Receiver-Driven Multicast RSVP-TE Requirements

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RFC 4875 Design

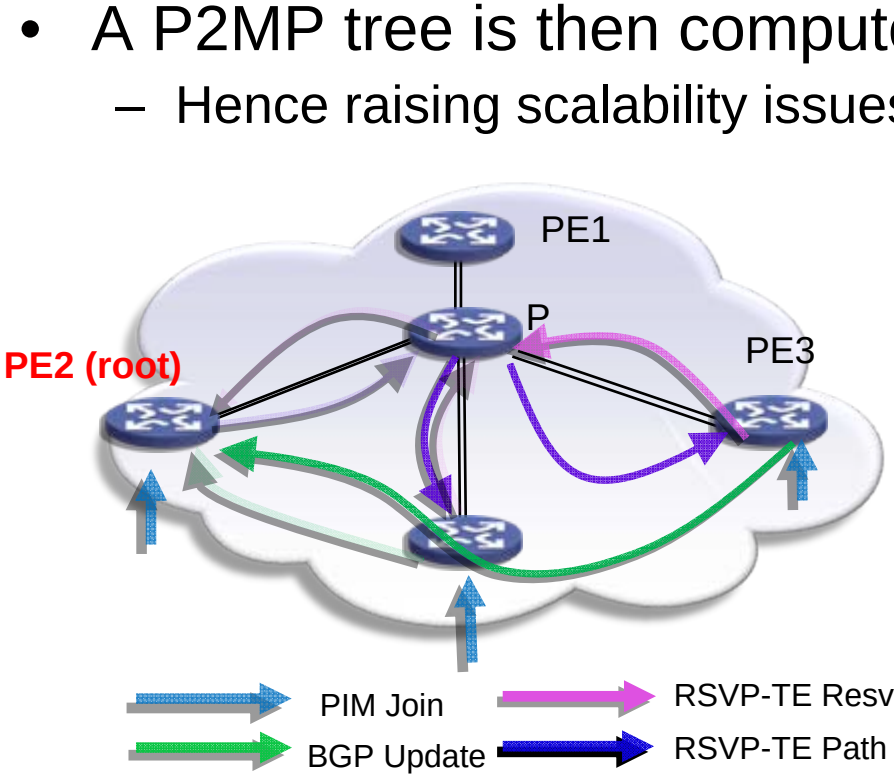
- Assumes the root already has a priori knowledge about the leaves before computing the P2MP tree
  - Often addressed by static configuration
  - May use BGP Auto-Discovery mechanism in some environments
- Loses the dynamics of receiver-initiated multicast distribution trees
- Does not cover MP2MP tree computation
  - *E.g.*, for large scale, QoS-demanding interactive e-learning services

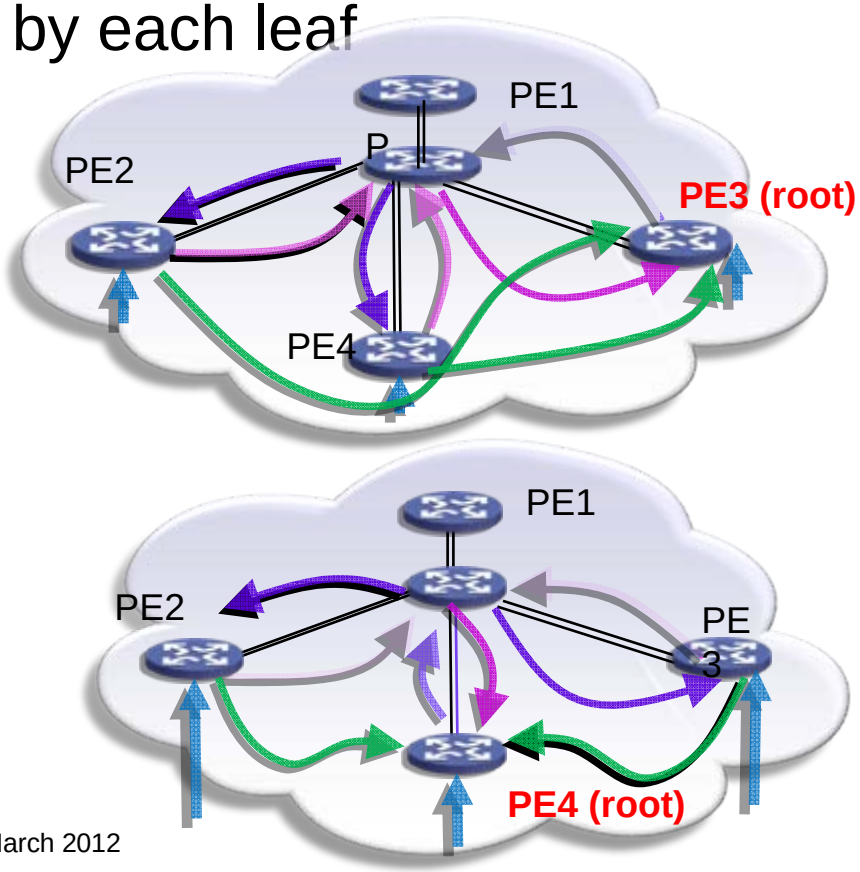
Best of Breed

- Dynamics of IP multicast
  - Receiver-driven scheme allows for finer tree design, computation and maintenance
    - Key for bandwidth optimization in the access
- Robustness of MPLS TE
  - RSVP-based paradigm yields hard guarantees
    - Down to the first IP node
  - Protection toolkit (PLR design for both link and node protection purposes)
- Agility of multicast-inferred AAA
  - Dynamic policy (QoS, security) enforcement scheme

