BIER-TE-ARCH
IETF106 Singapore

draft-ietf-bier-te-arch-05

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Since IETF105

- In WGLC since after IETF104
  - please review
- IETF105: draft-ietf-bier-te-03
- IETF106: draft-ietf-bier-te-05
  - Review feedback from from Dirk Trossen, Jeffrey Zhang
  - Thank you very much

Changes

1.Introduction:

- Added note about related work using, or referring to bloom filters for trees
  - draft-ietf-roll-ccast
  - ICC – Stateless multicast switching in SDN

2. Layers -> Components

2.2.3 Flow overlay signaling

- Added reference to ietf-bier-multicast-http-response]

3.4 (OLD) BIER-TE Forwarding Example

- Indicate to RFC editor to remove this section
  (unless reviewers would like to keep it)
  Superseeded by larger, earlier example introduced in -03

Changes

4.3 Leaf BFER

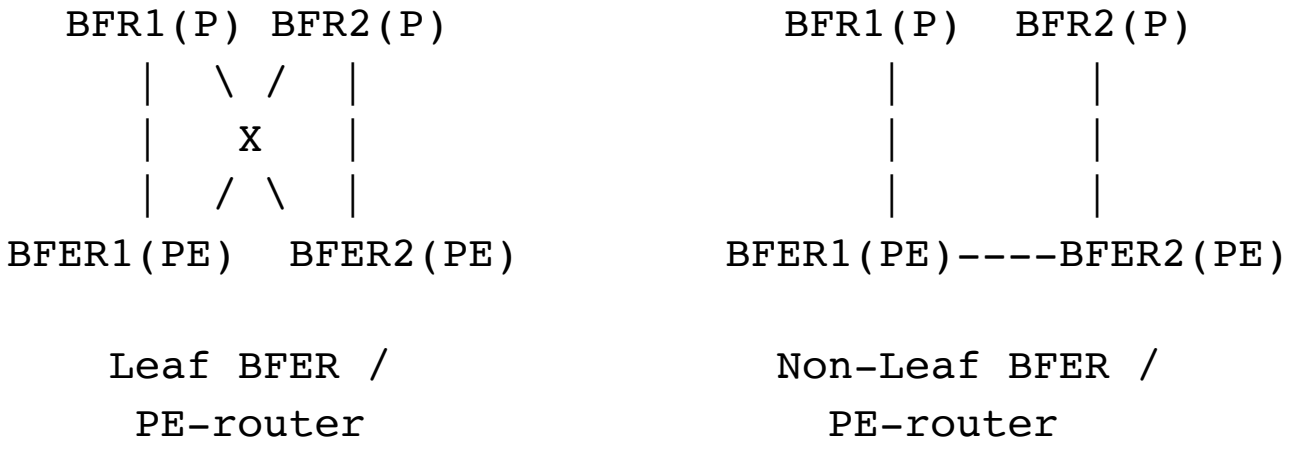


Figure 8: Leaf vs. non-Leaf BFER Example

- Saving bits with leaf BFER
- Added graphics/explanations for leaf vs. Non-leaf BFER as shown above. Also note that this requires appropriate routing to ensure leaf BFER will not be used as transit under routing changes

Changes

4.5 Hub & Spoke

- Added explanation how hub & spoke optimization is example of saing bits when traffic can be “flooded” to group of nodes (common in TV deployment use-cases.

- 4.7 ECMP – expanded BIFT entries to be more clear
  Example (multiple occurances in text):

-04:

Index	Adjacencies
0:6	ECMP({L1-to-BFR2,L2-to-BFR2,L3-to-BFR2}, seed)

-05:

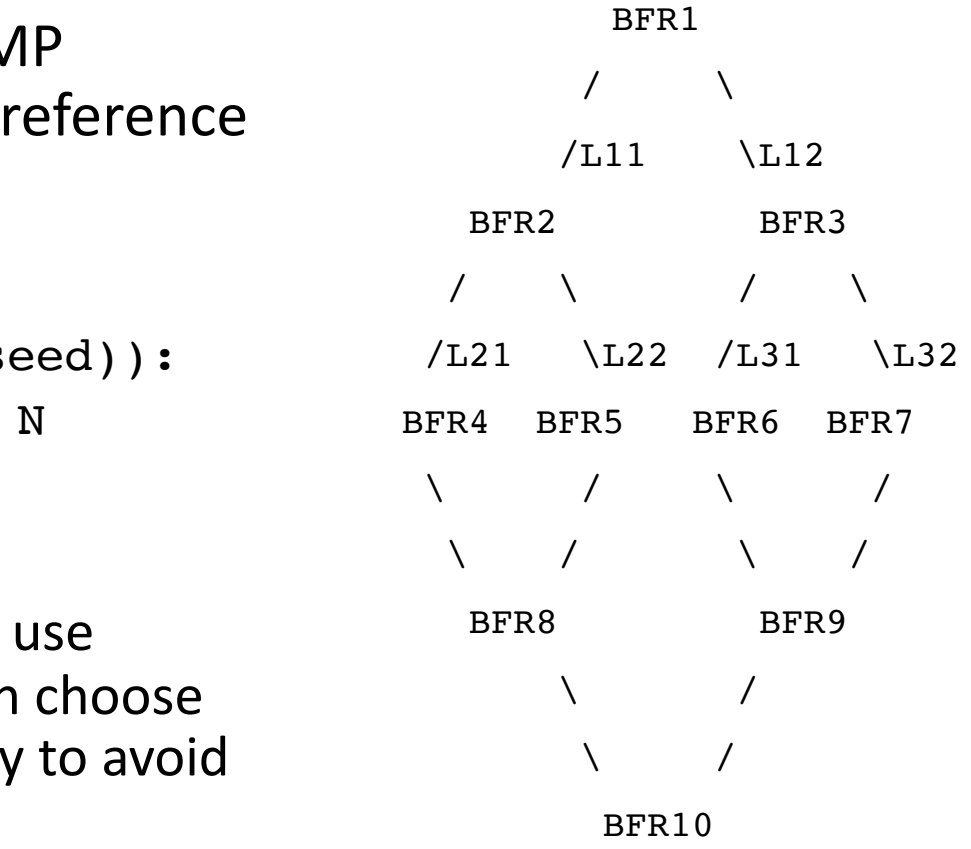
Index	Adjacencies
0:6	ECMP({forward_connected(L1, BFR2), forward_connected(L2, BFR2), forward_connected(L3, BFR2)}, seed)

