SR-MPLS Aggregation Segment

draft-decraene-spring-sr-mpls-aggregation-segment-00

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IP route aggregation

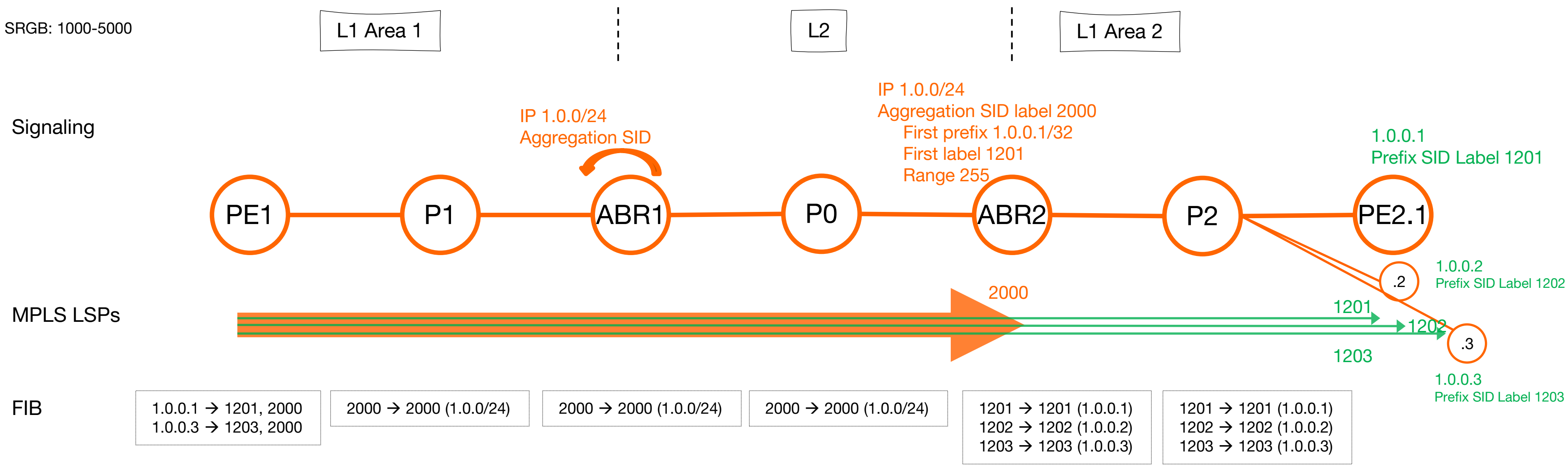
- Aggregation is a key property of IP and improves scaling
  - FIB, control plane, churn
- SR-MPLS does not allow for aggregation at routing border (ASBR, ABR)
- This draft defines an Aggregation Segment for SR-MPLS, allowing for
  - Summarization in the control plane (IGPs)
  - MPLS hierarchy in the data plane → single FIB entry for P routers in ingress or transit area/domain.

The SR-MPLS Aggregation Segment

- An Aggregation Segment represents both
  - The Prefix Segment of the summary (1.0.0/24)
  - The set of specific Prefix Segments being aggregated (1.0.0.1/32 … 1.0.0.255/32)

- With a two-labels MPLS hierarchy
  - One label for the summary (2000)
  - A range of labels for the specific Prefix-SIDs (1201 … 1455)

