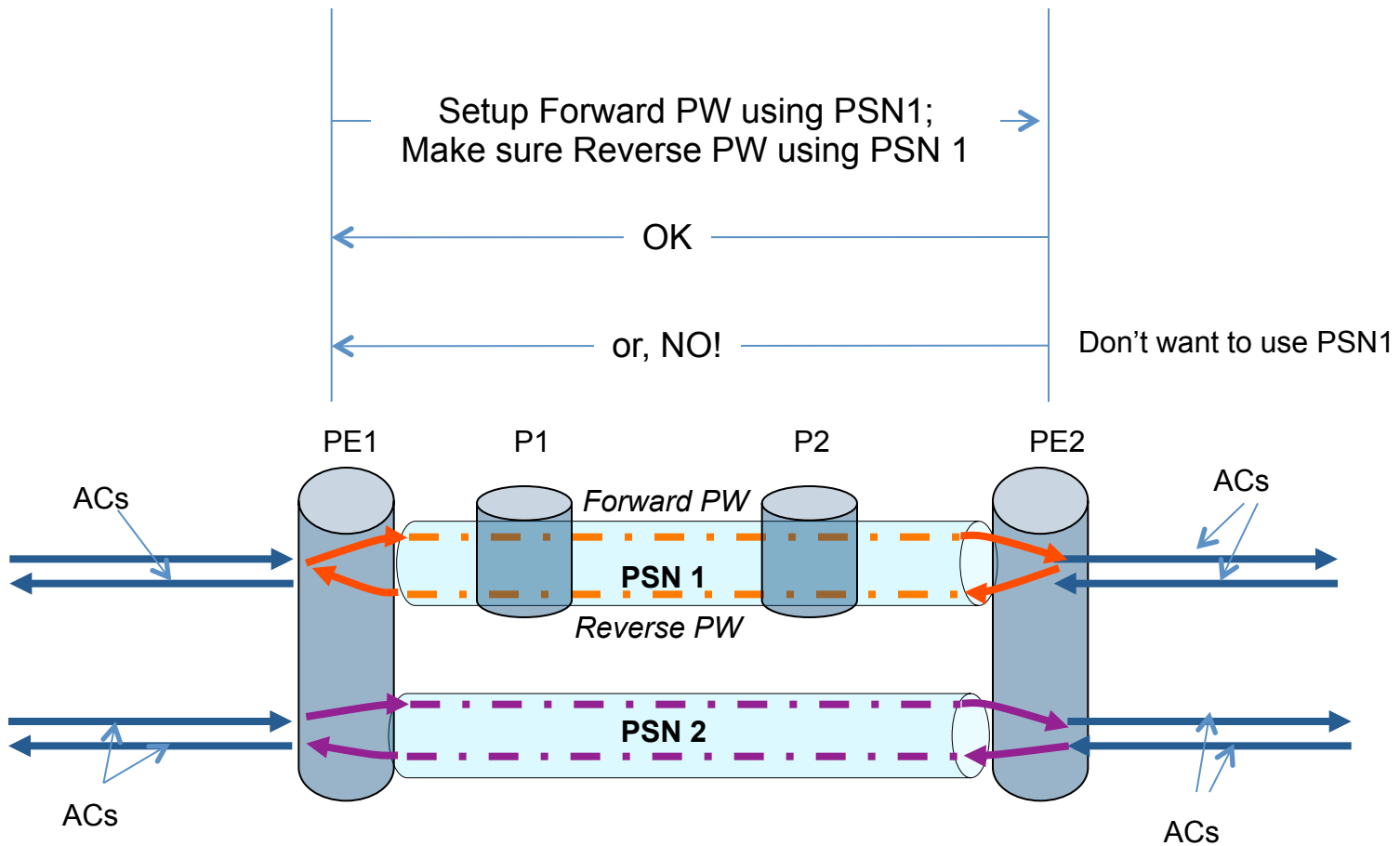
Solution Overview (Single-Hop)
(Congruent Mode)

Setup Forward PW using PSN1;
Make sure Reverse PW using a PSN
with the same route as PSN1

Hmm… OK, how about PSN2?

