IS-IS Spine-Leaf

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Agenda

• Change Summary
• TLV in Hello and CS-LSP
• Extension Basics
• Link and Node Down (no horizontal connections)
• Spine-Leaf Discussion
Change Summary

• Spine-Leaf draft first published in Nov. 2015
• V3 (March 2017) introduced “Leaf Set advertisement” to allow leaf nodes to direct traffic away from spine nodes which do not have full connectivity to leaf nodes
• V4 (June 2017) introduced auto Tier level detection and making reduced flooding to leaf nodes optional
TLV in Hello/CS-LSP

- **T** bit: Tier field is valid
- **L**: Leaf mode bit – enables reduced flooding
- **R**: Default Route Gateway bit
- **B**: Leaf-Leaf bit (backup gateway)
- Optional Sub-TLVs in CS-LSP: *Leaf-Set, Info-Req*

*blue: sent by leaf nodes  green: sent by spine nodes*
Sub-TLVs/TLVs in CS-LSP

Used when flooding optimizations are in use between tier 0 and tier 1

1) Leaf Set (sent by spines): List of system IDs of all leaf node neighbors

2) Info Requested (sent by leafs): List of system IDs for which reachability info is requested

3) Prefix Reachability (TLV 135/236) used by spine nodes to advertise requested prefix reachability
Extension Basics

Core Layer with IS-IS

Normal ISIS Operation

Full IS-IS Database

Aggregation Layer

Only default routes to Spines

Access Layer

Spine-Leaf Extension
S1-S4 include Leaf-Set sub-TLV when sending Spine-Leaf TLV in CS-LSP to leaves

L4 picks S3 0/0, forward to L6 for p3

S3-L6 link down

S3 Leaf-Set lost L6 in sub-TLV

L4 picks S4, sending “forward prefixes behind node L6” Info-Req sub-TLV

S4 replies with “Prefixes are: p1, and p3 for L6” with IP/IPv6 Reachability

L4 adds more specific entries p1, p3 with nexthop to S4

L4 picks S4 lookup p3, forward to L6 for p3

Leaf L3 Node down. Nothing special to do

Spine S2 Node down. Nothing special to do
Spine-Leaf Discussion

- Other networks vs DC networks (this draft helps to meet the DC special requirements)
- One protocol vs 2+, does it really matter
- Other rich features (past 20 years) using e.g. BGP-EVPN or other overlay protocols, multicast, TE, SR, etc.
- Topology-less on leaf nodes can also do TE.
- Auto-tier discovery/flooding optimizations optional (from draft-white-openfabric)
- Welcome comments and reviews