OSPF Two-part Metrics

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RFC 6845 Hybrid Interface

• A broadcast network with different costs between different pairs of neighbors
• Treat as broadcast for Hello, adjacency and database synchronization purpose
• Treat as p2mp to advertise different costs for different neighbors
Hybrid interface limitations

• Each Router LSA has N-1 links for the interface
  – One for each neighbor
• In some networks, e.g. a satellite radio based one, the change in one router’s communication capability causes all attached routers to update their Router LSAs
• This causes unbearable flooding in a large network with routers constantly moving around
Observation 1

- In the example satellite radio network, if one router’s communication capability changes, all costs change in a similar fashion:
  - other routers’ cost to it
  - its cost to all other routers
Observation 2

• Network LSA does not have costs associated with listed routers
  - It is assumed that a router’s cost to all neighbors are the same
    • encoded in the transit link in Router LSA
  - Note that different routers can still encode different costs in the transit link of their own Router LSA for the same network

Router LSA for R1
  - Transit link in R1’s Router LSA
  - Cost 15

Router LSA for R2
  - Cost 20

Router LSA for R3
  - Cost 30

SPF calculation result:
  - R1->R2,R3: cost 15
  - R2->R1,R3: cost 20
  - R3->R1,R2: cost 30
Proposed solution

- Use Router and Net LSAs instead of advertising p2p links
- Break router to router cost to two parts: to/from-network
- Advertise both in the transit link (of a different type X)
  - For OSPFv2, encode from-network cost as an MT cost
  - For OSPFv3, use TLV per draft-acee-ospfv3-lsa-extend
  - Network LSA as is
- SPF calculation to consider both to-and from-network costs
- When one router’s communication capability changes, only its own Router LSA is updated

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R1->R2: 10+10=20
R1->R3: 10+15=25
R2->R1: 10+5=15
R2->R3: 10+15=25
R3->R1: 20+5=25
R3->R2: 20+10=30
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Plan

• Seeking review & comments
• Polish the solution
  – Finish OSPFv3 TLV details
  – Advertising a router’s support for this?
    • If one router does not support this extension, all from-network costs are treated as 0
• Seeking WG adoption