

# IGP Extensions for Sub-interface Relationship Information

[draft-zl-lsr-igp-sub-interface-relationship-00](#)

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# Motivation-1/2

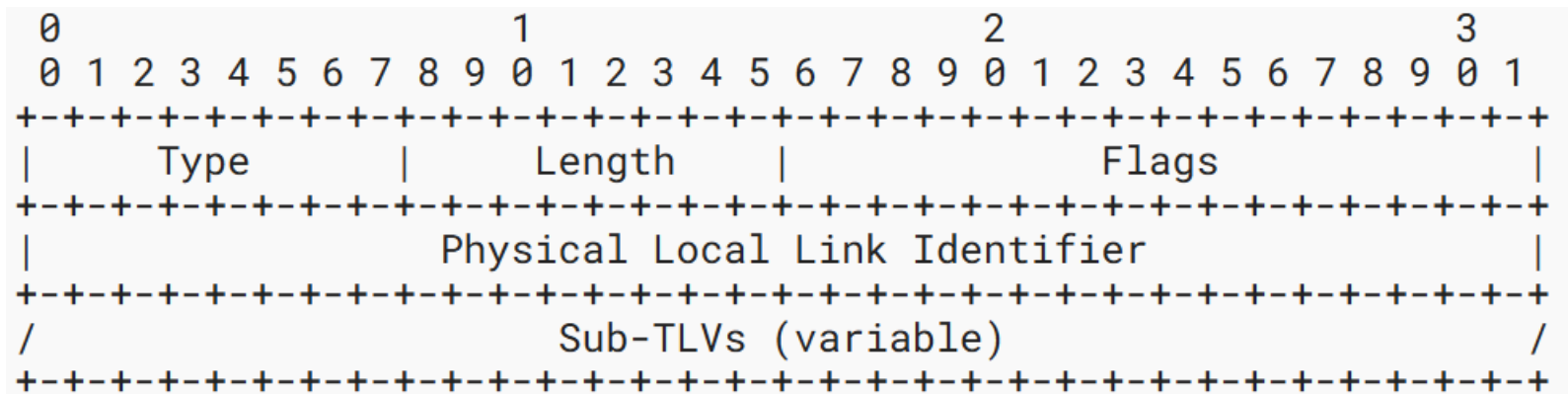
- **An alternate TE path can be used for traffic load balancing when the shortest path is becoming congested**[draft-dong-lsr-load-balancing-alternate], this requires the devices to know the bandwidth information of other links.
- RFC5305 extends IS-IS to support Traffic Engineering(TE). It defines the Maximum Link Bandwidth sub-TLV to advertise the maximum bandwidth information.
- RFC8750 further extends RFC5305, and defines the Unidirectional Utilized Bandwidth Sub-TLV to describe the bandwidth utilization of a link.
- RFC3630 describes extensions to OSPF to support TE. It defines the Maximum Link Bandwidth sub-TLV.
- RFC7471 further extends RFC3630, and defines the Unidirectional Utilized Bandwidth Sub-TLV to describe the bandwidth utilization of a link.

# Motivation 2/2

- Layer 3 protocols (IS-IS and OSPF) sometimes establish neighbor relationships through sub-interfaces.
- When two directly connected IS-IS neighbors are established through sub-interfaces, **the Link Bandwidth and Utilized Bandwidth of the sub-interfaces are just inherited from their parent physical interface.**
- The remote devices don't know the relationship between the sub-interfaces and their parent physical interface. Therefore, **the remote devices don't know the link bandwidth and utilized bandwidth is shared.**
- This makes a remote **link based on sub-interfaces difficult to participate in traffic load balancing as an alternative Path.**
- This document extends IGP, allowing a network device to **advertise the relationship between a physical interface and its sub-interfaces.**

# IGP Extensions

- Take ISIS as an example, a new type of sub-TLV named Physical Local Link Information sub-TLV is defined, can be used in 22 and 222 TLV.
- Carries the link identifier, physical bandwidth, and bandwidth utilization information of the Physical interface of a link.



## Supported Sub-TLVs:

- Maximum Link Bandwidth Sub-TLV in RFC5305.
- Unidirectional Utilized Bandwidth Sub-TLV in RFC8570.

# Use case:

- **Source node:** node A;
- **Destination node:** node C;
- **Two links between C and D:** through different sub-interfaces of the same physical interfaces;
- **Traffic rate:** 60Gbit/s
- **Primary path:** A->B->C;
- **Alternate path:** A->D->C;

Without the sub-interface relationship information

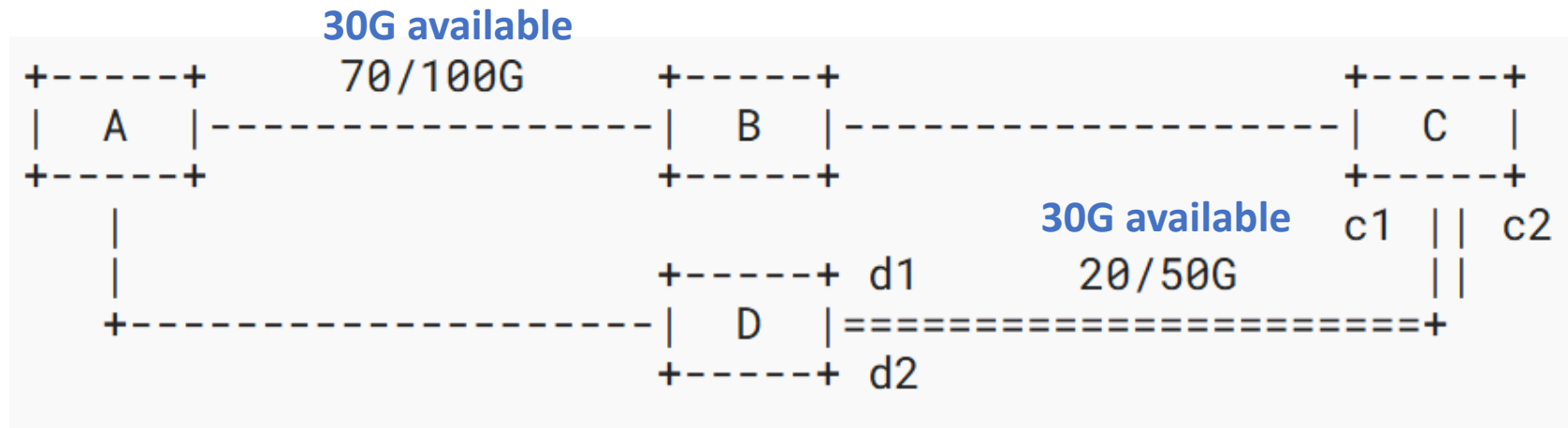


Three paths  
Allocates 20G on each path  
Link between C and D is overloaded

With the sub-interface relationship information



Two paths  
Allocates 30G on each path  
All of the links works well



# Next Steps

- Is this motivation clear?
- Welcome for the collaborators to work together.
- Welcome for suggestions and comments.
- Continue to improve the document.