Changes

4.7 ECMP explanations

- Added text that there is no standardization of ECMP algorithms (vendor proprietary is sufficient). But: reference example added:

```
forward(packet, ECMP(adj(0), adj(1),...adj(N-1), seed)):
      i = (packet(bier-header-entropy) XOR seed) % N
      forward packet to adj(i)
```



- Enhanced text of ECMP example about polarization to use different seed1 and seed2 to show how controllers can choose different seeds for multiple stages of an ECMP topoogy to avoid polarization.

- Refined explanation text

Changes

4.8.1 Routed Adjacencies

- Simplified example of how routed adjacencies can be used to reduce #BPs needed

-04:

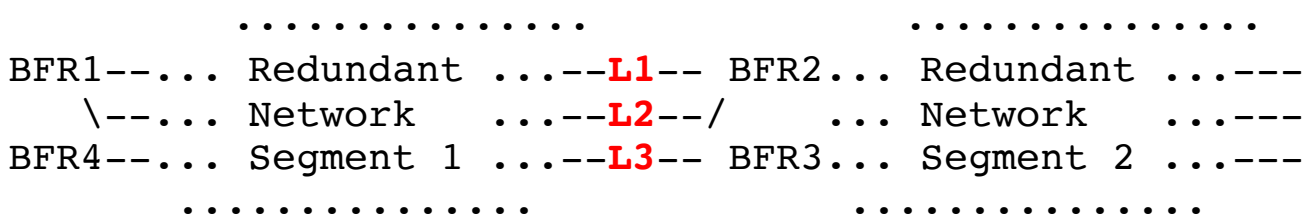


Figure 13: Routed Adjacencies Example

-05:

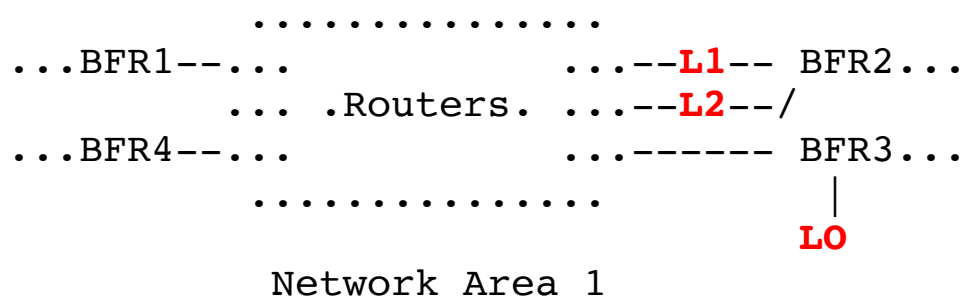


Figure 14: Routed Adjacencies Example

Changes

4.9 New section “reuse of BitPositions (without DNR)”

- Adds explanation about generic rules how BPs can be reused for multiple interfaces/links to save #BP
- Referring to prior section example pictures
- Rules are not too difficult to understand: Can not reuse bits when we can have “trees” where interfaces /links using the same BP could be happening sequentially in on branch
- But reuse can happen if those bits happen jusst in parallel across different branches

4.10 New section summary of BP optimizations

- restating the 4.1 … 4.9 classes of optimizations described.

Changes

6. Overhauled explanations for forwarding pseudocode
   - No change in pseudocode!
   - In BIER-TE when copy is made to one outgoing interface for the first BP routed across that interface, all other BP that would be forwarded to the same interface are reset. To avoid multiple copies to same interface (F-BM).
   - So processing of one BP depends on other BP
   - There is no such dependencies between processing of BPs in BIER-TE
   - If multiple BFER go across the same outgoing interface, its not those BFER BPs causing the copy, but the BP for the outgoing interface.
   - This may allow better / easier parallelization of processing of BPs in BIER-TE, e.g.: each outgoing interface/linecard may ONLY look at its BP and decide whether a copy is needed.
   - One benefit of the cost of using more bits than BIER.

Changes

7.2 Bit assignment comparison

- Dirk challenged rough numbers for “transit-hop” bits 20%...80%, no good research work done (randomn topologies, measurements), so reformulated this softer without these numbers (“can vary widely based on topology”).

8. BIER-TE and Segment-Routing

- Added explanation how senders can determine receivers to send packets to
- OR’ bits of receivers (BIER), OR bitstrings of paths to receivers (BIER-TE)
  When branches tor eceivers are independent (defined in prior section)
  Used in draft HTTP-response solution

THE END