BIER Brownfield Deployment Options

draft-zzhang-bier-brownfield-options-00
draft-przygienda-bier-migration-options-00

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Brownfield Deployment

• Mixed BFRs and BIER-incapable routers (non-BFRs) in a BIER domain
• Informational Draft on brownfield deployment options
  • “Naked” MT
  • Section 6.9 of RFC8279
  • Skip non-BFRs in BIRT/BIFT calculation
  • Controller-programmed BIFTs
  • BIER Tethering
  • BIER PHP
“Naked” MT

• A separate topology that only includes BIER-capable routers and connections between them
  • The connections can be native links or tunnels that can be viewed as IGP adjacencies

• No protocol extensions needed
Section 6.9 of RFC8279

- At the end of SPF calculation, examine all the children of the root node of SPF tree
  - A child could be a reparented one as in the next bullet

- If a child is BIER-incapable, remove it from the tree, and reparent its children to the root (the calculating router) directly

- Eventually all children of the root are BFRs
  - Some are reparented ones and they must be reached via tunnels
  - Native forwarding or tunneling to the children

- The concept of “tunnel to downstream BFRs” can be achieved with BGP signaling as well
  - With the “BIER Nexthop” in the BIER attribute that is only changed by BFRs
Skip non-BFRs in BIER-specific SPF Calculations

• Separate SPF for BIRT/BIFT calculations
• Signal a BAR value that indicates a BIER-specific calculation algorithm that skip non-BFRs
  • During the calculation the non-BFRs will not be considered
  • There must be a complete topology that connects all BFRs
    • With native links or tunnels as IGP adjacencies
Controller-programmed BIRTs/BIFTs

• An omniscient/omnipotent controller figures out everything and programs the BIRTs/BIFTs
  • Forwarding over native links or tunnels between BFRs
Tethering

• All previous options may lead to ingress-replication-like tunneling

• Tethering avoids that
  • It’s like turning a non-BFR into a BFR by tethering a helper to it
  • W/ very simple IGP signaling
  • Works with BGP as well
BIER PHP

- All previous options assume that the flow overlay edge routers support BIER
  - E.g., MVPN PEs are BFIRs/BFERs and capable of BIER forwarding
- BFERs may request its upstream to do PHP so that they do not need to handle BIER forwarding
  - Complete BIER control plane plus PHP request
  - No BIER data plane
- Ingress PEs need to be real BFIRs
Summary

• Brownfield deployment options
  • “Naked” MT
  • Section 6.9 of RFC8279 and its BGP equivalent
  • Skip non-BFRs in BIRT/BIFT calculation
  • Controller-programmed BIRTs/BIFTs
  • BIER Tethering
  • BIER PHP

• The most practical solutions may be:
  • Section 6.9 of RFC8279 and its BGP equivalent
  • Tethering (IGP & BGP)
  • PHP
Next Steps

• Discussions and comments
• WG adoption?