PE1

PE2

ACs

ACs

Forward PW

PSN 1

Reverse PW

PSN 2

ACs

ACs
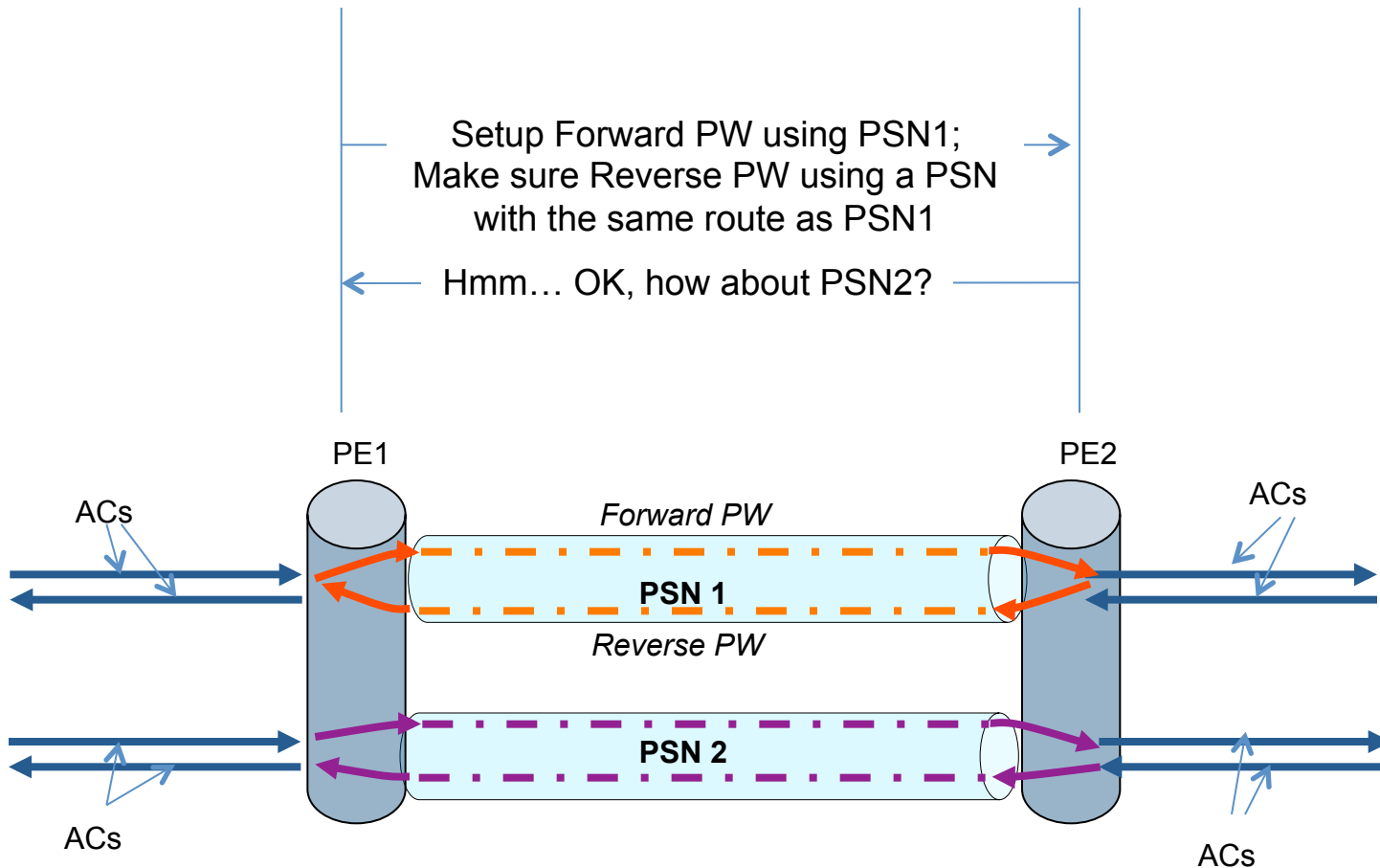
Solution Overview (Multi-Segment)
(Strict Mode)

