Running SRP on SPB/IS-IS

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What does it mean to use IS-IS and SPB (or Link-State Routing in General) for SRP?

Models for Running SRP over Link-State Routing

- Model 1: SRP over SPB
  - Use SPB to calculate the topology.
  - Use SRP as-is, and forward MSRP messages over the topology calculated by SPB instead of RSTP.
- Model 2: Constrained-Based Routing Support
  - Use IS-IS to advertise information needed to compute valid paths.
  - Use a signaling protocol (e.g. SRP) to set up the path.
- Model 3: Full Integration
  - Run MSRP at the edge to allow end-stations to register Talker advertisements and Listener requests.
  - Integrate the MSRP functionality into IS-IS.
  - Distribute Talker and Listener messages, and all other required information via IS-IS.
  - Switches compute reservations independently using this information.

Model 1: SRP over SPB

- Approach
  - Use SPB to calculate the topology instead of RSTP.
  - Use SRP as-is:
    forward MSRP messages over the topology calculated by SPB instead of RSTP.
- Existing Proof Points
  - SRP over RSTP.
  - RSVP operating over OSPF or IS-IS.
- Advantages
  - Simple (It should just work.)
  - Streams follow the shortest path from Talker to Listener.
- Disadvantages
  - Doesn’t solve existing SRP scalability issues.

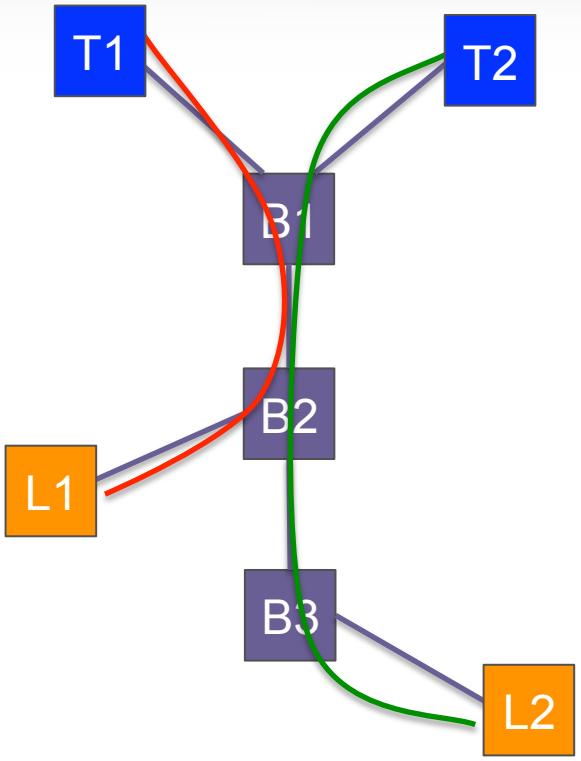
Model 2: Constrained-Based Routing Support

- Approach
  - Use IS-IS to advertise information needed to compute valid paths.
    - Available Bandwidth.
    - Max active streams
    - Boundary State
    - Etc.
  - Use a signaling protocol (e.g. SRP-TE: SRP + ERO) to set up the path.
- Existing Proof Points
  - ATM PNNI/ATM Signaling
  - OSPF-TE, ISIS-TE, RSVP-TE.
  - GMPLS
- Advantages
  - Extends SRP over SPB approach.
  - Ability to find paths that satisfy stream requirements.
  - Allows SRP to use more than just the shortest path.
- Disadvantages
  - Existing examples are unicast. Multi-path constraint-based signaling TBD.
  - SRP-TE needs to be defined.

