IS-IS Spine-Leaf
IETF 99 Prague

July, 2017

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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

```
0                   1                   2                   3
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|      Type      |     Length    | Tier  | Reserved      |T|B|R|L|
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|         .. Optional Sub-TLVs
+-+-+-+-+-+-+-+-+-....
```
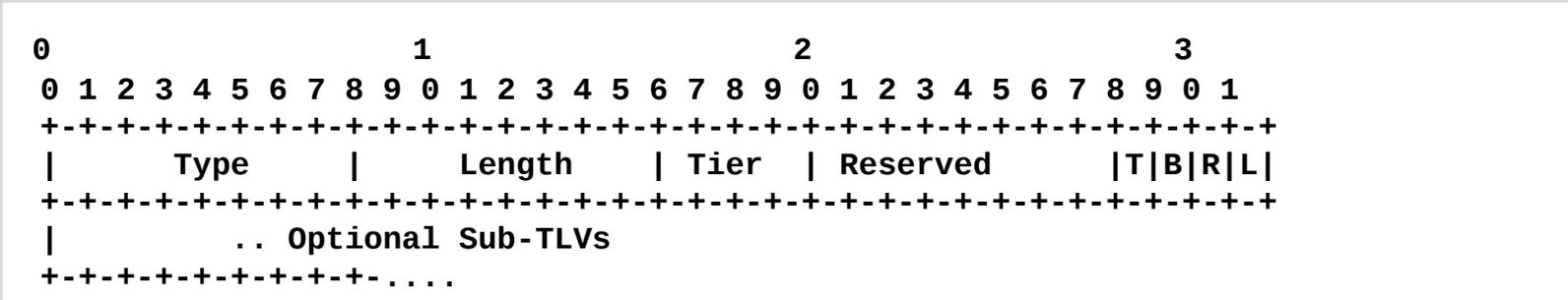
- T bit: Tier field is valid
- L: Leaf mode bit – enables reduced flooding
- R: Default Route Gateway bit
- B: Leaf-Leaf bit (backup gateway)
- Optional Sub-TLVs in CS-LSP: **Leaf-Set**, **Info-Req**

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
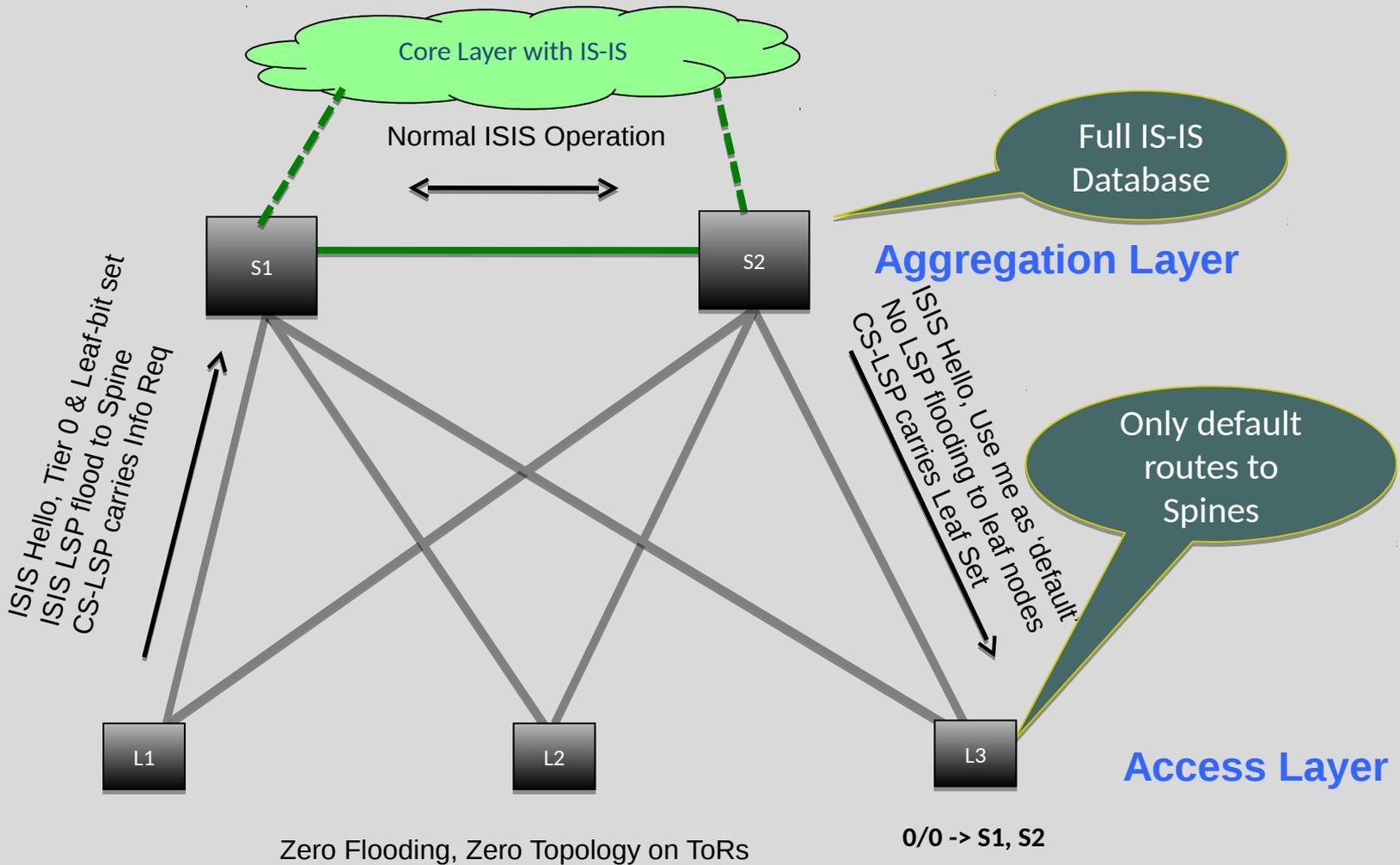
Core Layer with IS-IS