MP2MP Scenario

- Each leaf needs to learn about the others first, *e.g.*:
  - BGP Auto-Discovery may be used by PE4 and PE5 leaves to notify PE2 (root) and then trigger tree computation
- A P2MP tree is then computed by each leaf
  - Hence raising scalability issues





Requirements

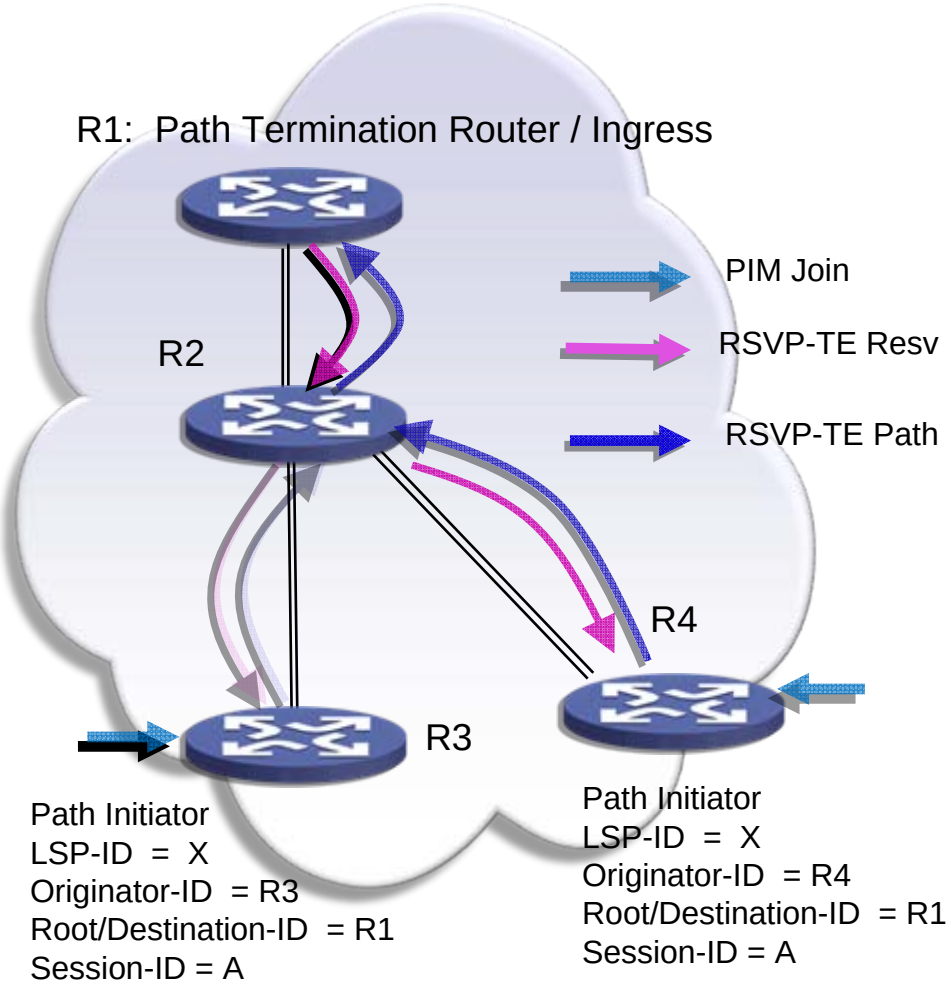
- Requirements of RFC 4461 still apply
- Receiver-Driven MPLS tree structures introduce additional requirements
  - Tree computation relies upon a collection of label states
    - Upstream label states should be merged with downstream states for MP2MP trees
  - Covers MP2MP tree computation
  - Support of dynamic leaf Graft/Prune operation
  - State maintenance operation for P routers should be independent of the number of receivers and source/receivers (MP2MP)
  - Intermediate routers need to compute a route towards the root or use explicit object for next hop resolution

In-Band Signaling

- mRSVP TE object should be used by leaf routers to signal multicast stream information
  - mRSVP TE object is parsed by root to compute the tree and forward traffic to receivers accordingly
  - P routers do not need to parse mRSVP TE object
- Aggregation of several multicast flows bound to a given RD tree structure is encouraged
  - To facilitate LSP design and operation

Overview

- Receiver triggers RSVP_PATH towards the source
  - By means of IGMP/MLD messages processed by access routers (R3/R4)
- RSVP_RESV messages are sent back from the root
  - R1 connected to the source
- Label allocation is done prior to sending PATH messages
- RSVP is used as per procedure defined in RFC 4875
  - But RSVP machinery is triggered by leaf routers instead of ingress router



Comments?