

Advertising Unreachable Links in OSPF

draft-gong-lsr-ospf-unreachable-link-00

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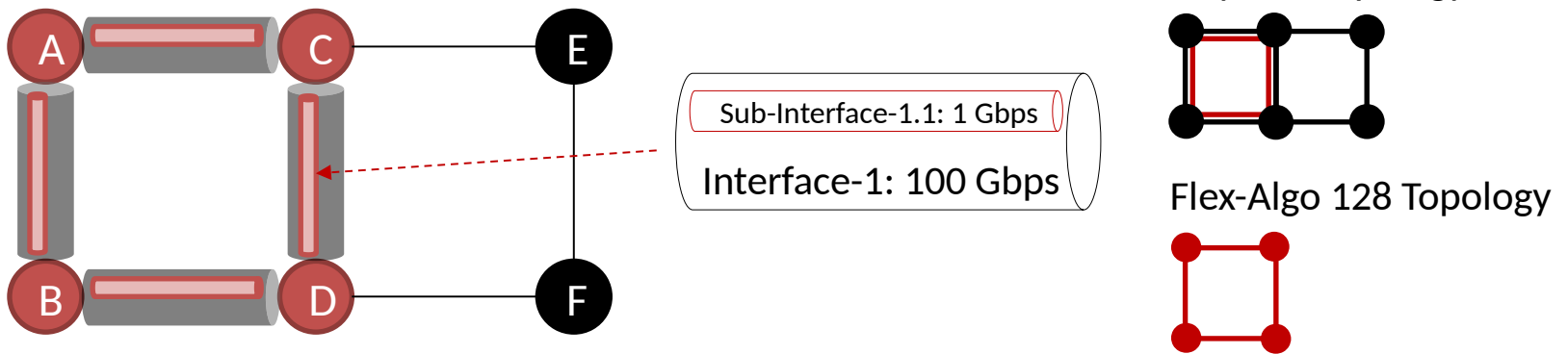
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Background

- As discussed in the interim meeting held in September, there are requirements to advertise unreachable links for purposes other than building the normal Shortest Path Tree in IGP protocol.
- In IS-IS, a link of maximum link metric is unreachable during normal SPF computation [RFC5305].
- This document proposes the method to advertise unreachable links in OSPF.

Use Case

- Flex-Algorithm 128 are used to transmit particular flows of network slice. The "red" links used by Flex-Algorithm 128 are sub-interfaces with dedicated bandwidth resource.
- It is expected that only the particular flows are transmitted on "red" links.
- However, all links are contained in the default topology used by normal SPF calculation, and flows of best-effort service may be steered into "red" links.



