

# BIER-TE Fast ReRoute

draft-chen-bier-te-frr-00

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# Introduction

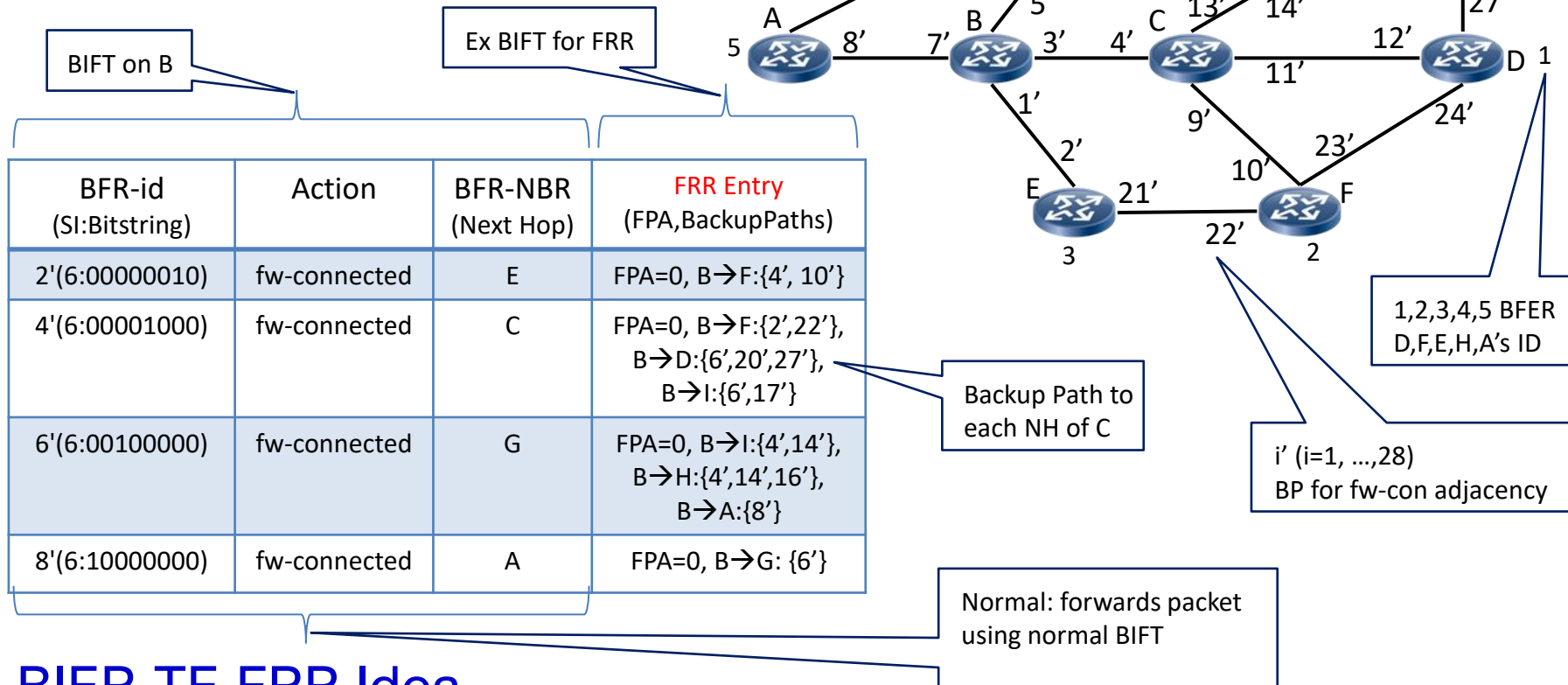
## Fast Protection for BIER-TE (called BIER-TE FRR)

- Fast Re-Route (FRR) protection for transit nodes in BIER-TE domain
- No per-flow state in the core

# BIER-TE FRR Overview

## BIER-TE Overview

- BIFT has forwarding entries for its adjacency BPs
- Forwards packets using BIFT



