draft-anand-spring-poi-sr-01

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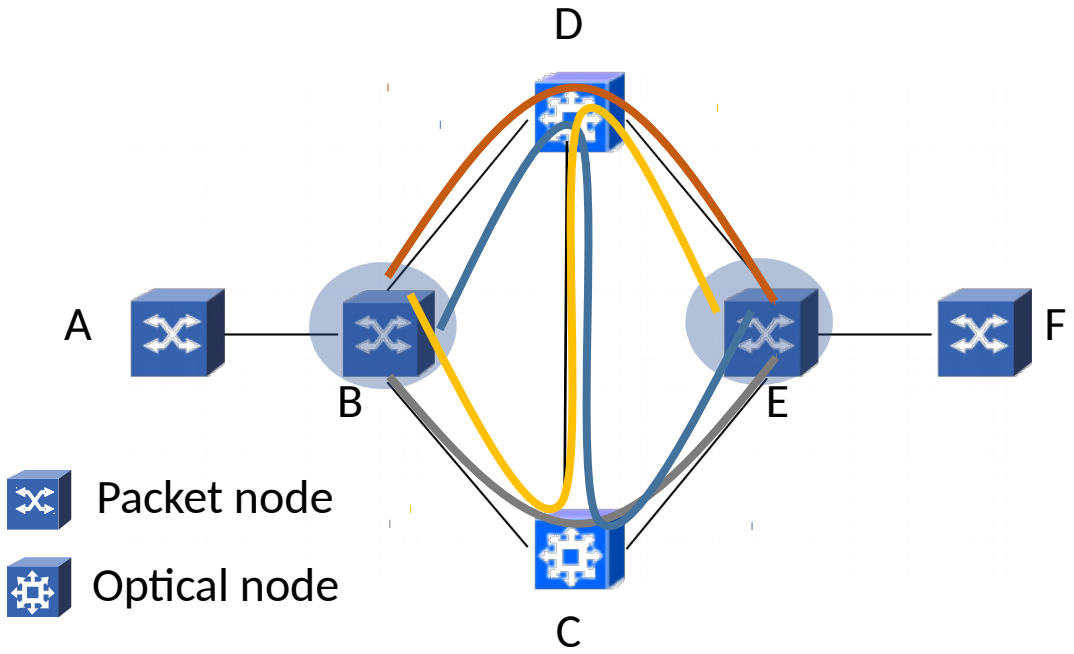
Recap - 00



- In the packet network, node B is one hop away from node E
- Packet Optical Gateways (POGs) B and E may advertise 4 optical paths with different optical characteristics as transport segments into the packet domain
  1. O1 (B, D, E)
  2. O2 (B, C, E)
  3. O3 (B, D, C, E)
  4. O4 (B, C, D, E)
- The Packet PCE can include these transport segments O1, O2, O3, O4 in specifying paths for reaching F from A based on service needs and including them in the appropriate segment lists
- Transport segment is an opaque abstraction of the optical plane and leaves the definition of the optical path (O1/O2/O3/O4) to the optical control plane;

Changes since -00

- Transport segments now follow PCEP extensions similar to the ones in draft-sivabalan-pce-segment-routing-03 for SR-TE paths instead of opaque adjacency SIDs (as proposed in -00 draft)

- Proposed modifications to PCEP:
  - New PCEP TLV -- TRANSPORT-SR-PCE-CAPABILITY to announce a POG
  - New PCEP TLV - TRANSPORT-SEGMENT-BINDING-TLV to carry Transport Segments

Mechanism for Packet-Optical Integration using SR/PCEP

1. Underlay topology is discovered using standard protocols (e.g., IGPs) and mechanisms for both packet and optical domains:
   - Labels for internal nodes are distributed
   - Customer Subnets are learned at the edge routers and distributed

2. Packet-Optical Gateway (POG) announce themselves with a new PCEP TLV - TRANSPORT-SR-PCE-CAPABILITY (Extension Proposal)

3. POGs announce optical transport segments as binding SIDs with a new type TRANSPORT-SEGMENT-BINDING-TLV in order to report the binding label/SID associated with the transport segment (Extension Proposal)
   - This TLV is also enhanced to carry the optical characteristics of the transport segment through the subTLVs.

