Handle BIER Incapable Routers

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Problem Statement

- A BIER deployment may have routers incapable of supporting BIER
- BFRs signaling a mismatched <BAR, IPA> for a subdomain are treated as if BIER incapable
- How should they be handled?
  - draft-zzhang-bier-algorithms has one proposal
    - Method 4 in this slide deck

Method 1

- Section 6.9 of BIER Arch spec
- At the end of SPF calculation, immediate children of the calculating BFR are examined
- If a child is BIER incapable, it’s replaced with its children on the SPF tree
- Repeat the process until all immediate children are BIER capable
- This may result in some children on the SPF tree not directly connected
  - Just tunnel BIER packets to those children

Method 2

- Use Flexible Algorithm
- Mark all links connecting to a BIER incapable router certain color, say brown
- Define a FlexAlgo to exclude brown links
  - Plus the constraints from the “base” FlexAlgo
- An extra FlexAlgo for each “base” FlexAlgo, just for the BIER purpose
- If a router is upgraded to support BIER, remove the brown color on all those links
- Method 2a - use MT

Method 3

- Use Flexible Algorithm
- Define a FlexAlgo with algorithm “skip BIER incapable routers”
  - Plus the constraints from a base FlexAlgo
- An extra FlexAlgo for each “base” FlexAlgo, just for the BIER purpose
- BIER specific algorithm – better signaled via BAR
- Method 3a: use MT

Method 4

- Define BAR 1 as following:
  - BA: SPF
  - BC: Skip BIER incapable routers
- This can work with IPA values for Flexible Algorithms
  - w/o introducing parallel FlexAlgos

Comparisons

- Method 4 vs. Method 2/3
  - Less provisioning & signaling overhead with Method 4
  - Method 2 requires provisioning change when incapable routers are upgraded
  - Method 3 involves BIER specific algorithm in IPA
- Method 4 vs. Method 1
  - Method 4 is easier to implement
  - Method 4 may need to advertise tunnel to provide continuous BIER connection; method 1 does not
  - Method 1 has congruent BIER/unicast forwarding
    - This may be desired for some deployments, while not for others

Summary

- “Skipping BIER incapable routers” has practical use and advantages
- Define “BAR 1” as:
  - BA = SPF
  - BC = Skip BIER Incapable Routers

Next Steps

- Seek Comments
- Re-focus draft-zzhang-bier-algorithms on “BAR 1” for handling of BIER incapable routers
  - Seek WG adoption afterwards