Model 3: Full Integration

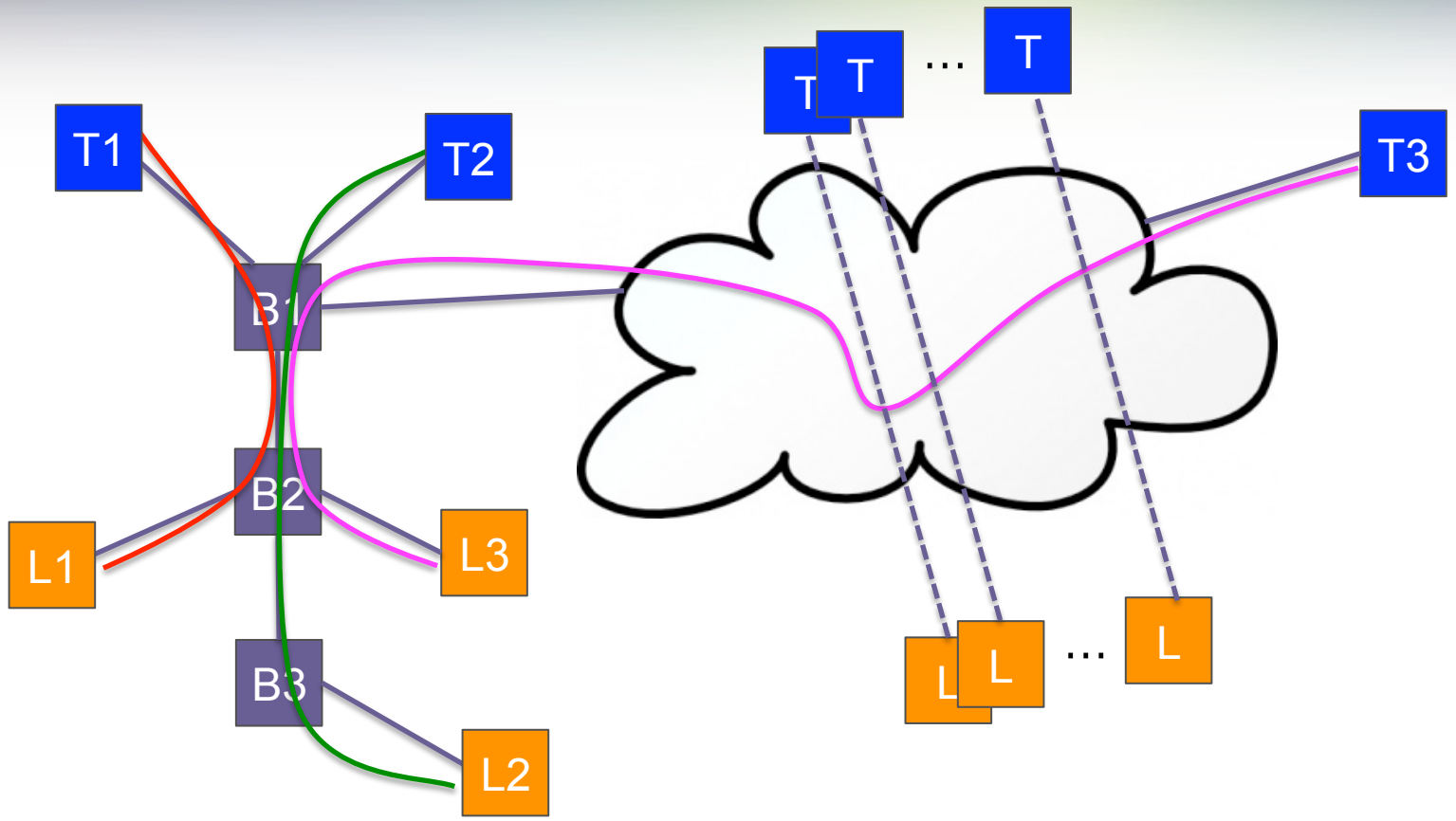
- Approach
  - Run SRP at the edge to allow end-stations to register Talker advertisements and Listener requests.
  - Integrate the SRP functionality into IS-IS.
    - Advertise Talker and Listener message information via ISIS.
    - Add tie-breaker (original time of request?) to Listener message.
    - Advertise all information required to make **deterministic** SRP decisions (boundary state, link bandwidth, table sizes, vlan membership, other resources)
    - All switches compute stream propagation and reservations **independently** using this information.
- Existing Proof Points
  - NONE
- Challenges
  - Each switch needs to
    - Compute routes for all streams in the network
    - Compare resources available to Talker requirements and listener reservations.
  - Huge computational requirements result in scaling issues.

Example 1



- SRP Approach
  - Each switch evaluates local information to make reservation decistions including
    - SR boundary state
    - Incoming Talkers and Listeners
    - Switch resources.
- Fully Integrated Approach
  - Each switch
    - Has all the information, and
    - Must do the above for every other switch in the network.

Example 2



- Let's assume that L3 has the best tie-breaker.
- B3 needs to calculate everythign that is happening in the whole network to determine whether the T3/L3 stream will interfere w/the T2/L2 stream.

Conclusions

- Tread very carefully into replacing SRP signaling with the IS-IS/SRP fully integrated approach.