(1)
Setup Fwd PW1 using PSN1;
Reverse PW1 needs to be PSN 1

(2)
Setup Fwd PW2 using PSN3;
Reverse PW2 needs to be PSN 3

(4) OK

(3) OK

PE1

PE2

PE3

ACs

ACs

Fwd PW1

Fwd PW2

PSN 1

PSN 3

Reverse PW1

Reverse PW2

PSN 2

PSN 4

ACs

ACs
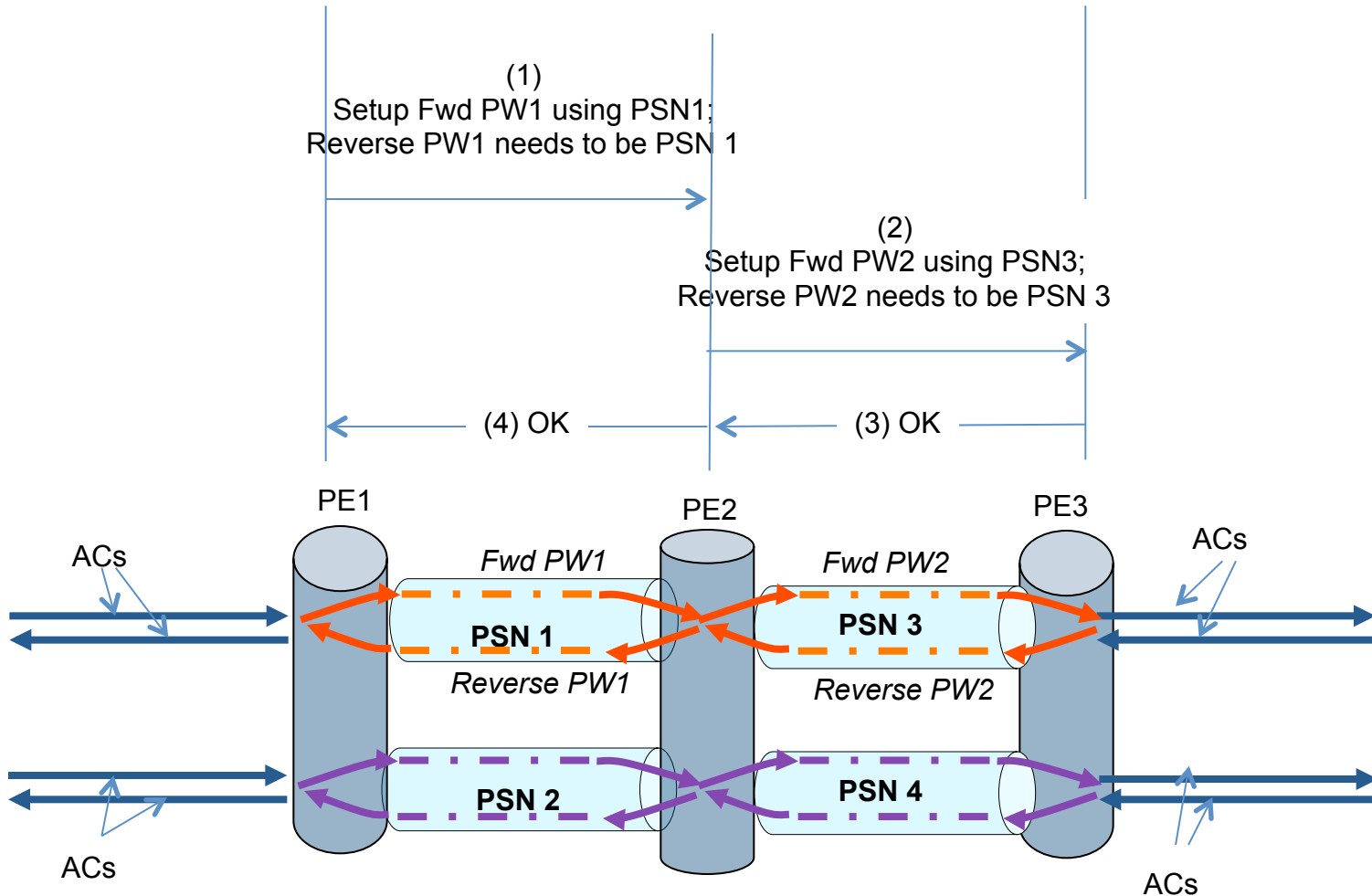
Protocol Extension

- PSN Tunnel Binding TLV (optional)

```
 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
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|1|1| PSN Tunnel Binding (TBA)   |             Length            |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|              Flag             |            Reserved            |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
~                      PSN Tunnel Sub-TLV                        ~
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```
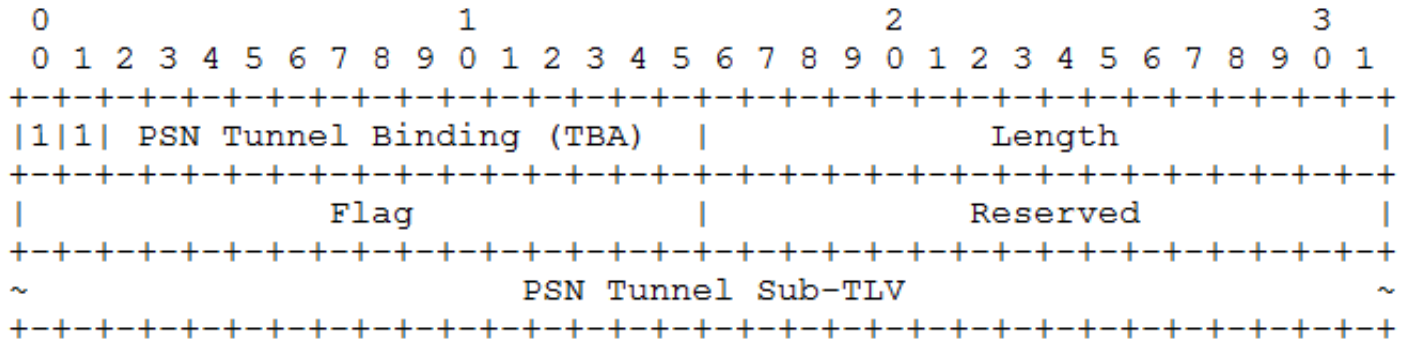
- IPv4 PSN Tunnel sub-TLV format

```
 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
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|0|0| IPv4 PSN Tunnel sub-TLV    |          TLV Length           |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                        Source Global