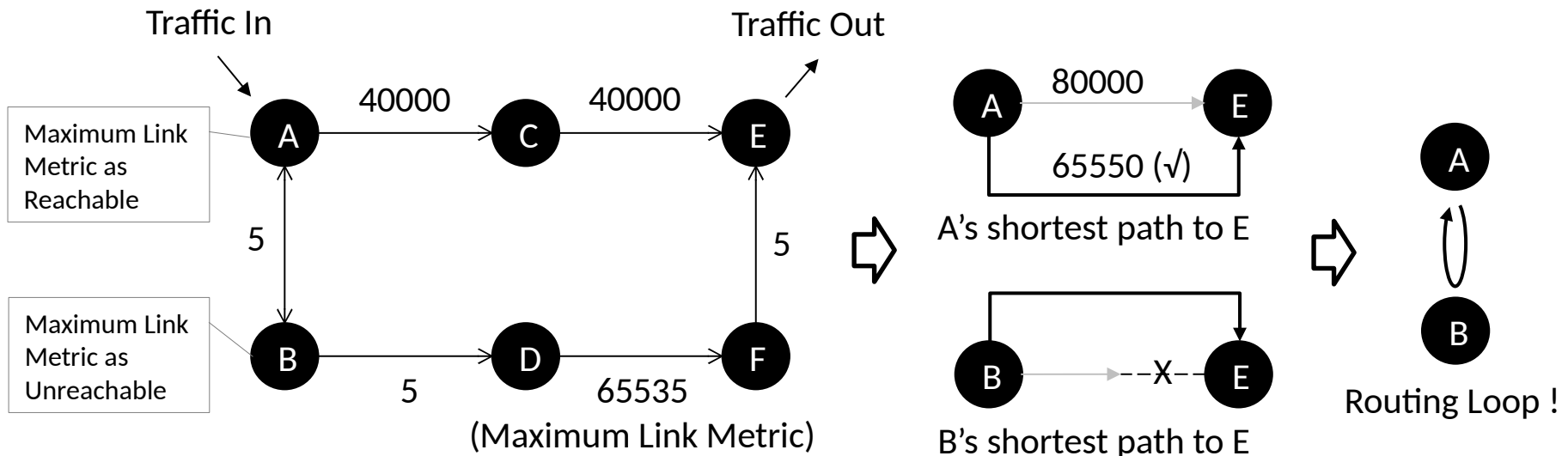
Flex- Algo 128: include "red" links

Inconsistencies of Maximum Link Metric

- In OSPF, there are some inconsistencies when a link is advertised with the maximum link metric (0xffff).
 - [RFC1247]: unreachable.
 - [RFC1583] and higher: reachable.
- In the current implementations of many vendors, a link with maximum link metric tends to be treated as reachable.
- Extensions or updates for OSPF are required.

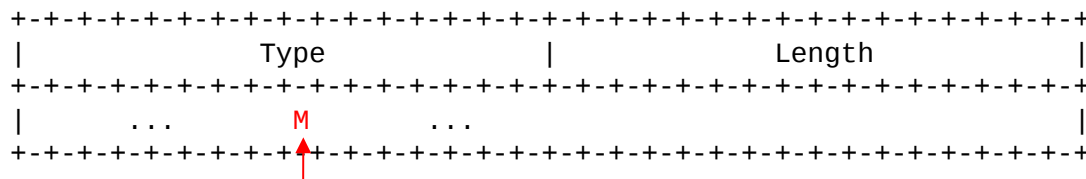
Solution A: Maximum Link Metric

- When using Maximum Link Metric to advertise unreachable links, backward compatibility should be guaranteed.
- An example of routing loops caused by inconsistencies of Maximum Link Metric:
 - Link D-F is advertised with Maximum Link Metric .
 - Router A treats Link D-F as reachable, but router B treats it as unreachable.
 - Inconsistencies of Maximum Link Metric cause routing loop between A and B.



Extensions for Maximum Link Metric

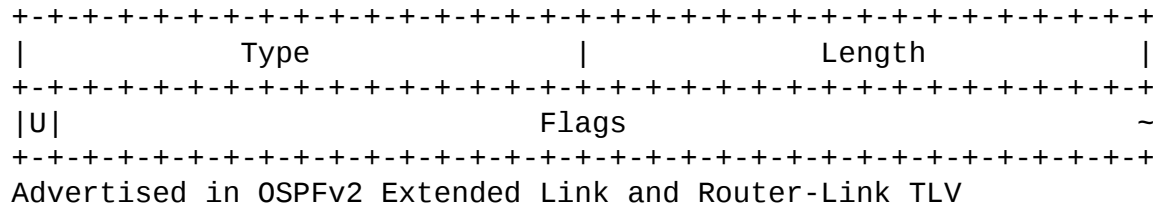
- A new Router Functional Capability Bit in Router Functional Capabilities TLV [RFC7770] :



- Maximum Link Metric support
- All routers supporting that feature must advertise the corresponding capability. If detecting the presence of a reachable Router-LSA without a companion RI LSA that has the bit set, all routers MUST recalculate routes without considering Maximum Link Metric. Otherwise, links of Maximum Link Metric MUST be treated as unreachable during normal SPF computation.
- Applicable for TLVs/LSAs:
 - The Router-LSA
 - The OSPFv2 Extended Link TLV of OSPFv2 Extended Link Opaque LSA
 - The Router-Link TLV of OSPFv3 E-Router-LSA

Solution B: Unreachable Link Flag

- OSPF Link Flags sub-TLV



- U-Flag: Unreachable Link Flag. The associated link MUST be treated as unreachable during SPF calculation.
- A new Router Functional Capability Bit in Router Functional Capabilities TLV [RFC7770] : Unreachable Link Flag support.
 - All routers supporting that feature must advertise the corresponding capability. Upon detecting the presence of a reachable Router-LSA without a companion RI LSA that has the bit set, all routers MUST recalculate routes without considering Unreachable Link Flag .

Next Steps

- Any questions or comments are Welcomed

Thanks