Handle BIER Incapable Routers

Zhaohui Zhang, Antoni Przygienda (Juniper)
Andrew Dolganow (Nokia)
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