ID                       |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                         Source Node ID                        |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|      Source Tunnel Number     |  Source LSP Number (optional) |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                      Destination Global ID                    |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                      Destination Node ID                      |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|   Destination Tunnel Number   | Destination LSP Number (opt.) |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```
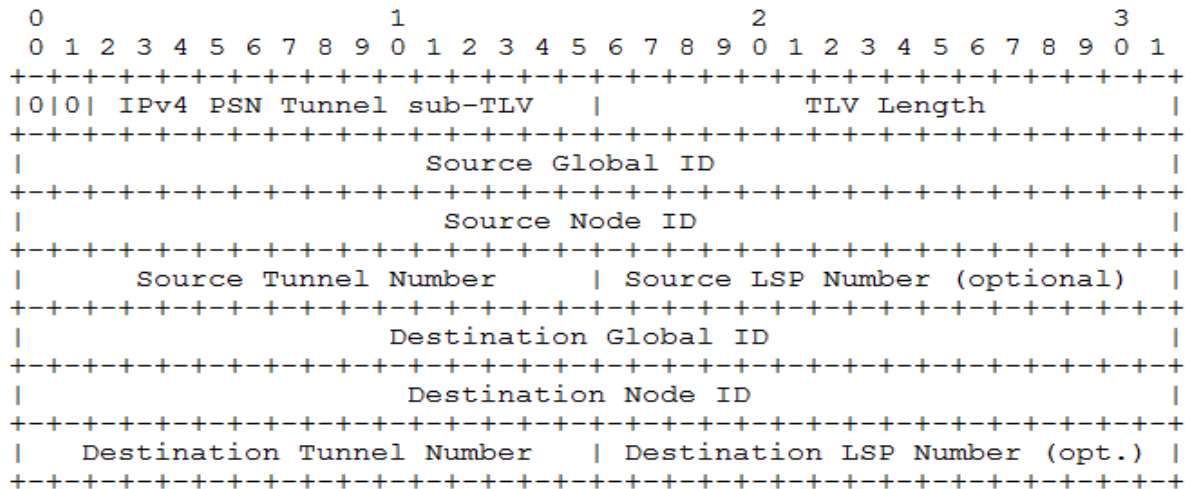
Changes since last version

- Rewrite the Abstract and Introduction sections to make the motivation and requirement clearer

- Some editorial changes

Key Comments from the list

- Suggest re-work procedures to withdraw such an advertised binding

- Need more explanation on the usage of FEC 128 (for SS-PW) and FEC 129 (for SS-PW and MS-PW)

Next steps

- Resolve the received comments and re-submit new version after this meeting

- Like to request for WG document?