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Communication Networks

Stateless MNA-based Egress Protection (SMEP)

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draft-ihle-mpls-mna-stateless-egress-protection-00

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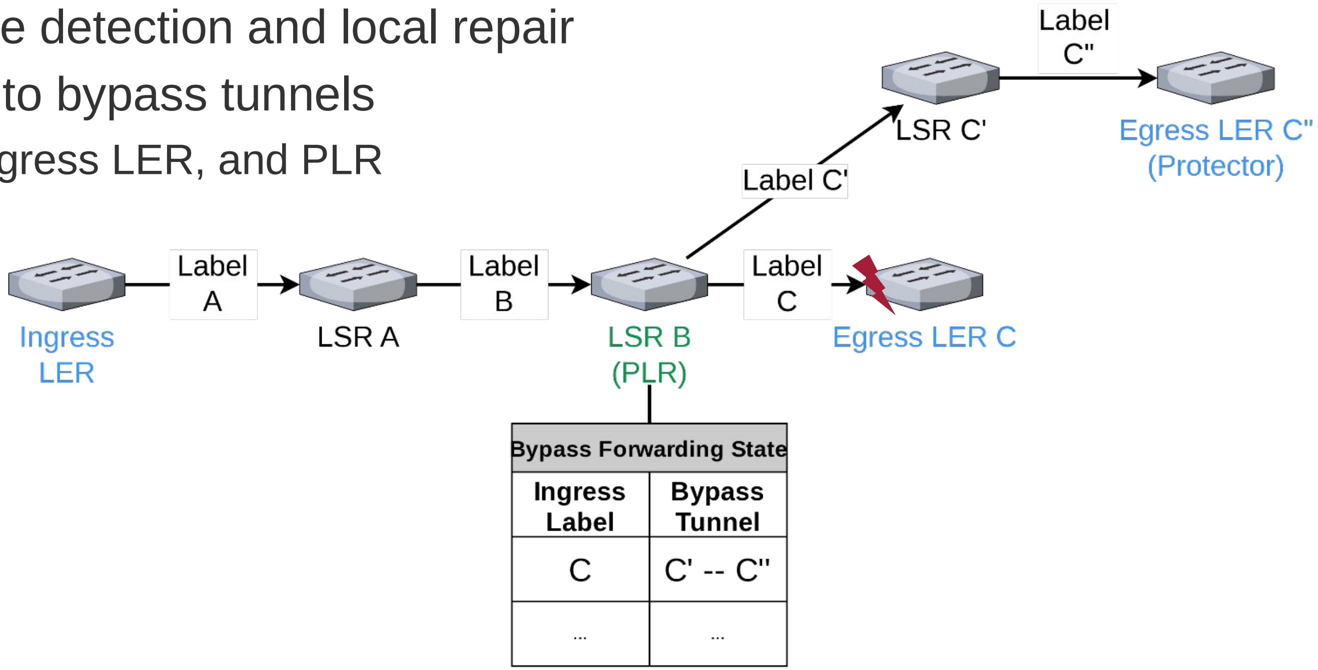
Introduction

- MPLS Egress Protection Framework (RFC 8679) establishes bypass tunnels for egress routers on an egress failure
  - Relies on Point of Local Repair (PLR) for failure detection and local repair
  - PLR maintains a mapping of transport tunnels to bypass tunnels
    - Signaled between egress LER, Protector LER, ingress LER, and PLR



