IS-IS Spine-Leaf

IETF 100 Singapore

DCRouting BOF

draft-shen-isis-spine-leaf-ext-04

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DC IS-IS Spine-Leaf

- Reuses well deployed protocol for DC fabric supporting large number of network routing features
- Supports full routing in small/median DC and serves as a DC fabric for overlay routing
- Supports Auto-tier discovery and protocol configuration for ZTP
- Minimizes IS-IS LSP flooding due to DC topology and characteristics
- Handles link/node DOWN events in spine-leaf topology to avoid black holes
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*
Extension Basics

Normal ISIS Operation

Core Layer with IS-IS

Full IS-IS Database

Aggregation Layer

Access Layer

Zero Flooding, Zero Topology on ToRs

0/0 -> S1, S2
Multi-Level Spine-Leaf

Tier 0
Only Tier-0 is defined

Tier 1

Tier 2

RF-Leaf Adjacency

IIF Tier X, L-bit, LSPs

S1, S2, S3, S4

C1, C2
Link/Node Down (Tier 0-1)

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

Node Down

Link Down

0/0 -> S1, S2

0/0 -> S3, S4

p1, p3 -> S4