Normal ISIS Operation

S1

S2

Full IS-IS Database

Aggregation Layer

ISIS Hello, Tier 0 & Leaf-bit set
ISIS LSP flood to Spine
CS-LSP carries Info Req

ISIS Hello, Use me as 'default'
No LSP flooding to leaf nodes
CS-LSP carries Leaf Set

Only default routes to Spines

L1

L2

L3

Access Layer

Zero Flooding, Zero Topology on ToRs

0/0 -> S1, S2

Link/Node Down (no horizontal)
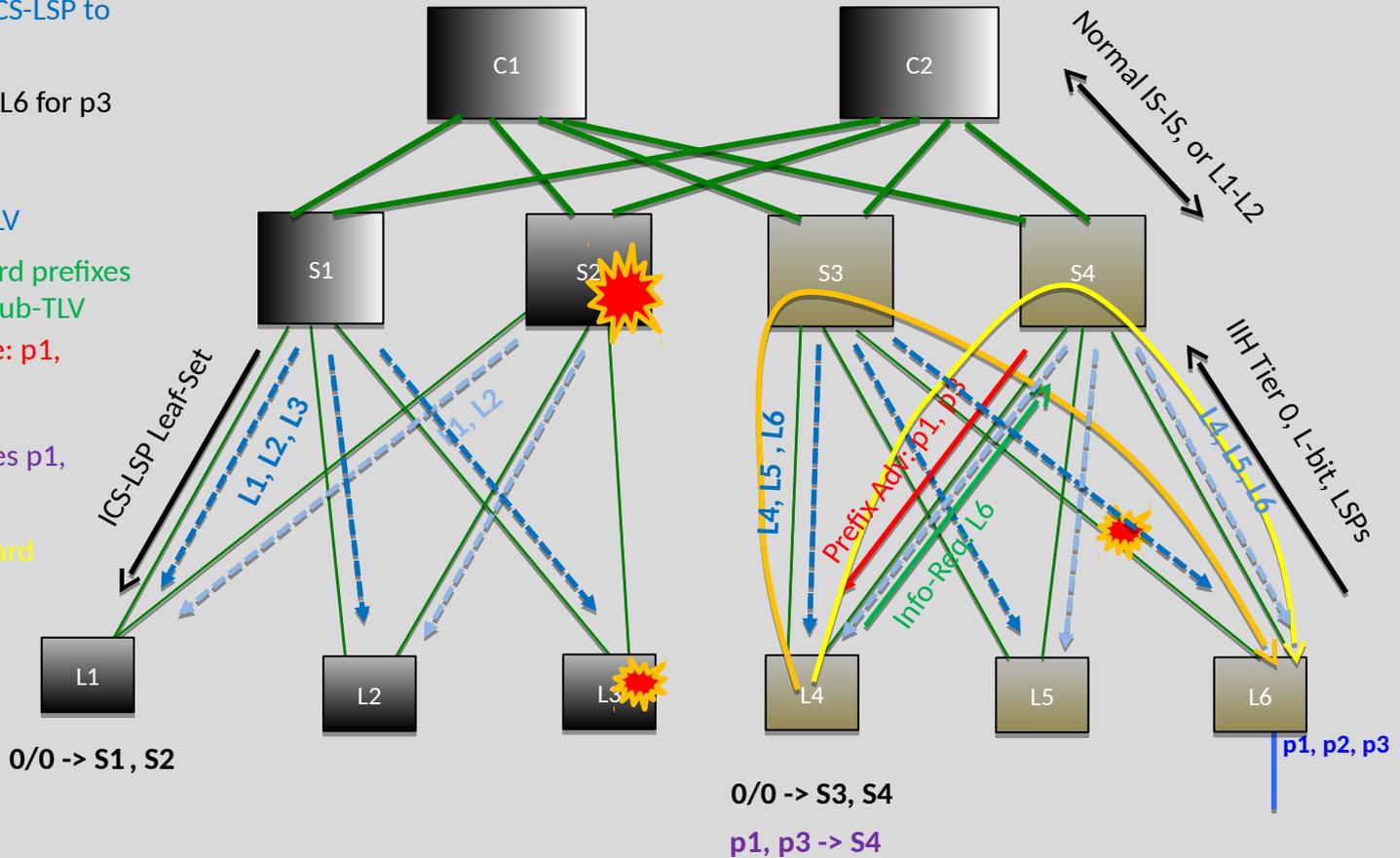
Spine-Leaf Discussion

- 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