Area Abstraction
Better areas for IS-IS
draft-li-area-abstraction-00
Trend: Turning the router inside out

• Traditional multi-chassis router design:
  • Packet forwarding engines at the edges
  • Clos or Benes fabric in the middle
  • Single system abstraction

• What happens if you put the fabric on the outside?
  • Many smaller systems for doing packet forwarding
  • Clos or leaf-spine topology
  • Need abstraction of the result

• IGP abstraction mechanism: the area
Review: IS-IS areas

- Level 1 areas abstracted into Level 2
- But, for transit, Level 1 topology must also be Level 2 topology
- If most of the Level 1 topology is used for transit, this provides no benefit
- Result: Level 2 scale problem. Areas not particularly useful.
Requirements

• A stronger Level 1 abstraction
  • Level 1 area looks like a Level 2 node
  • Internal topology NOT advertised at all
  • All external connectivity represented
Proposed Architecture

- Represent L1 area as a single L2 pseudo-node
  - L1 area elects an Area Leader
  - Area Leader picks a pseudo-node ID
  - On external links, border routers generate IIH’s using pseudo-node ID.
  - Internally, border routers create tunneled L2 adjacencies with Area Leader.
• Area Leader creates pseudo-node LSP listing external adjacencies from border router LSPs.

• Only the pseudo-node LSP flooded on external links

• Other L2 area-originated LSPs NOT flooded externally

• L2 transit LSPs flooded normally

• Result: L1 area looks like a single L2 pseudo-node with full external connectivity
Internals

• L1 area border routers must provide forwarding for L2
  • ABRs are full fledged L2 routers
  • Logical connectivity is via the Area Leader, but that’s suboptimal for forwarding
  • Compute ‘shortcuts’ from entry ABR to exit ABR for direct tunneling across L1
  • Can use SR (or even GRE) for forwarding
Area Pseudo-node TLV

- **TLV Type**: TBD
- **TLV Length**: $2 + (\text{system ID length} + 1)$
- **Pseudonode ID**: Pseudonode ID for the area