OTN B100G Routing Extension

draft-merge-ccamp-otn-b100g-routing-ext-00

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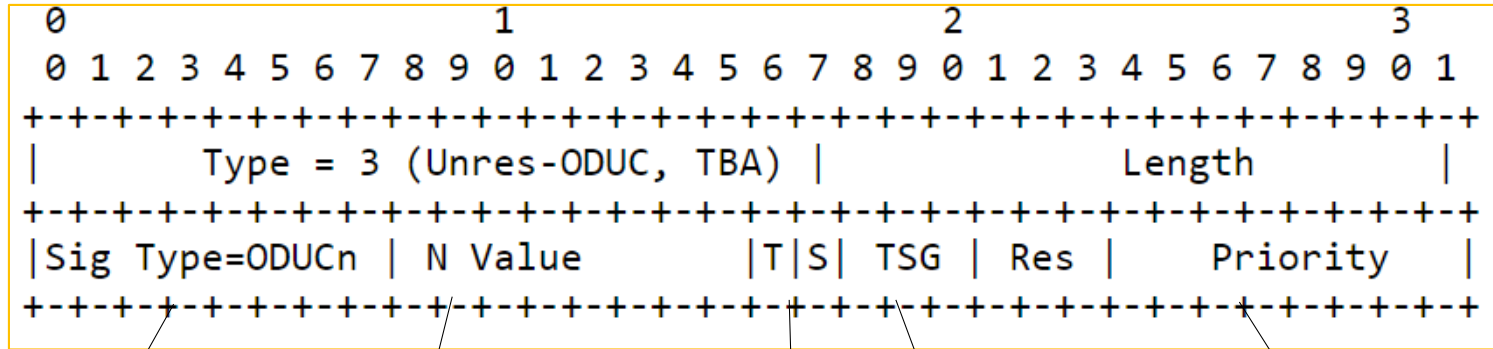
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draft-merge-ccamp-otn-b100g-routing-ext-00 (work in progress)

- This draft merges two drafts about B100G routing extension
  - Draft 1: draft-izh-ccamp-b100g-routing-01
  - Draft 2: draft-fan-ccamp-gmpls-g709v5-ospf-ext-00
- Summary of each draft is presented
- All drafts follow RFC7138
  - Extensions mainly focus on the ISCD part

Draft 1: draft-izh-ccamp-b100g-routing-01

- Two new Signal Types are introduced per G.709
  - ODUflex (IMP) & ODUflex (FlexE-aware)
- For SCSI, Type 3 Bandwidth sub-TLV for ODUCn container is defined
  - TSG field is extended with value 4 for "5 Gbps"
  - "unreserved bandwidth" field is not included
    - Not required as there is no switchable ODUCn as per G.709 and G.798

```
  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
 +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
 |       Type = 3 (Unres-ODUC, TBA) |            Length          |
 +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
 |Sig Type=ODUCn | N Value         |T|S| TSG | Res |   Priority  |
 +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

Draft 1: draft-izh-ccamp-b100g-routing-01

Bandwidth Sub-TLV – Type 3

```
 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
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|      Type = 3 (Unres-ODUC, TBA) |              Length         |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|Sig Type=ODUCn | N Value          |T|S| TSG | Res |   Priority   |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