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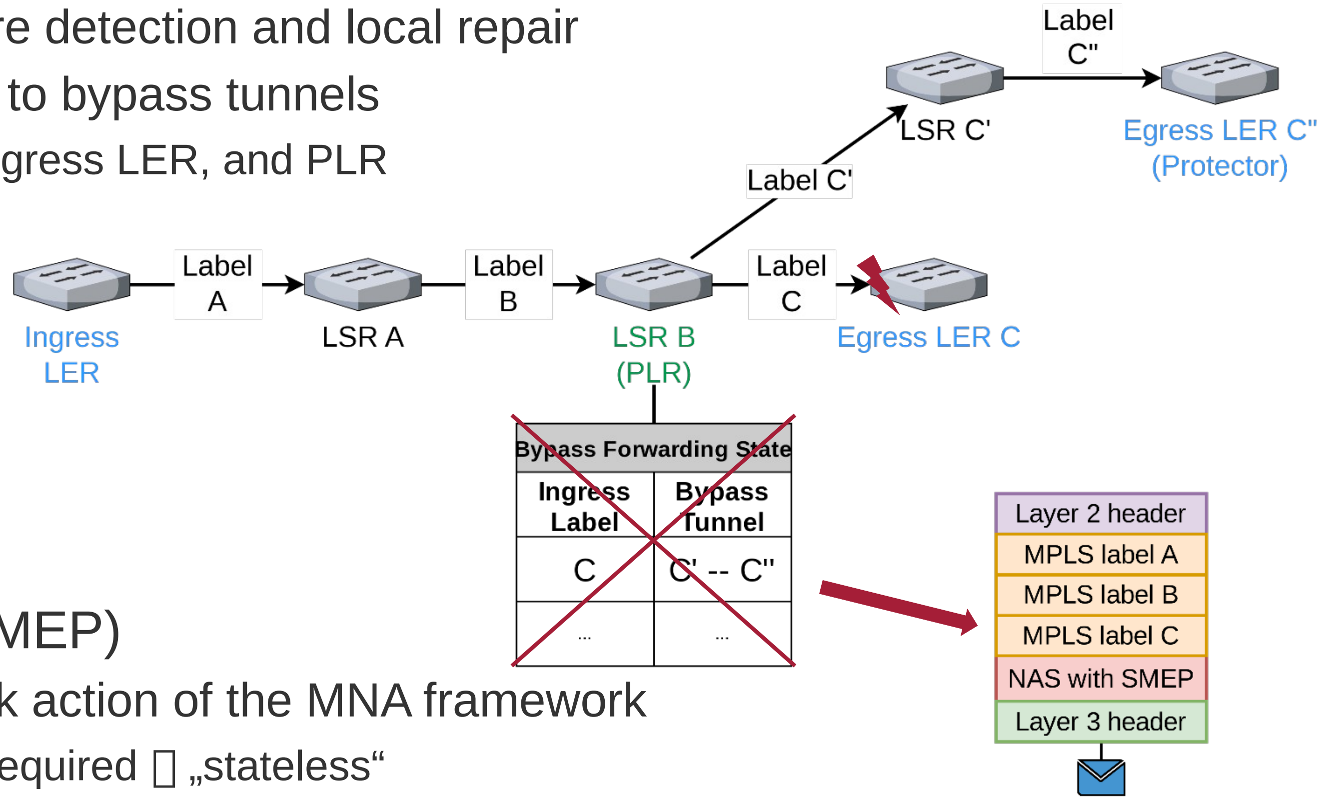
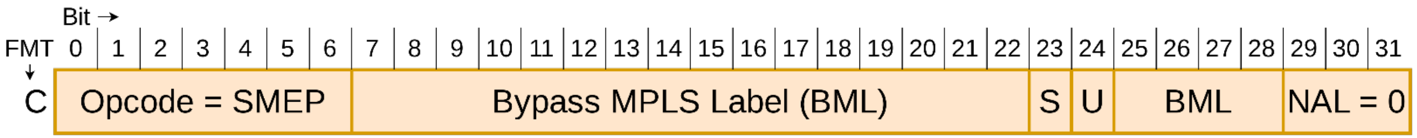


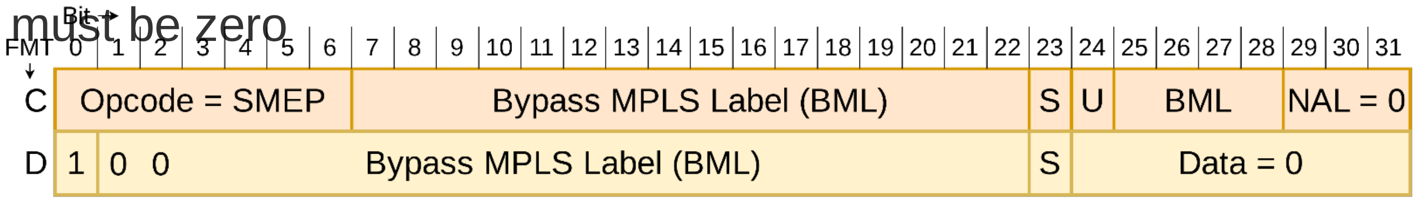
- Stateless MNA-based Egress Protection (SMEP)
  - Egress bypass tunnels are carried in a network action of the MNA framework
    - No mapping from label to bypass tunnel in PLR required □ „stateless“
    - Signaling with the PLR is not required anymore
  - PLR uses the bypass MPLS label (BML) from the network action to reroute traffic on an egress failure

SMEP Network Action Encoding

- Format C LSE required
  - 20 bits of AD
    - 16 most-significant bits of bypass MPLS Label (BML) in first data field
    - 4 least-significant bits in second data field



- Optional Format D LSE
  - Encode a Segment Routing Bypass Tunnel
  - Two most-significant bits in first data field must be zero
  - Second data field must be zero



SMEP Network Action Processing

- Ingress LER includes bypass MPLS labels in the network action
  - Must be placed in-stack with select scope for penultimate node (PLR)
  - Requires signaling between egress / protector node and ingress node just as in the MPLS Egress Protection Framework
    - But no signaling to PLR required!

