



IETF101

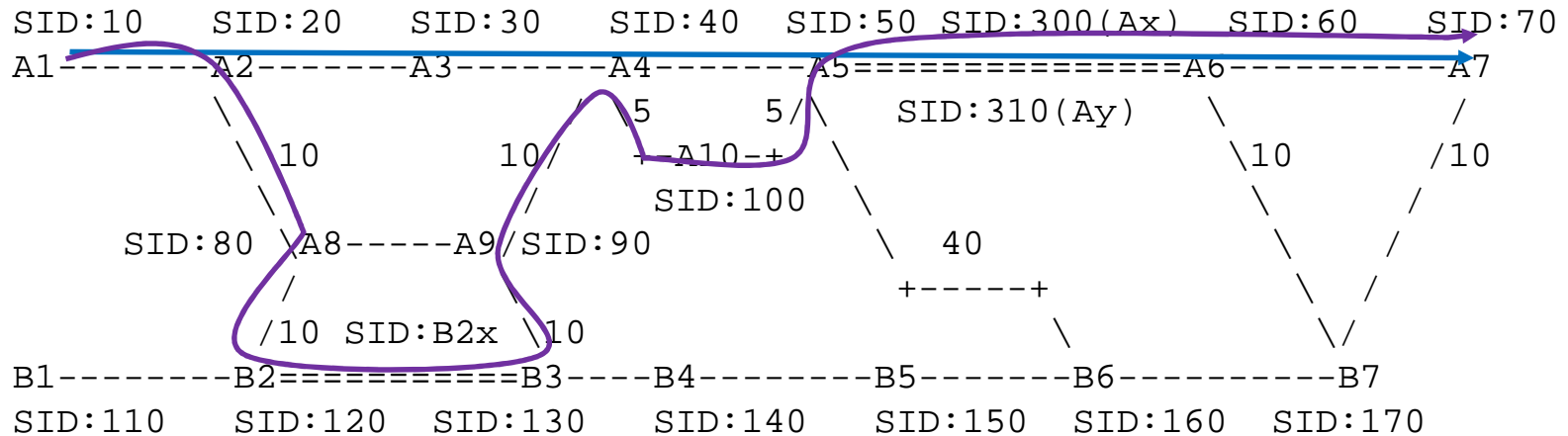
Usage of Non Shortest Path Forwarding (NSPF) Ids in IGPs

[draft-ct-isis-nspf-id-for-sr-paths-00](#)
[draft-ct-ospf-nspf-id-for-sr-paths-00](#)

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SR Network



SR Non Shortest Path:

- All nodes: A1 to A7 and B1 to B7 (In the above Picture uses SR-MPLS)
- Shortest Path from A1 to A7: A2-A3-A4-A5-A6-A7 (→)
- SR-PATH-1 (**NSP**): From A1 to A7 - A2-A8-B2-B2x-A9-A10-Ax-A7(→)
- The above SR path uses both node and adjacency SIDS a stack of 8 labels.

- This number can be higher based on MSD Capabilities of intermediate nodes and ELI/EL pair
- If this were to use for IPv6 data plane – RFC8200 IPv6 Encap. + SRH with 8 SRv6 SIDs

