

BIER BOF

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draft-wijnands-mpls-encapsulation-01

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Parameters for BIER Forwarding of Data Packets

- Set of Egress BFRs (BFERs)
 - Encoded as set of 1's in a BitString
 - To interpret BitString, must know:
 - *Length* of BitString
 - *SetId*: which BFR-id is represented by low-order bit
- Which underlay is being used
 - To find *next hops* for each packet
- Entropy
 - For ECMP
- These parameters must be inferable from data packet header

Encaps

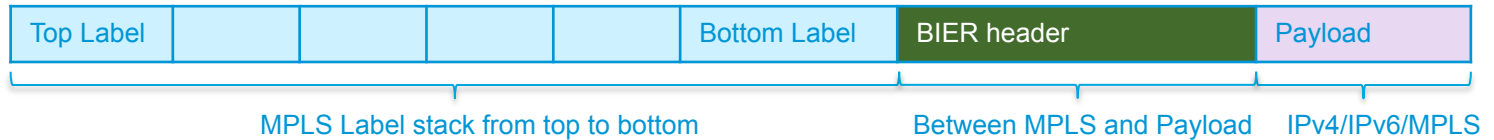
dispatch *payload* (part of packet beneath BIER header)

- Allow payload to be MPLS packet

Strategy Behind Design of Encaps

- Since BIER already has IGP-based control plane, needed to advertise BIER already has IGP-based control plane, needed to advertise BFR Ids, etc.
 - Piggyback on this to allow each BFR to assign an MPLS label to the triple: $\langle \text{SetId}, \text{BitString Length}, \text{underlay} \rangle$
 - Piggyback on this to allow each BFR to assign an MPLS label to the triple: $\langle \text{SetId}, \text{BitString Length}, \text{underlay} \rangle$
 - (Detail: OSPF draft actually assigns *label range* to *sequence of SetIds*, instead of assigning single label to single SetId) , instead of
 - No additional MPLS control protocols are needed
- No additional MPLS control protocols are needed
- MPLS label serves as a (locally significant) lookup key for this triple
- MPLS label serves as a (locally significant) lookup key for this triple
 - Appears as *bottom label* of label stack
 - Label precedes BIER header:
 - Appears as *bottom key* of *Label Index Forwarding Table*
- Serves as lookup key for proper *Bit Index Forwarding Table*
- Additional labels (as needed for app) may follow BIER header, as part of payload
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- Integrates BIER well with MPLS transport and with MPLS-based applications
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MPLS BIER Header



Top Label	(Note: Bottom Label will usually be the only label in this stack)		
Bottom Label	Represents SetId, underlay, and BitString length; also indicates that BIER header is following.		
BIER header	The BIER header encoded between MPLS and payload		
Payload	Payload (type is indicated in the BIER header)		
0	1	2	3