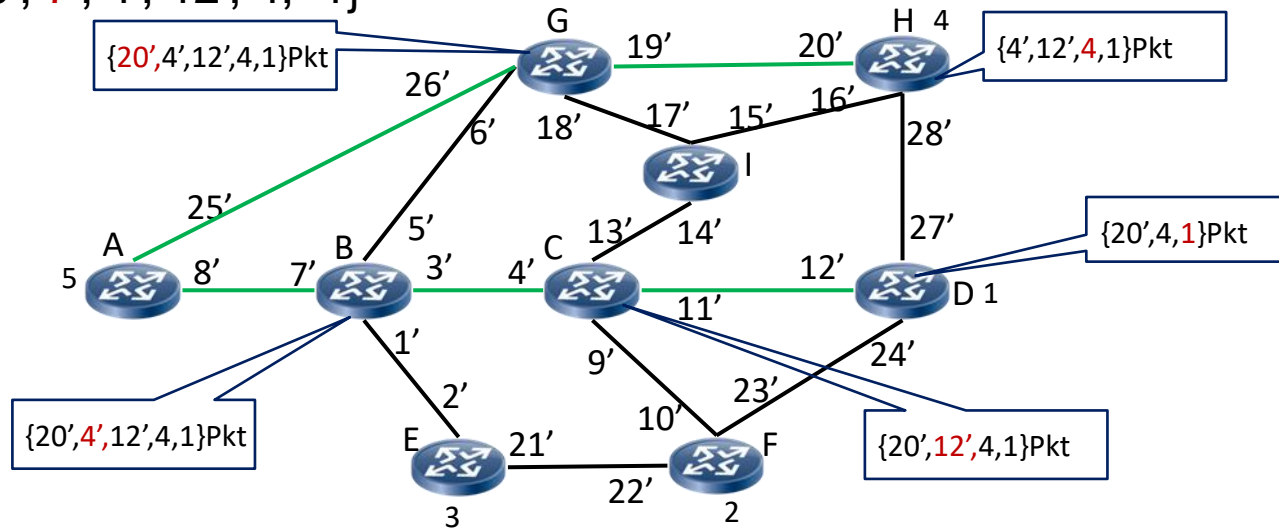
## BIER-TE FRR Idea

- A **FRR entry** is added for each forwarding entry with NH N, contains flag FPA, a backup path to each N's NH
- It forwards packets with BP to N to N's NHs on the path using FRR entry when N fails

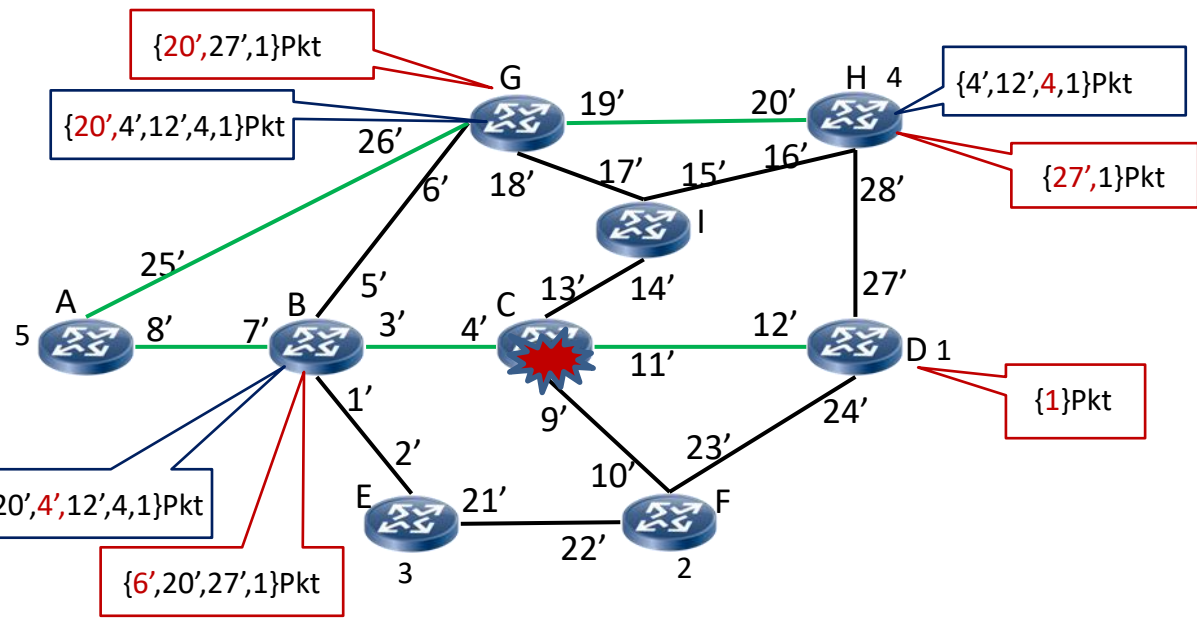
# BIER-TE FRR Details by Example

Path A to D, H: {26', 20', 7', 4', 12', 4, 1}

Packet with path in normal operations



Packet with path when BFR C fails



	BFR-NBR (Next Hop)	FRR Entry (FPA, BackupPaths)
4'	C	FPA=1, B→F:{2', 22'}, B→D:{6', 20', 27'}, B→I:{6', 17'}

Remove 4 not on branch from B, add B→D

# Updated Forwarding Procedure (1)

For BFR-NBR N as transit of path encoded in a packet,

FPA == 1? (N fails?) // When detecting N failure, FPA is set to 1

If so, clears BP for adjacency to N,

For any BP for BFER,

removes it if it is on backup path and not on branch from PLR

For each N's NH on path,

copies and sends the packet to NH along backup path.

Clears BP for adjacency from N to NH,  
adds BPs for backup path

# Updated Forwarding Procedure (2)

```
Packet = the packet received by BFR;
FOR each BP k (from the rightmost in Packet's BitString) {
  IF (BP k is local decap adjacency) {
    copies Packet, sends the copy to the multicast
    flow overlay and clears bit k in Packet's BitString
  } ELSE IF (BP k is forward connect adjacency of the BFR) {
    finds the forwarding entry in the BIER-TE BIFT for the domain
    using BP k
    IF (FPA == 1) { //FRR for BFR-NBR/transit N is Active
      Clears BP k in Packet's BitString
      FOR each BP j for a BFER in Packet's BitString {
        IF (BP j is on a backup path and
            is not reachable by BPs in BitString) {
          Clears BP j in Packet's BitString;}}
      FOR each N's next hop on P2MP path in Packet's BitString {
        Clears the BP for the adjacency from N to the next hop;
        Adds the BPs for the backup path to N's next hop
        into Packet's BitString;}
    } //Adjacency to N removed, backup path to N's next hop added
  } ELSE {
    Copies Packet, updates the copy's BitString by
    clearing all the BPs for the adjacencies of the BFR,
    and sends the updated copy to BFR-NBR
  }
}
}
```

# Next Steps

- Welcome comments