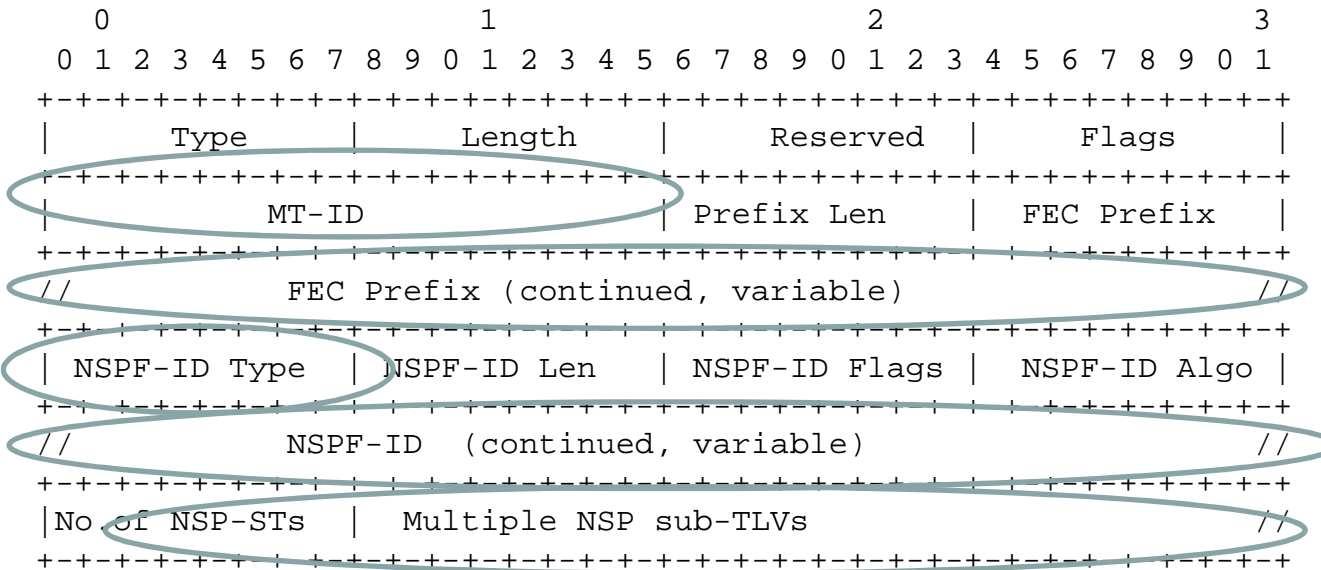


Deployment Scenarios & Issues

Issues:

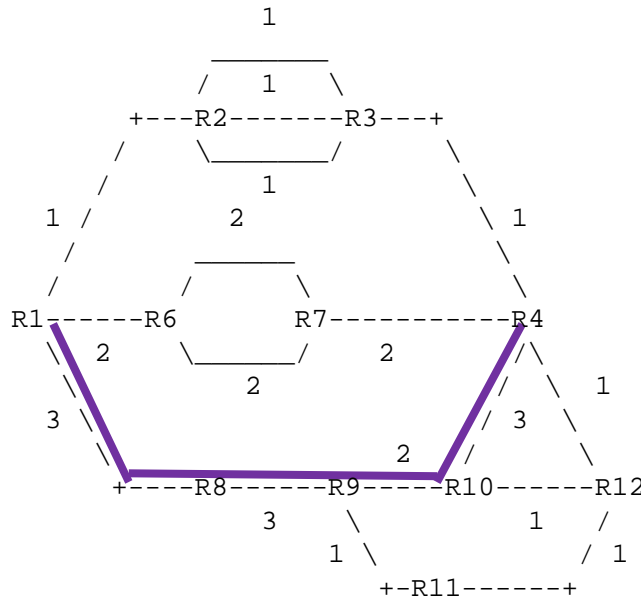
- Potential MTU/Fragmentation issues with large SID stack (SR-MPLS, SRH)
- Hardware capabilities/performance Related
 - MSD only helps to mitigate, if there is an alternate NSP, which meets the operator requirements
- NW/Path overhead relative to actual application data (this is critical in some deployments)

NSPF ID TLV (IS-IS)



- MT aware control plane prefix
- Data Plane type (e.g. MPLS, SRH, IPv6 etc..)
- Data plane identifier (NSPF-ID)
- Non Shortest Path description with set of TLVs
- Other Sub TLVs – Described in the draft (but being revisited).

Computation



- NSP: R1-R8-R9-R10-R4 for a FEC from R4
- After R9 receives the path, immediately after SPF computation it check if R9 is itself on the path
- For E.g.: @R9: Without the above NSP, for R4's FEC, R9 would have set the NH to R11, but it changes to R10.
- Same applies to all the nodes in the path (R1, R8 etc..).

In Summary:

- Change the next hop from actual shortest path NH to the NH of the immediate segment in the advertised NSP.
- Data-plane: IGP programs the received NSPF-ID to the corresponding NH calculated as above (based on the data plane type)
- All local protections/IP-FRR works as is; per new NH.



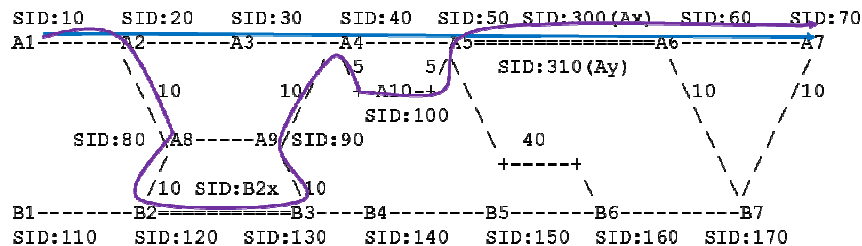
Relation To Binding SID

- Not related
 - Earlier version of SR draft has EROs
- IS-IS Binding SID advertises the SID on behalf of one or *more* nodes in the network