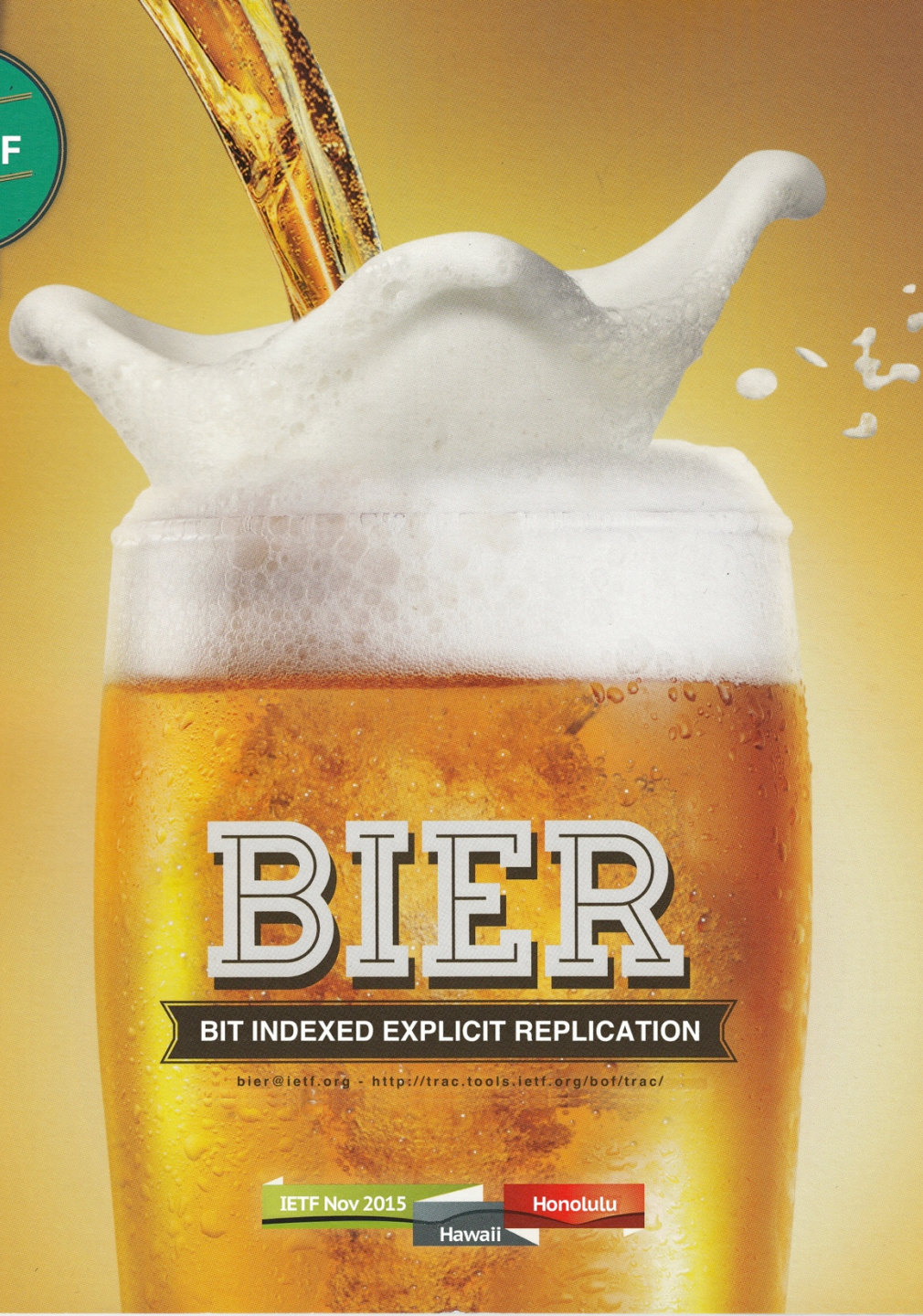
I: BFIR-id present

Advantages of Integration with MPLS

- Flexibility to add additional forwarding parameters without changing the encapsulation format
 - Example: maybe the best way to identify an underlay is with a TLV; one could bind a label to a TLV, but one wouldn't want the TLV in the data packet encapsulation header.
- Leverages MPLS forwarding procedures
 - Label maps to *Bit Index Forwarding Table*
 - Reduces need to string together lookup key out of multiple header fields
 - Very simple integration with MPLS protection schemes
- No need for additional layer 2 codepoints
- When MPLS based FRR is used, no need for special label to indicate payload is BIER

Controversies re MPLS Integration

- “I like BIER, but I hate MPLS”
 - Rename the “MPLS Label” to be the “BIER Lookup Key”
- “Having to maintain and distribute locally significant lookup keys requires too much state and protocol.”
 - Compared to the amount of state and protocol required to maintain/distribute the BFR-ids???
- “My hardware can’t swap header fields”
 - Hard to do BIER (or even IP) if you can’t modify the header fields!
- “But isn’t it better if *one size fits all*?”
 - No.
- A longer, non-MPLS, encapsulation could easily be developed
 - may be a viable option in some environments,
 - but that doesn’t eliminate the advantages of using the MPLS encapsulation.



BIER

BIT INDEXED EXPLICIT REPLICATION

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Thank you.