- The PLR MUST use the bypass MPLS label from the SMEP network action on an egress failure
  1. Extract BML from AD of network action
  2. Pop incoming MPLS label
  3. Push BML onto the stack
  4. Pop SMEP network action
  5. Forward according to top-of-stack BML

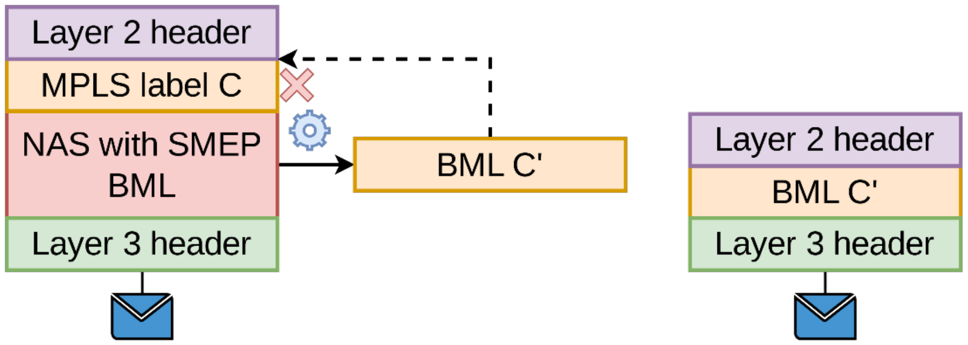
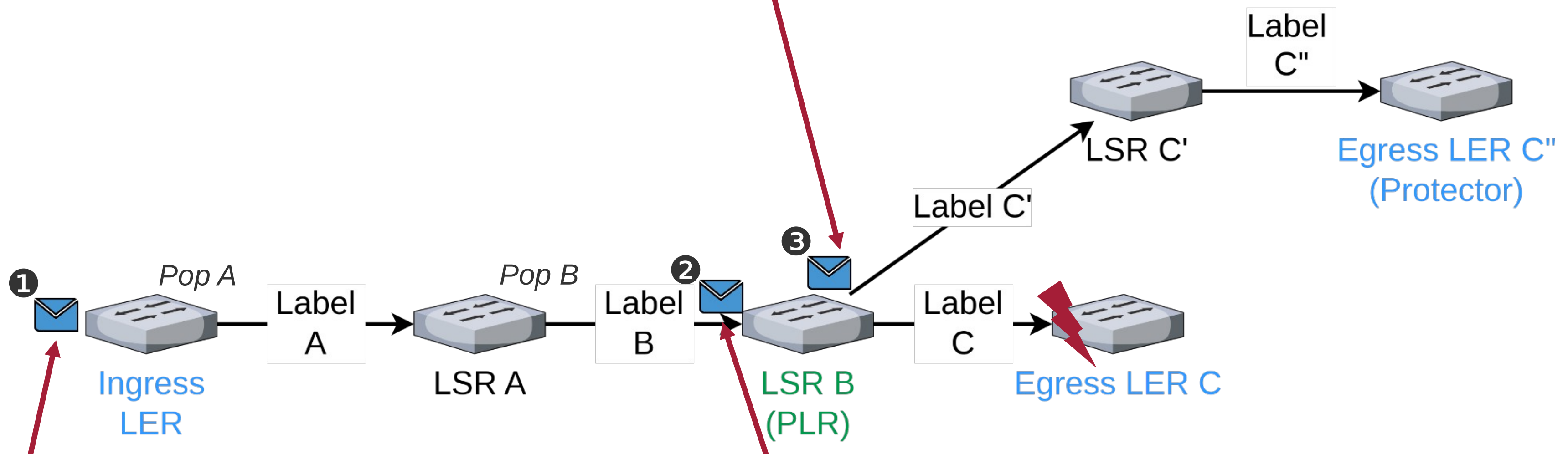


Fig. Application of SMEP network action (left), resulting MPLS stack (right).

Example

MPLS label = C'	TC	S	TTL
MPLS label = C''	TC	S	TTL



FMT								
	MPLS label = A	TC	S	TTL				
	MPLS label = B	TC	S	TTL				
	MPLS label = C	TC	S	TTL				
A	MPLS label = bSPL (MNA)	TC	S	TTL				
B	Opcode = *	Data	R	IHS	S	U	NASL = 2	NAL = 0
C	Opcode = SMEP	Bypass MPLS Label (BML) = C'	S	U	BML	NAL = 1		
D	1	0 0	Bypass MPLS Label (BML) = C''	S	Data = 0			

	MPLS label = C	TC	S	TTL				
A	MPLS label = bSPL (MNA)	TC	S	TTL				
B	Opcode = *	Data	R	IHS	S	U	NASL = 2	NAL = 0
C	Opcode = SMEP	Bypass MPLS Label (BML) = C'	S	U	BML	NAL = 1		
D	1	0 0	Bypass MPLS Label (BML) = C''	S	Data = 0			

Security / IANA Considerations

- The security issues discussed in [I-D.ietf-mpls-mna-hdr] and in [RFC8679] apply to this document.

- This document requests that IANA allocates a new codepoint with the name "Stateless MNA-based Egress Protection" in the "Network Action Opcodes Registry".

MNA Opcode	Description	Reference
TBA1	Stateless MNA-based Egress Protection	This document

Next steps: Questions, Comments, Discussion

THANK YOU