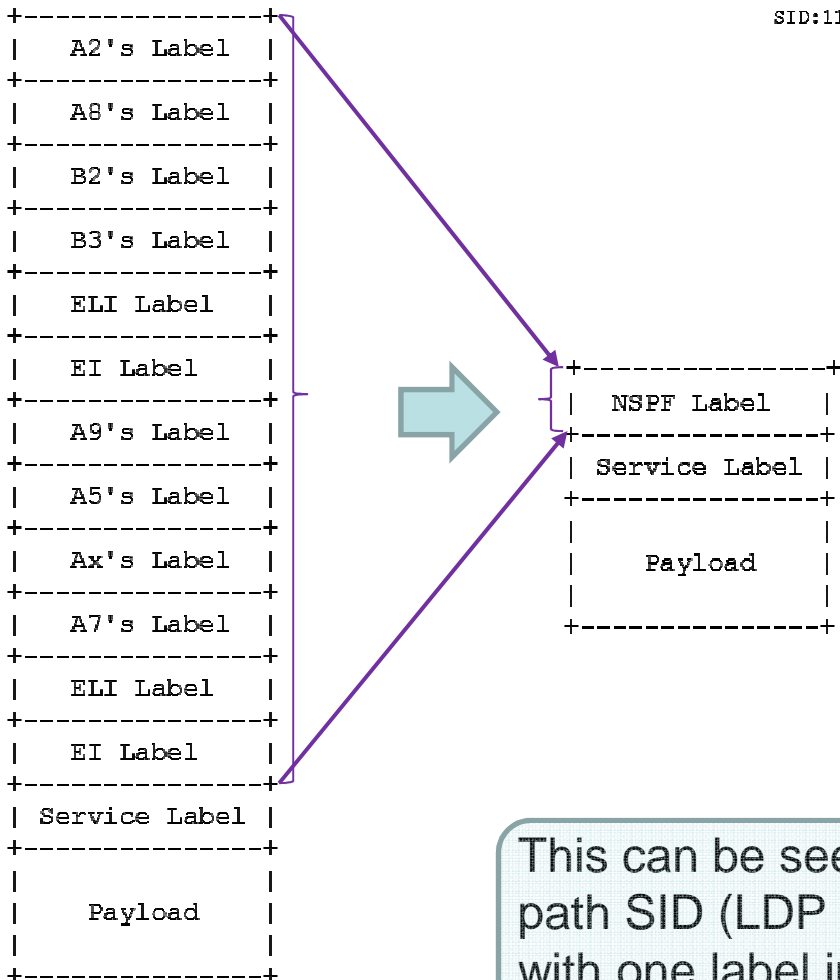
Being Updated..

- From where to advertise
 - **OPT1:** Ingress node/node where the NSP is received from (controller)
 - **OPT2:** From the node where FEC/Prefix belongs to
 - Advantages in case of anycast SIDs
- Traffic Accounting Statistics for the NSP with NSPF-ID
 - **OPT1:** Provisioning and collecting from the nodes as needed based on the operator
 - NSPF-ID representing the NSP simplifies this operation for Operators
 - **OPT2:** Dynamically enable stats for certain NSPs through optional TLVs(traffic accounting with fine granularity for some NSPs as needed automatically)

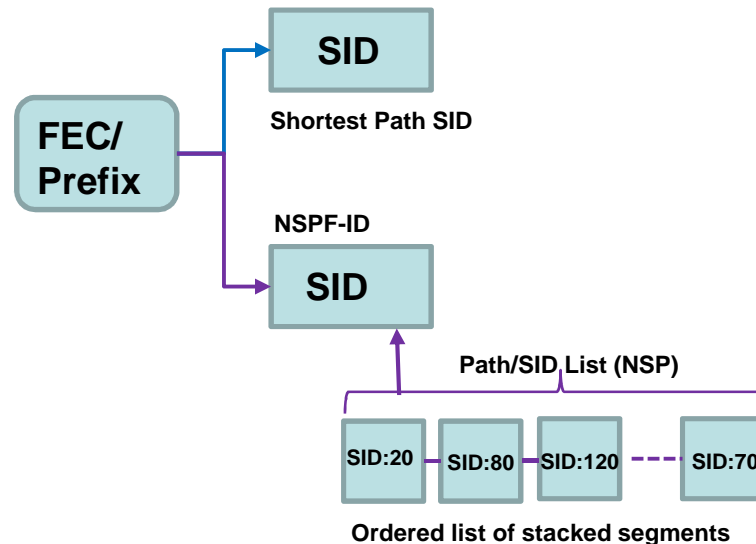
Data plane after NSPF-ID (MPLS)



8 Node NSP with RLD = 6



Summary:

