IS-IS Sparse Link-State Flooding

(draft-hsmit-lsr-isis-dnfm-00)

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A simple IS-IS extension

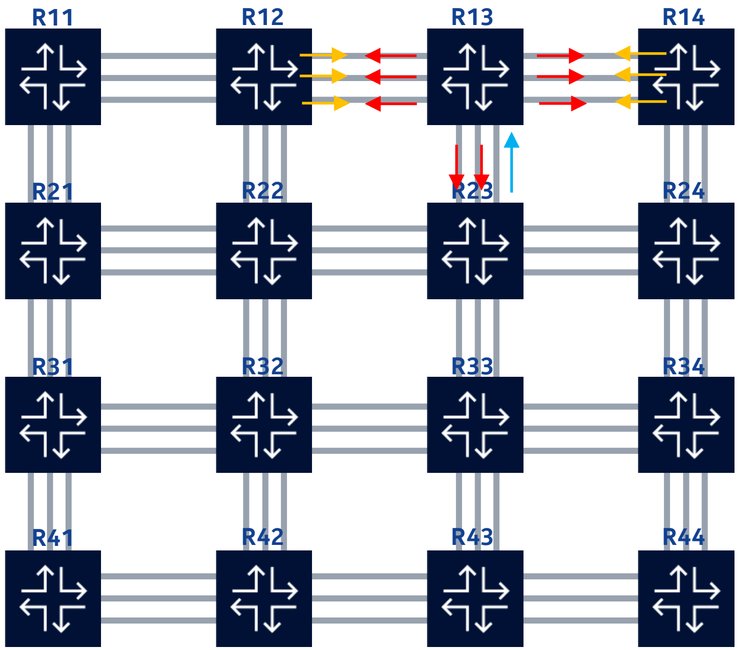
- What?
  - Technology extension to reduce link-state flooding in highly resilient dense networks
- How?
  - Reduce the number of adjacencies over which link-state flooding takes place
- Method used?
  - New TLV in LSP (indicator of Flooding Anchor)
  - New TLV in IIH (indicator of Flooding suppression)

High Level Overview

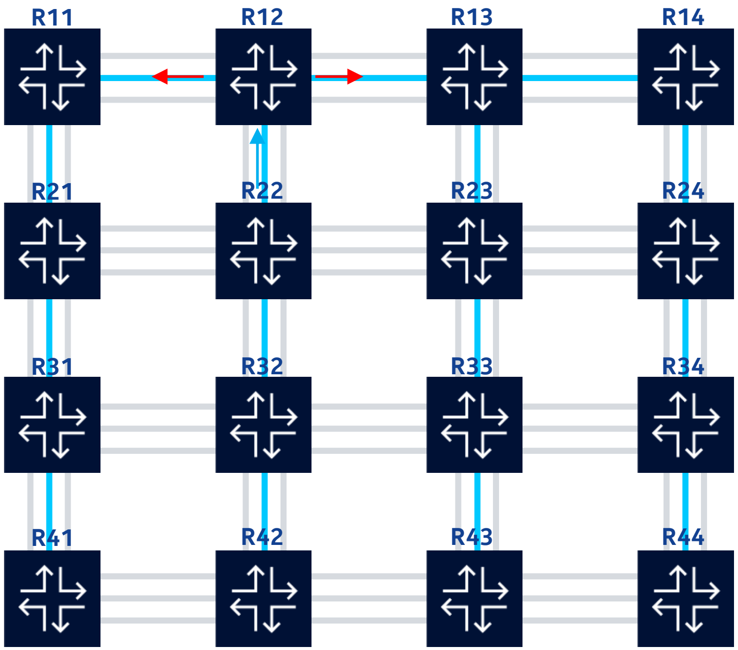
- Goal is to create a Flooding tree of nodes and links (“the flooding tree”)
- Steps to create flooding tree
  1. Root of flooding tree is the flooding “Anchor”
  2. Router adjacent to “anchor” will “clamp” or “attach” themselves to flooding tree to make tree bigger
  3. Their neighbors will attach themselves as well, extending flooding tree
  4. The decision to flood or not flood on interface towards anchor is local router decision (similar to RPF)