inter-area scenario

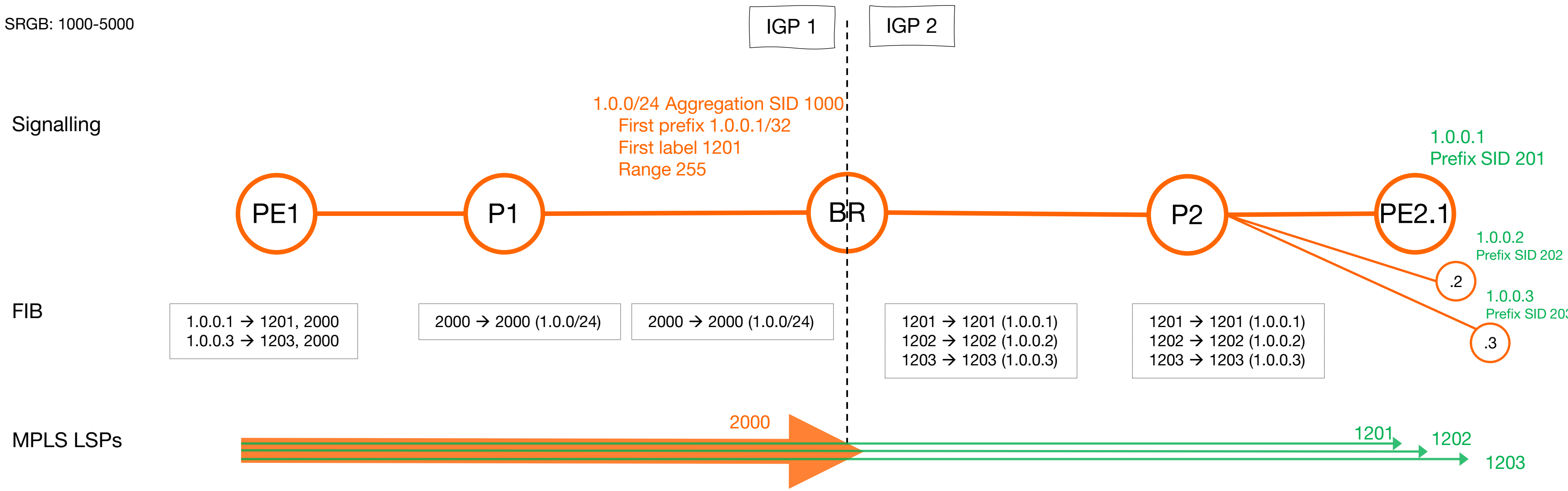


ABR2 performs aggregation and advertises:

- one IP Aggregate (1.0.0/24) to summarize 255 IP addresses
- one Aggregation Segment to summarize 255 Prefix Segments with its (top) label (2000)
- one range of (bottom) labels for the set of specific Prefix Segments
  - First prefix 192.0.2.1/32, First Label 1201, Range 255

- P routers in transit (P, ABR) only install the Aggregation Segment (2000) in their FIB
- Ingress PE (PE1) installs specific Prefix Segments on an as-needed basis.
  - With a two labels stack (2000, 1203)
  - As with BGP-LU in Seamless MPLS

inter IGP instances scenario



BR performs aggregation and advertises:

- one IP Aggregate (1.0.0/24) to summarize 255 IP addresses
- one Aggregation Segment to summarize 255 Prefix Segments with its (top) label (2000)
- one range of (bottom) labels for the set of specific Prefix Segments (First prefix 192.0.2.1/32, First Label 1201, Range 255)

- P routers in transit (P, ABR) only install the Aggregation Segment (2000) in their FIB
- Ingress PE (PE1) installs specific Prefix Segments on an as-needed basis.
  - With a two labels stack (2000, 1203)
  - As with BGP-LU in Seamless MPLS

Summarizing hides details

- Pro: scaling
  - FIB
  - control plane
  - churn

- Cons: hides the details of each PE/Prefix SID
  - Reachability
  - End to end IGP metric
  - Signaled data (prefix tags, prefix flags, Entropy Label Capability…)

- Loss of reachability may still be signaled using “IGP Unreachable Prefix Announcement” (aka UPA)
  - draft-ietf-lsr-igp-ureach-prefix-announce

Operational constraints

- Aggregatable
  - IP addresses
  - SID
  - IP, SID allocated in order
- All aggregated prefixes must have the same prefix length
- A single level of aggregation
- Redundant ABRs anycast Aggregate Prefix SID
  - → anycast considerations (draft-ietf-spring-mpls-anycast-segments)
  - Does mandating the same SRGB on all redundant BR works?
    - Or do we need to handle different SRGB.
    - Think about SRGB transitions, especially for network merge

Next steps

- Thanks for the initial reviews and comments
  - Nat Kao, Robert Raszuk
- More review and comments welcomed.
- -01 to address comments