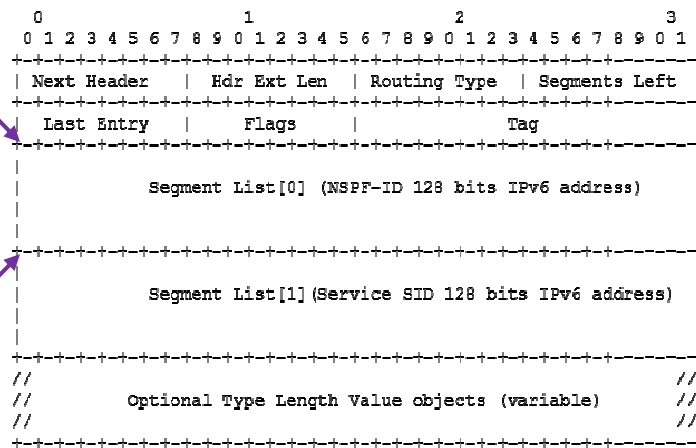
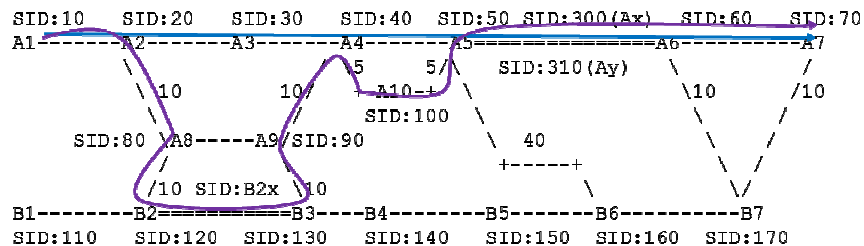
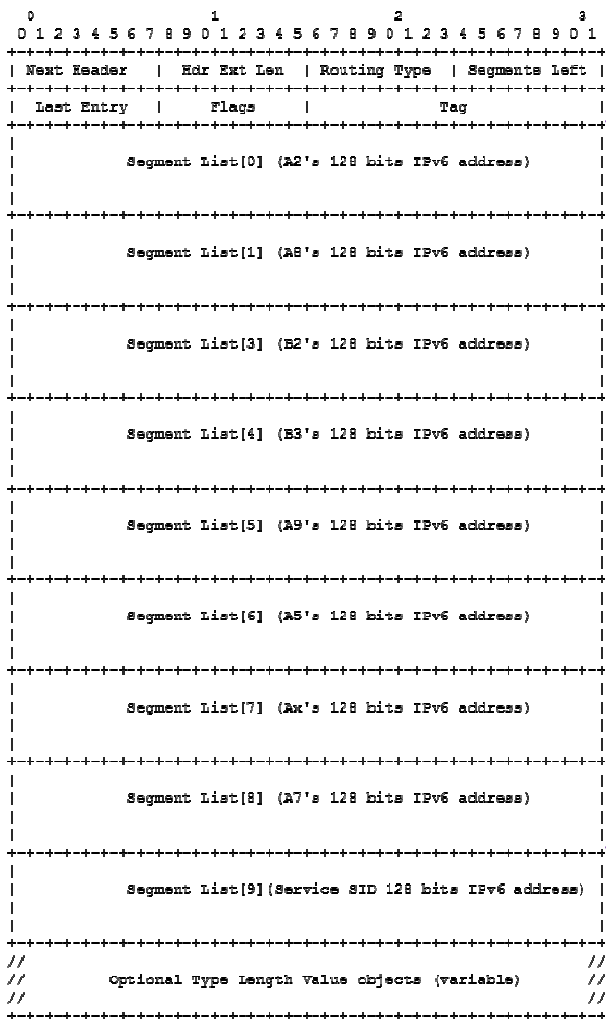


This can be seen as equivalent of single shortest path SID (LDP equivalent); i.e., NSP is represented with one label in the DP



Data plane after NSPF-ID (MPLS & SRH)

SRH with 8 Segment NSP



Plus..

DMM WG is responding to 3GPP Study item for optimized 5G data plane

- 3GPP Study Item http://www.3gpp.org/ftp/tsg_ct/WG4_protocollars_ex-CN4/TSGCT4_82_Gothenburg/Docs/C4-181380.zip
 - 3GPP Scenarios, Requirements, Solution Comparison <https://www.ietf.org/id/draft-bogineni-dmm-optimized-mobile-user-plane-00.txt>
 - SRv6 (<https://tools.ietf.org/html/draft-ietf-dmm-srv6-mobile-uplane-01>)
 - LISP (<https://tools.ietf.org/html/draft-farinacci-lisp-mobile-network-02>)
 - ILA (<https://tools.ietf.org/html/draft-herbert-ila-mobile-01>) (??)
- ✓ **This draft helps most of the proposals to reduce the transport overhead on N9 interface.**



I E T F

Next Steps:

- Adding OSPF equivalent
- Taking care of offline comments received
- Feedback ?

Thank you!