

BIER Anycast MPLS Label

draft-chen-bier-anycast-label-00

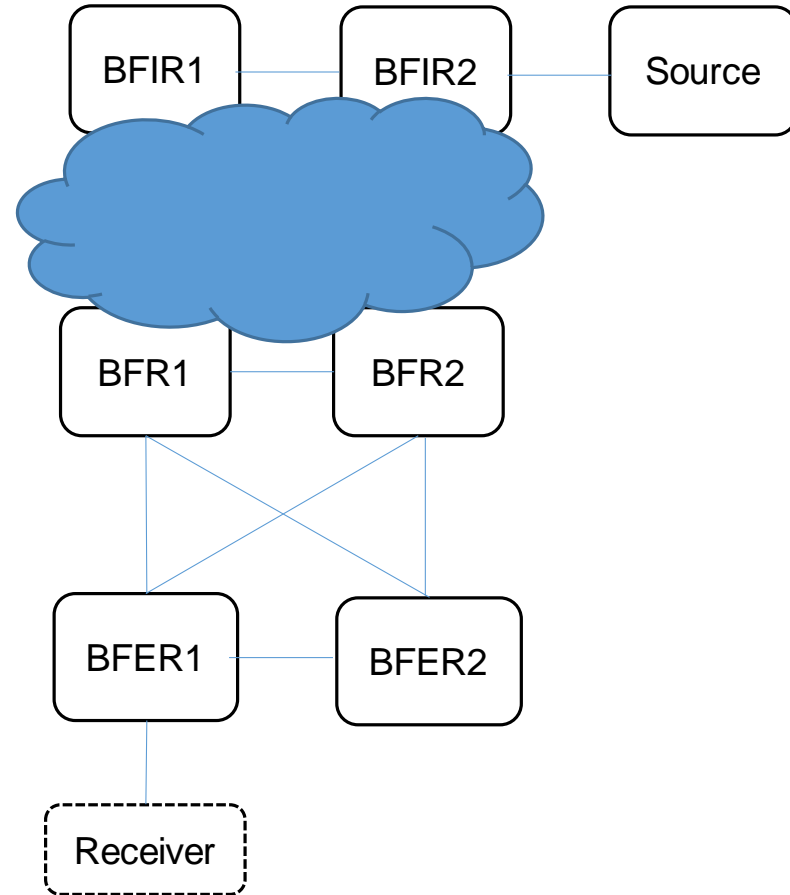
Siyu Chen@Huawei

Fanghong Duan@Huawei

IETF 119

Mar. 2024

Background



For certain network topology, BIER failure protection method are needed.

Topology:

- Each site has two BFR devices
- Each BFR can be backup device for the other BFR within the site

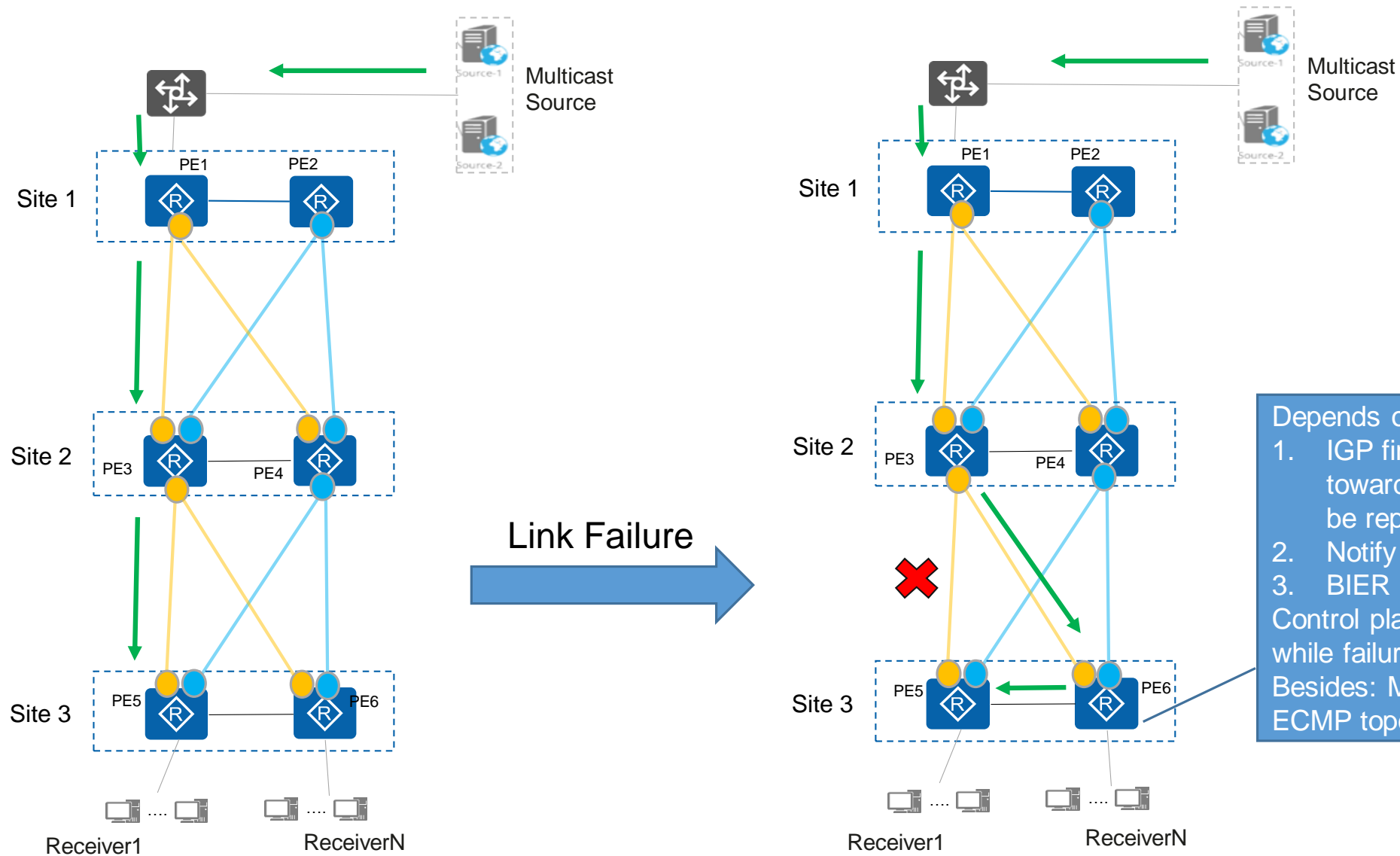
Failure Protection Method Requirements:

