Signaling RSVP-TE tunnels on a shared MPLS forwarding plane

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Recap

- Couple the feature benefits of the RSVP-TE control plane with the simplicity of the SR MPLS forwarding plane.
- Allocate unique pop labels with pop-and-forward label action for each TE link.
- Use label stacking from ingress.
- Delegation of label stack imposition.
Changes since -00

- Delegation of label stack imposition
  - Delegation labels
  - Automatic/Explicit delegation
  - Construction of label stack
- Added new co-author and contributor
Delegation of label stack imposition

Manage limitations of label stack depth imposition at ingress

**Automatic** selection of label stack delegation hops

- Allow transits to automatically select delegation hops D and G

**Explicit** selection of label stack delegation hops

- Allow ingress to explicitly select delegation hops D and G

**Delegation hop**

- Allocates a *delegation label* to represent a set of labels that will be pushed
  - Label 350 at D and label 650 at G

- **RRO Label subobject flag**
  - Delegation label

- Attributes Flags TLV: Label Stack Imposition – Delegation (LSI-D)
  - HOP_ATTRIBUTES subobject
  - LSP_ATTRIBUTES subobject
Stacking to reach delegation hop

RSVP-TE pop and forward tunnel from A to J
- Delegation hops D and G

At ingress and delegation hops, label stack...
- Includes the next delegation label
Stacking to reach egress

RSVP-TE pop and forward tunnel from A to J
  - Delegation hops D and G

At ingress, label stack...
  - Includes all delegation labels at the end of stack

At transit, label stack...
  - Does NOT include the next delegation label

- Attributes Flags TLV: Label Stack Imposition – Delegation (LSI-D-S2E)
  - LSP_ATTRIBUTES subobject
Automatic Delegation - Effective Transport Label-Stack Depth (ETLD)

RSVP-TE pop and forward tunnel from A to J

- Delegation hops D and G automatically chosen during initial signaling sequence.

ETLD (per-hop signaled attribute) processing:

- Ingress populates ETLD with the maximum number of transport labels that it can potentially send to its downstream hop.
- Each successive hop decrements it by 1 (or appropriately based on limitations at that hop).
- If a node is reached where the phop ETLD is 1 (or there is no phop ETLD), then that node selects itself as delegation hop.
- Each delegation hop resets the ETLD to the maximum number of transport labels that it can potentially send to its downstream hop.
- By the time the Path message reaches the egress, all delegation hops are known.

- Attributes TLV: ETLD
  - HOP_ATTRIBUTES subobject
Next Steps

- Add section for Node protection.
- Request early allocation of IANA code points.
- Request WG adoption.