Mechanism for Packet-Optical Integration using SR/PCEP

4. Map incoming binding label/TRANSPORT-SEGMENT-BINDING-TLV on the packet side to appropriate forwarding action on the optical side and program the forwarding plane

5. Communicate Binding-SID/TRANSPORT-SEGMENT-BINDING-TLV to the Controller or PCE using PCEP-LS (Extension Proposal)

6. Controller/PCE then uses the appropriate transport segment in an end-to-end path for a given service

Extensions to SR/PCEP

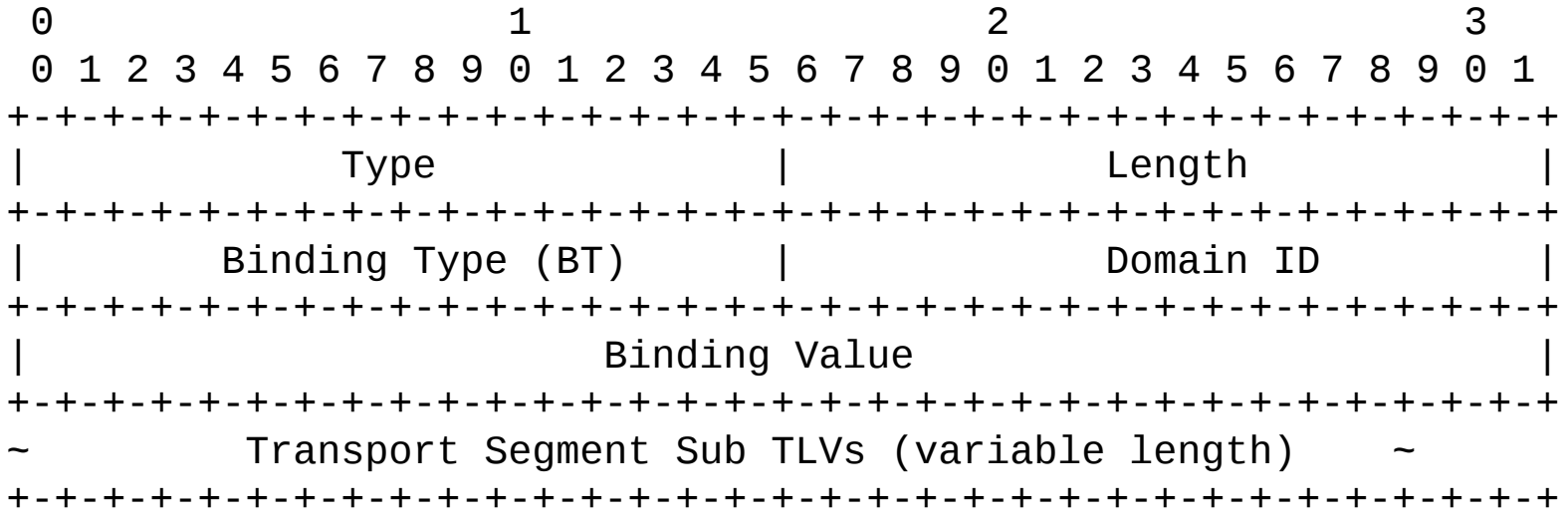
- **To declare a POG**, a new PCEP type is defined (extensions to draft-sivabalan-pce-segment-routing)

Value	Meaning	Reference
27	TRANSPORT-SR-PCE-CAPABILITY	This draft

- This is an optional TLV associated with the OPEN Object to exchange the capability of the PCEP speakers. It follows the same format as in the draft for SR-PCE-CAPABILITY

Extensions to SR/PCEP

- **To signal a Transport Segment**, the encoding is very similar to TE-PATH-BINDING TLV as defined in draft-sivabalan-pce-binding-label-sid-01
- TRANSPORT-SEGMENT-BINDING-TLV has the following format:



Type: TBD, suggested value 32;
Length: variable
Binding Type: as defined in draft-sivabalan-pce-binding-label-sid
Domain ID is the identifier for the transport domain
Binding Value is the transport segment label
Transport Segment Sub TLVs:TBD

Non-PCEP extensions

- For non-PCEP environments, the Transport Segment constructs are included in OSPFv2, OSPFv3, ISIS and BGP-LS as suggested in the current draft
- POG announcements follow Protocol specific encodings
- Transport Segments follow a similar structure – the encoding of the Transport Segment is identical across all protocols along the lines of ERO definition