- Minimize reliance on unicast routing re-convergence
- Compatible with existed BIER protocol and signals such as BIER Info sub-sub-TLV
- Friendly to hardware platform

Proposed solution:

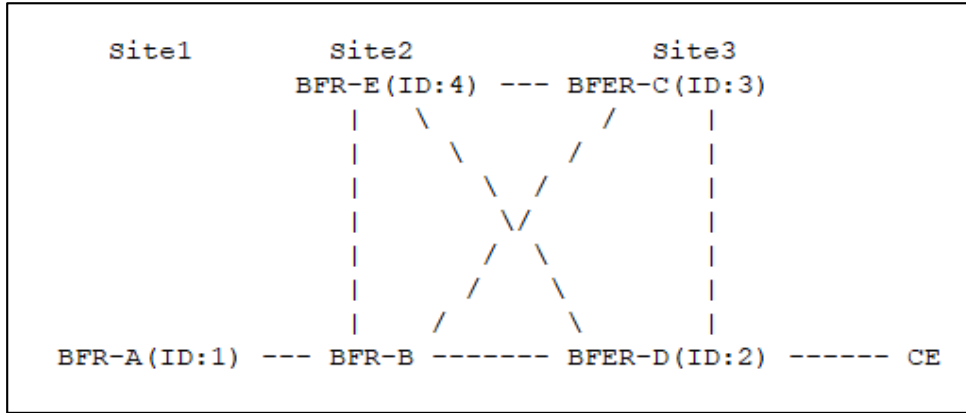
- Different BFRs within one site share **same Anycast MPLS Label** so that they can be combined as one entry in the upstream site BFR's BIFT table
- **Different Bypass MPLS Label utilized between BFRs** within one site so that they can forward BIER packets to each other

Problem: BIER Failure Protection Rely on IGP Re-convergence



Solution: Anycast and Bypass MPLS Label for Backup BIFT Entry

1. BIER and IGP protocol messages exchange between BFRs



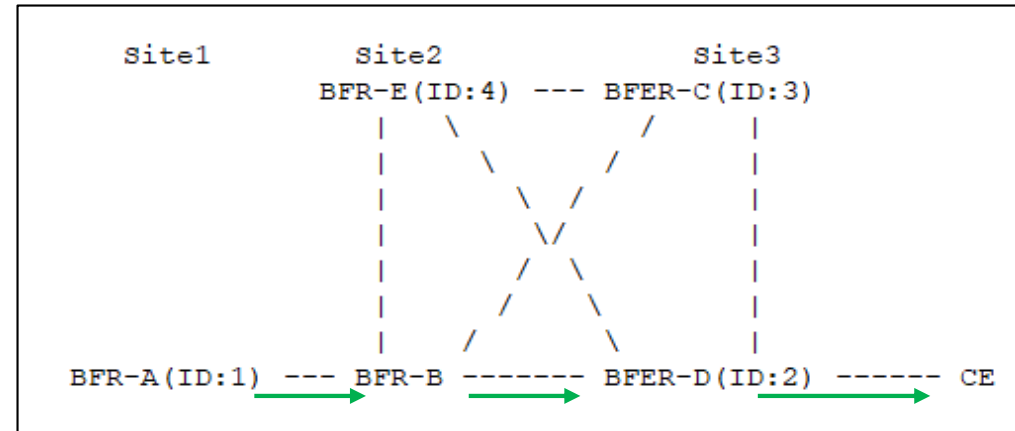
3. BFR-B generate BIFT table

BFR-B BIFT				
F-BM	BFR-NBR	NBR-Label	Link Status	
0001	A	AnycastLabel-1	UP	
0110	D	AnycastLabel-3	UP	
	c	AnycastLabel-3	UP	
1000	E	BypassLabel-21	UP	