Classic and Minimal Flooding

Classic



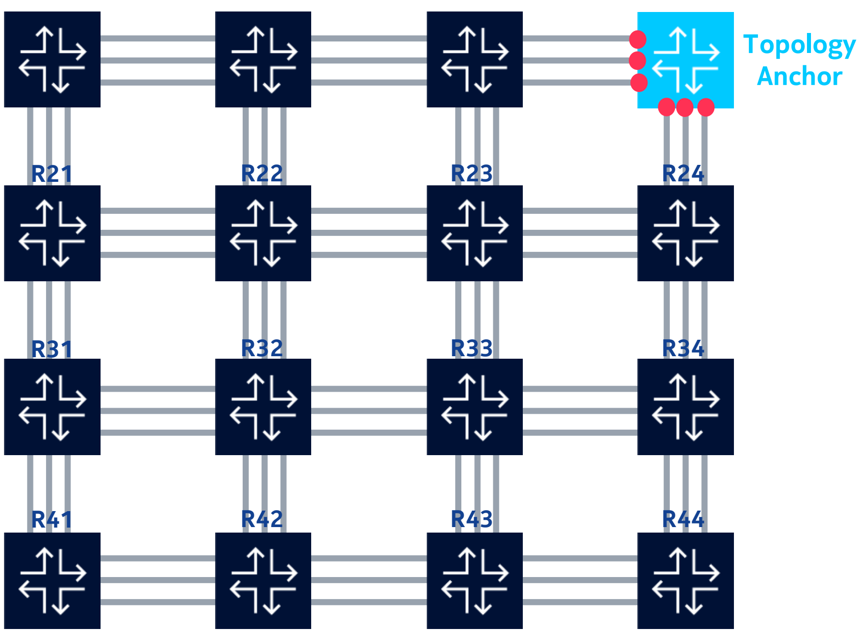
Minimal-flooding



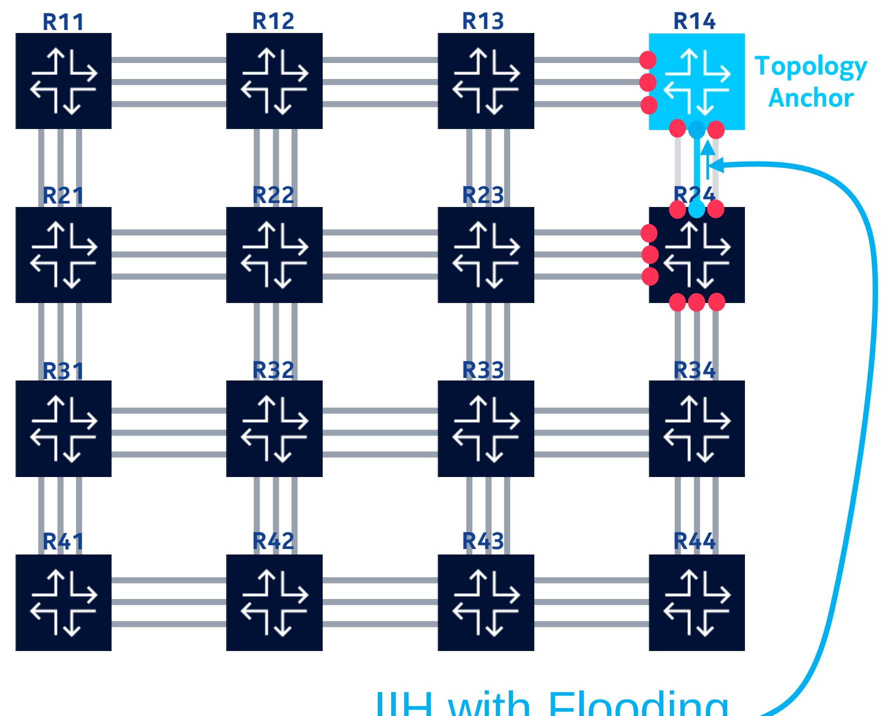
Algorithm (1)

Announce “Anchor” TLV in LSP

Step 1: Select “Anchor”



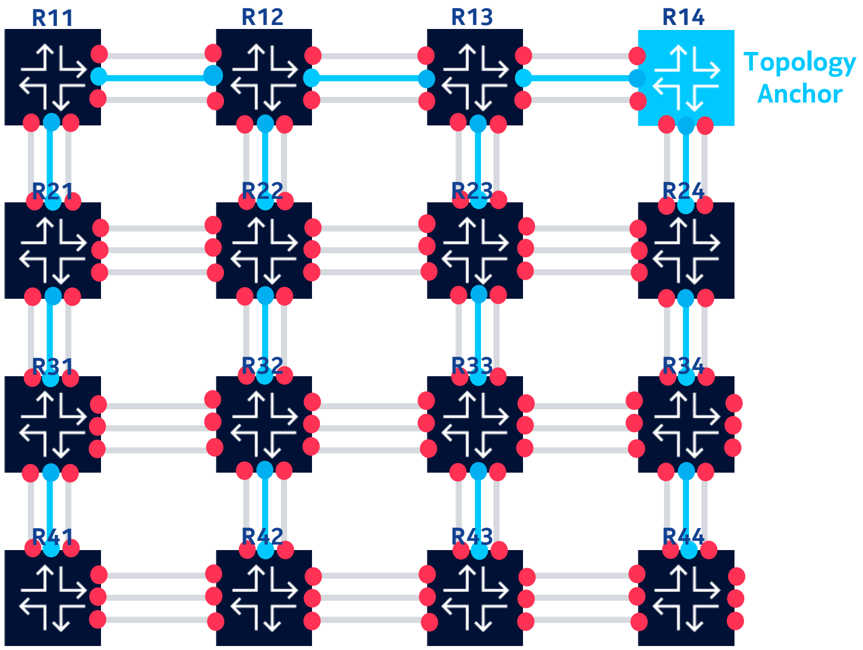
Step 2: Adj router to Clamp to “Anchor”
(using RPF info towards “Anchor”)