Next Steps

- Get consensus on the approach and encodings
- WG Adoption
- Work with individual WGs to adopt the proposed changes

Backup

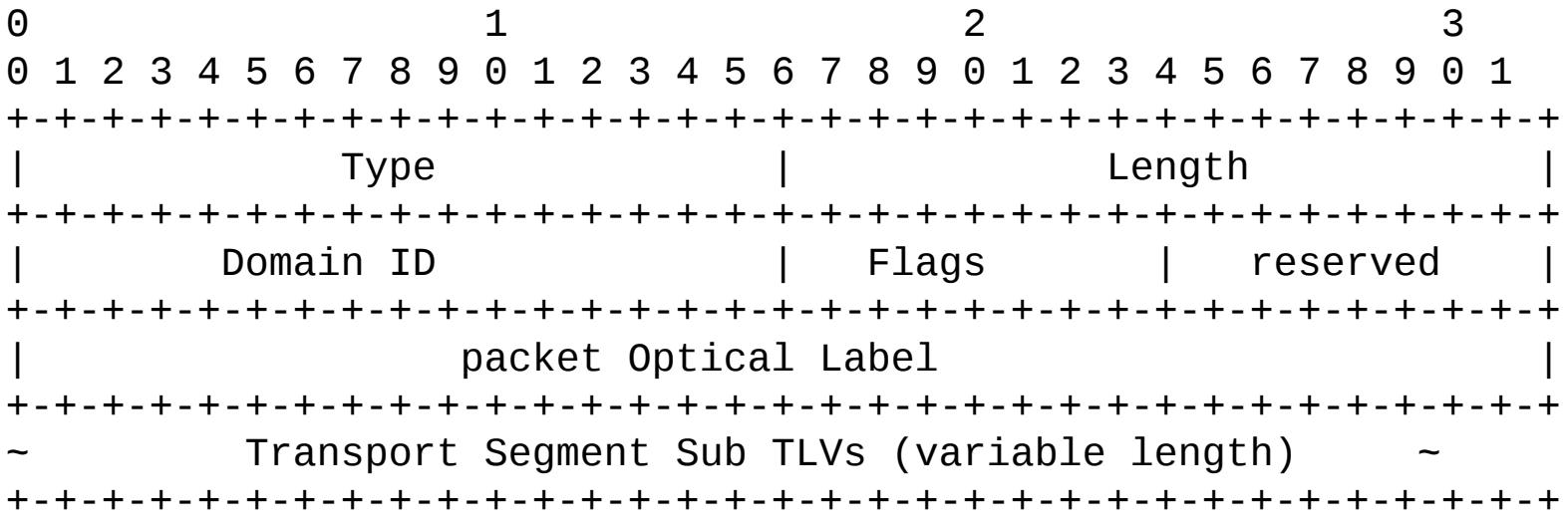
OSPF Extensions

To declare a POG

- Introduce an informational bit in the Router Capabilities TLV (RFC 7770)

To signal a Transport Segment

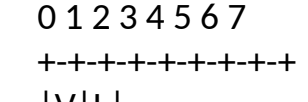
- Introduce a new sub-TLV (similar to ERO sub-TLV) of the SID/label binding sub-TLV (TRANSPORT-SEGMENT-BINDING-SUBTLV) to carry the Transport Segment Label



Flags: 1 octet field:

V - Value flag. If set, then the optical label carries a value. By default the flag is SET.

L - Local. Local Flag. If set, then the value/index carried by the Adj-SID has local significance. By default the flag is SET.



Packet-Optical Label : according to the V and L flags, it contains either:

- A 3 octet local label where the 20 rightmost bits are used for encoding the label value. In this case the V and L flags MUST be set.
- A 4 octet index defining the offset in the label space advertised by this router. In this case V and L flags MUST be unset.

Responses to comments on -00

- Are the optical paths pre-provisioned or dynamic? Pre-provisioned
- What information would the PCE use of this new information? Would be coded in Transport Segment sub-TLVs (looking at draft-ppsenak-ospf-te-link-attr-reuse for potential use)
- L2 bundles – draft-ginsberg-isis-l2bundles-00 - this draft may not be relevant;
- To represent optical links as IP interfaces – this will increase the number of links in the topology
- Suggestion to use PCEP – this is incorporated in the draft
- The reason this is flooded throughout the IGP is to address non-PCE and non-controller environments