2. Each BFR Advertises New BIER Info Sub-sub-TLV

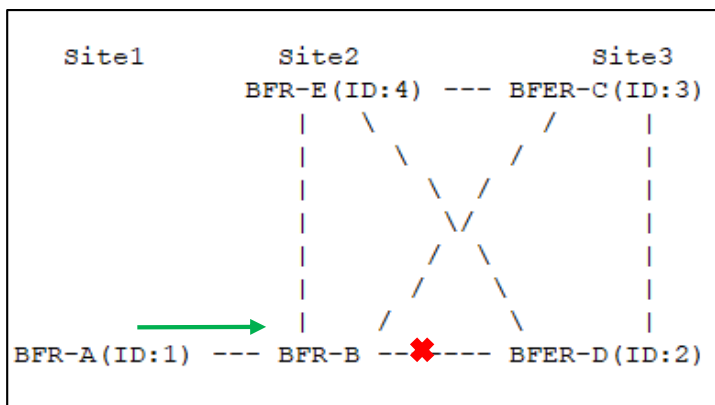
0										1										2										3									
0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+																																							
Type										Length																													
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+																																							
Max SI										BSL										(Bypass) Label																			
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+																																							
Type										Length																													
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+																																							
Max SI										BSL										Anycast Label																			
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+																																							

4. Flow can be forwarded along B → D → CE

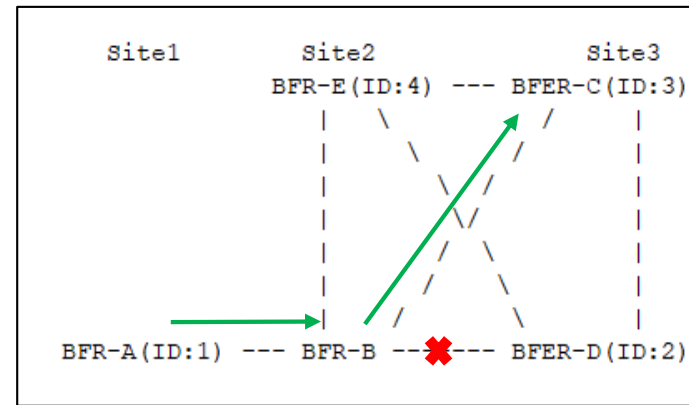


Failure protection

5. Links between B and D broken, B directly forward flow to C

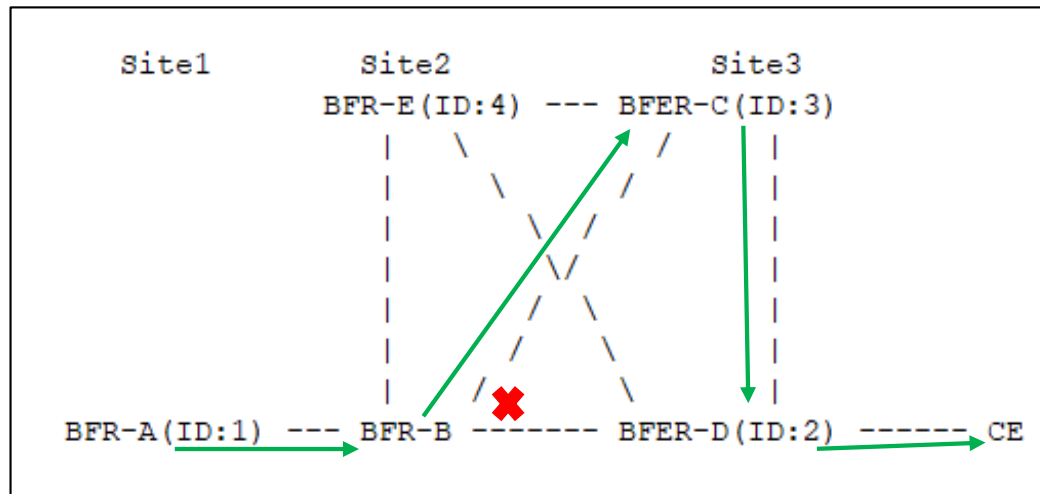


BFR-B BIFT			
F-BM	BFR-NBR	NBR-Label	Link Status
0001	A	AnycastLabel-1	UP
0110	D	AnycastLabel-3	DOWN
	c	AnycastLabel-3	UP
1000	E	BypassLabel-21	UP



6. Locate BIFT table with MPLS Label 3, BFER-C. Lookup BIFT with BFRID: 2, then forward to BFER-D using Bypass Label

BFR-C BIFT		
F-BM	BFR-NBR	NBR-Label
0010	D	BypassLabel-32
1001	E	AnycastLabel-2
	B	AnycastLabel-2



Advantages

- Failure recovery immediately
- No additional BIER packet edition, BFR won't modify its existing behavior of packet encapsulation
- Minimize reliance on IGP re-convergence
- Adding Anycast MPLS Label, which will not affect BFR-id and BFR-Prefix's uniqueness

Next Steps

- BIER WG reviews and comments
- Optimize solutions

Thanks