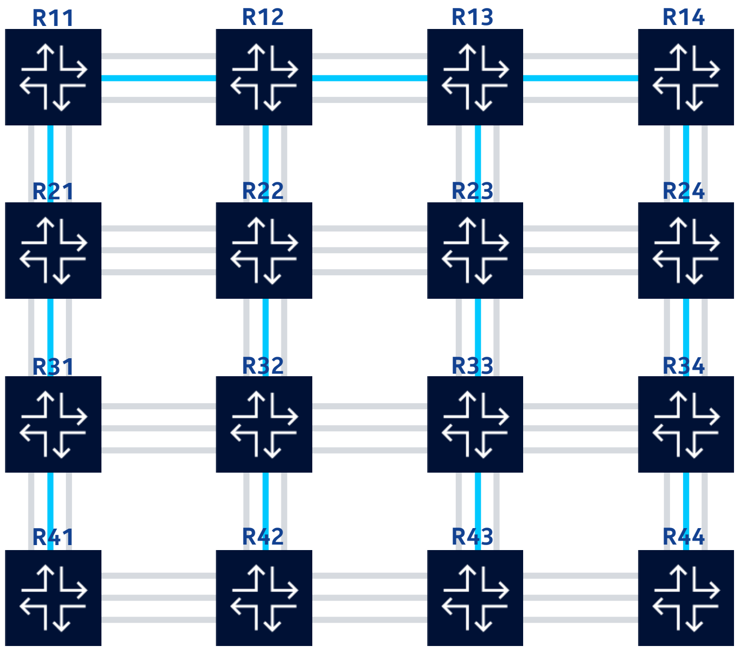
IIH with Flooding
reduction TLV

Algorithm (2)

Step 3: Expanding the tree

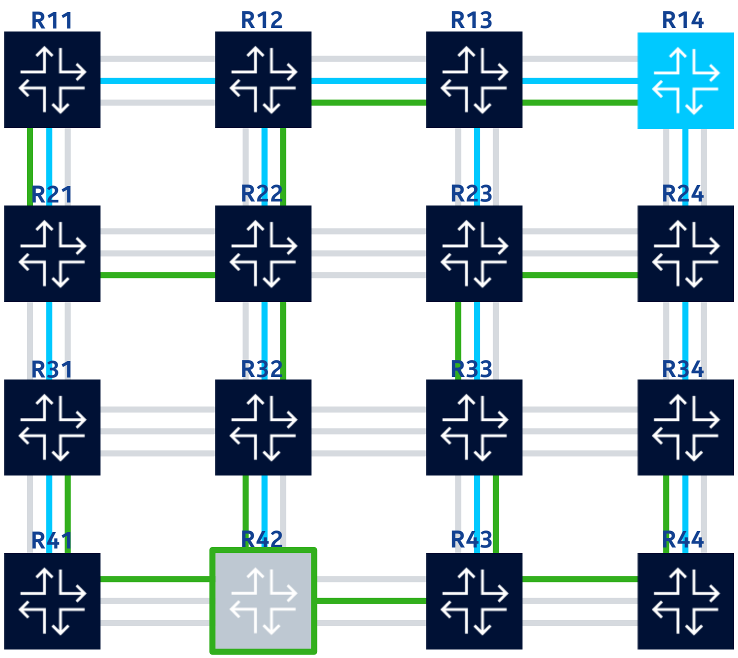


Step 4: The end-game
“Sparse-flooding tree”



Algorithm (3)

Step 5: Robust Resiliency



- Multiple topologies are possible for resiliency if desired
  - Topology ‘1’
  - Topology ‘2’

Algorithm Component 1: Anchor TLV in LS PDU

- Anchor TLV in LSPs
  - A new Anchor TLV in the LinkState PDUs
  - indicates that a router can be used as an anchor
    - Has priority field
    - Has field to identify # of flooding topologies

Algorithm Components 2:
Flooding-Suppression TLV in IIHs

- A new Flooding-Suppression TLV in the IIH PDUs
  - Fields
    - Flooding suppression (= suggestion field from sender)
    - Resulting actual suppression field (= current "suppression-state“)
    - The number of currently active flooding adjacencies (potential to help selecting best flooding adjacency)
  - Backward compatibility
    - When no IIH TLV = no flooding suppression = classic flooding at node

Future for -01 draft

- Flooding control between flooding tree’s
  - Build in randomized delay based upon the degree of connectivity of the adjacent peer node
  - Reasonable and controlled trade-off (stability vs speed) when anchor has high degree of connectivy (i.e. 1000 IS-IS peers)

Summary

- Simple
- Distributed
- Backward compatible
- No topological requirements
- No per-node configuration
- No complex computations (start with simple RPF)
- Resilient and robust

Next Steps…

- Our algorithm proposal is simple
- Ready for Adoption?

THANK YOU!