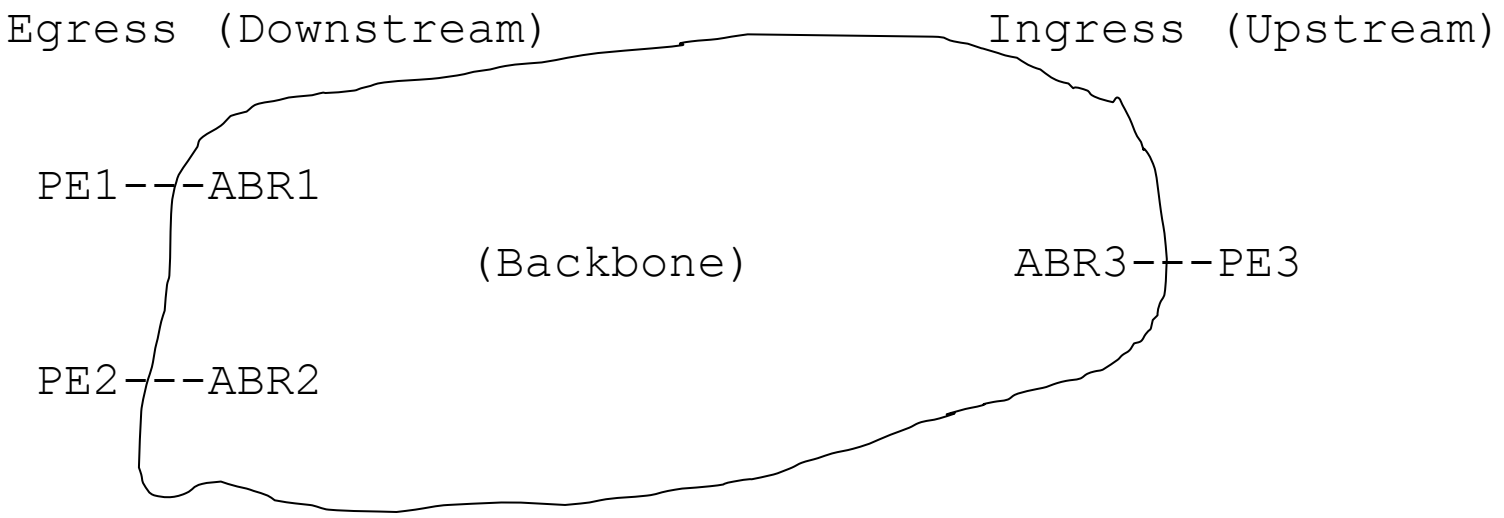
Targeted mLDP

- Base mLDP spec didn't consider use of LDP multipoint extensions over Targeted mLDP sessions
  - LDP speaker must choose "upstream LSR", i.e., next hop on path to root of MP LSP being constructed
  - Only IGP next hop considered, assumes upstream LSR is IGP neighbor
- Targeted mLDP can be useful way of applying LSP hierarchy to MP LSPs
- Draft-napierala-targeted-mldp specifies use of MP extensions on targeted LDP sessions

Hierarchical Topology



ABRs not IGP adjacencies, but are LDP peers over targeted sessions

(Sorry about the ASCII Art)

Approach

- No new protocol, messages, or TLVs
- Adds procedures to enable:
  - LDP speaker to select peer over targeted session as “upstream LSR”
  - Upstream LSR to transmit data through tunnel(s) to downstream LSRs
    - Ingress replication (through unicast tunnels), or
    - Multicast tunnels
      - Optional aggregation through use of upstream-assigned labels

Ways of Choosing Upstream LSR

- Suppose ABRs 1 and 2 need to create P2MP-LSP with root PE3
- ABR1 can choose ABR3 as upstream LSR on path to PE3 if:
  - ABR3 is BGP next hop on ABR1's path to PE2, or
  - Backbone is full mesh of P2P TE tunnels, ABR3 is head of ABR1's next hop interface (tunnel) to PE2
  - IGP tells ABR1 that ABR3 is the border router on its path to PE2
- Similarly, ABR2 may choose ABR3 as upstream LSR

Ingress Replication over Backbone

- ABR1 and ABR2 send Label Mapping Messages to ABR3
  - Include downstream-assigned “multicast label’ representing the P2MP LSP
  - ABR3 makes two copies of data, unicasts one to ABR1 and one to ABR2
  - Each packet carries two labels, e.g:

```
Unicast label for ABR1
ABR1’s multicast label
Data
```

Multicast Tunnels over Backbone

- ABR1 and ABR2 send Label Request Messages to ABR3
- ABR3 sends Label Mapping Messages to ABR1 and ABR2
  - Uses procedures from draft-ietf-mpls-ldp-upstream (on RFC Editor's queue)
  - Include *Interface TLV,* specifying multicast tunnel, and (optionally) upstream-assigned label for aggregating several MP LSPs inside single tunnel
    - Tunnels can be TE P2MP, e.g.

Summary

- Straightforwardly extends multipoint extensions to case of targeted LDP
- No new protocol
- Allows hierarchy to be applied in a manner that is transparent to the ingress and egress Pes
- Supports multiple backbone transmission schemes and allows aggregation
- Seems non-controversial … ☺