BFR Tethering

IETF 103

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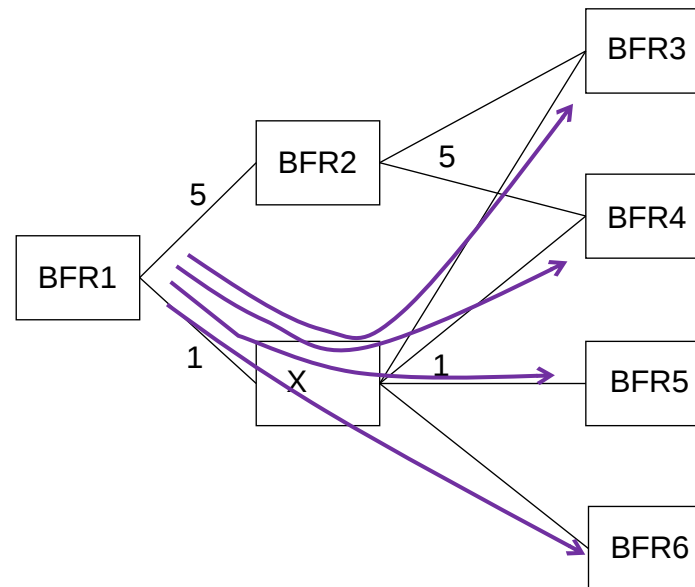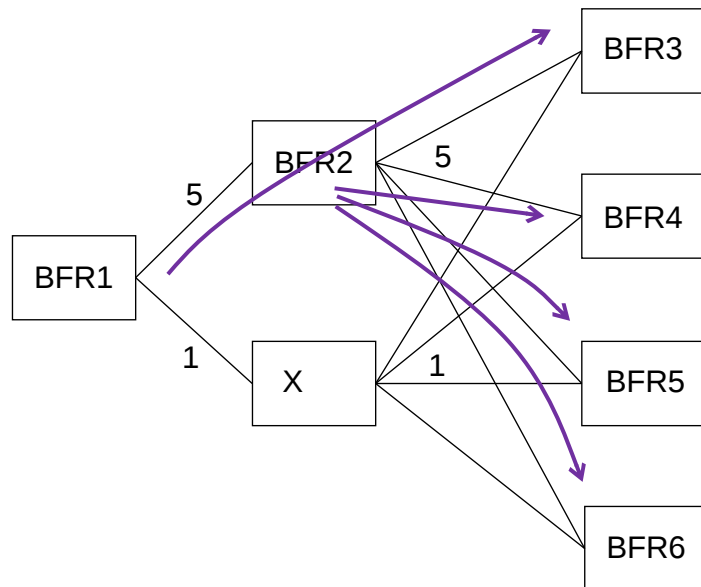
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Brownfield Deployment

How to handle BIER incapable routers?

- Get around them and/or tunnel through them
 - X in the below diagram does not support BIER

Tunnel Through Incapable Routers
And follow unicast topology

- Section 6.9 of BIER Architecture spec
  - At the end of SPF, examine each immediate child node on the SPF tree
  - If it's not BIER capable, replace it with its immediate children
  - If a new child (that just replaced its parent) itself is incapable, replace it with its immediate children
  - The process is repeated until all immediate children are BIER capable
  - If a child is not directly connected, then a tunnel must be used to send BIER traffic to the child
- Any tunnel to the child can be used
  - Static or dynamic (e.g. LDP/SR/GRE)
  - ***No need to announce the tunnels***