Sig Type : MUST be set to ODUCn

N : MUST be set in 1-256 range to Indicate the value of 'n' in ODUCn

T Flag : MUST be set to 1 to indicate terminated

S Flag : MUST be set to 0 to indicate non- switchable

TSG : MUST be set to 4 [TBA] to indicate 5G

Priority: Same as in RFC 7138

ISCD – Switching and Encoding Fields

```
 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
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| SwCap=OTN_TDM | Encoding = TBA|     Reserved (all zeros)       |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|         MAX LSP Bandwidth at priority 0 = 100 Gpbs            +
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```
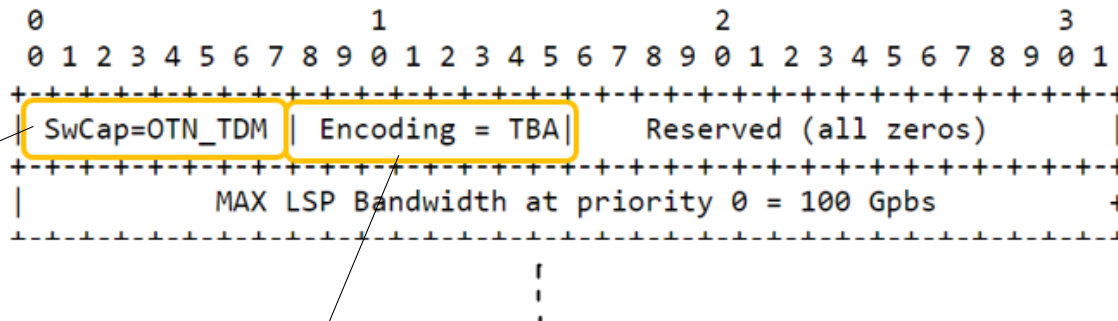
Same as RFC7138

New encoding type

Draft 2: draft-fan-ccamp-gmpls-g709v5-ospf-ext-00

- For SCSI, extended Type 1 Bandwidth sub-TLV for ODUCn
  - TSG set to 0 for ODUCn signal type
  - Try to modify the stage field (actually no need to do this)
  - Num of TS indicates the number of tributary slots that can be occupied, to differentiate OTUCn and OTUCn-M links
    - Two ends of a link can support different values of M

```
 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
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|      Type = 1 (Unres-fix)     |             Length            |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| Signal Type  | Num of stages |T|S| TSG | Res |    Priority   |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
~    Stage#1    |      ...      |    Stage#N    |    Padding     ~
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|  Unreserved ODUCn at Prio 0   |             ......            |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|  Unreserved ODUCn at Prio 7   |      Unreserved Padding       |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|      n       |   Reserved    |          Num of TS            |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

Merged Draft (work in progress)

- For the SCSI, defined Type 3 Bandwidth sub-TLV for ODUCn container
    - Extend TSG with value 4 for "5 Gbps"
    - P flag indicates whether ODUCn is mapped to OTUCn-M link where some tributary slots are marked as unavailable
    - Bit Map field indicates the exact locations of unavailable TS
        - Advertise the node capability to the other end

```
 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
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|      Type = 3 (Unres-ODUCn)       |             Length        |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|  Signal Type  |        n          |Res| TSG |P|Res|   Priority   |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|  Unreserved ODUCn at Prio 0    |           ......            |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|  Unreserved ODUCn at Prio 7    |     Unreserved Padding       |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
~      Bit Map for Unavailable TS      |       Padding        ~
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

Difference of Proposed ISCDs

Draft 1	Draft 2	Merged Draft
New LSP Encoding Type for ODUCn	Not mentioned	LSP Encoding Type = ODUCn
Define Type 3 Bandwidth sub-TLV	Extend Type 1 Bandwidth sub-TLV	Define Type 3 Bandwidth sub-TLV
Extend TSG with "4 – 5 Gbps only"	Set TSG to "0 – Ignored"	Extend TSG with "4 – 5 Gbps only"
Not include "unreserved bandwidth" field as ODUCn is non-switchable	"unreserved bandwidth" field is advertised for ODUCn connection setup	"unreserved bandwidth" field is advertised for ODUCn connection setup
Unavailable TS is not included	Number of available TS	Bitmap for exact locations of unavailable TS

Next Step

- Discuss and revise the merged draft
- Any comments are welcome

References

- RFC 7138
- https://datatracker.ietf.org/meeting/98/materials/slides-98-ccamp-10-gmpls-framework-signaling-and-routing-extensions-for-the-control-of-b100g-otucnoducn-network

Thank you!