Tunneling Alone May Not Be Good Enough
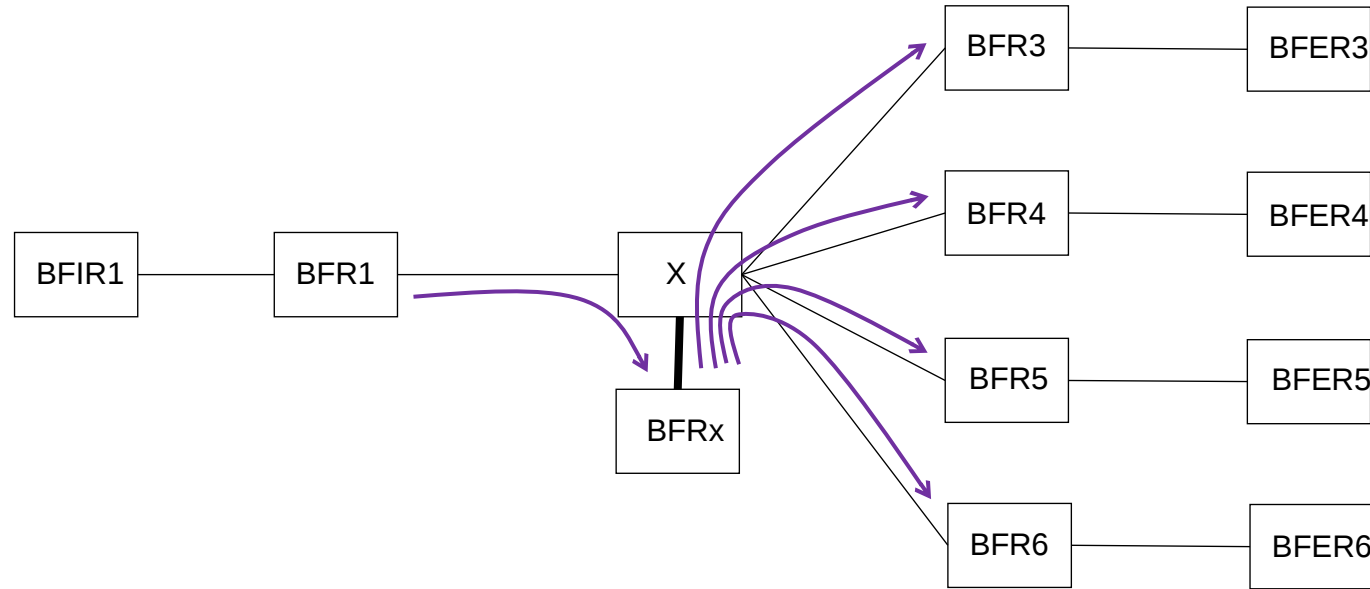
- If the number of BFRs that X connects to is large, then BFR1 needs to tunnel many copies through that BFR1-X link
  - Not good if the BFR1-X connection is long distance and/or BW constrained
- A solution is to tether a BFRx to X with a fat local pipe
  - BFR1 tunnels a single copy to BFRx, who in turn tunnels to other BFRs

Making Tethering Easier

- Tunnels would need to be announced in IGP to make tethering work
  - Otherwise the Section 6.9 method would never put BRFx onto its SPF tree
  - They would need to be announced a BIER specific MT or use FlexAlgo
    - Don't want to send unicast traffic through BFRx
- Unless with the following trick:
  - X advertises that it supports BIER so it will receive BIER packets natively
    - The BIER packets come with a BIER label that normally directs to BIER forwarding
  - X label switches (based on the BIER label) the BIER packets to BFRx
  - BFRx uses the Section 6.9 method to tunnel incoming BIER packets from X to other BFRs through X
    - BFRx knows that X does not really support BIER
      - Through provisioning or additional signaling from X
    - X could also have other connections as long as the X-BFRx metric is 1

Additional Signaling

- X signals "BFRx is my helper"
    - BFRx will know X is actually not capable
    - Other BFRs may use Section 6.9 method to tunnel over X
        - Instead of relying on X to use BIER labels to switch to BIER packets to its helper
- Alternatively, BFRx signals "I am X's helper"

Summary

- Tethering a BFR helper reduces the copies of tunneled packets over

- Two options to make tethering easier
  - X pretends it supports BIER but label switches incoming BIER packets to its helper BFRx
    - Requires software upgrade on X and its helper only
    - Only works for MPLS
  - BFRx advertises it is X's helper and others will tunnel over X
    - Upgrade needed on BFRs but not on X

  - Next Steps
    - Seek comments
    - Request adoption after polishing