

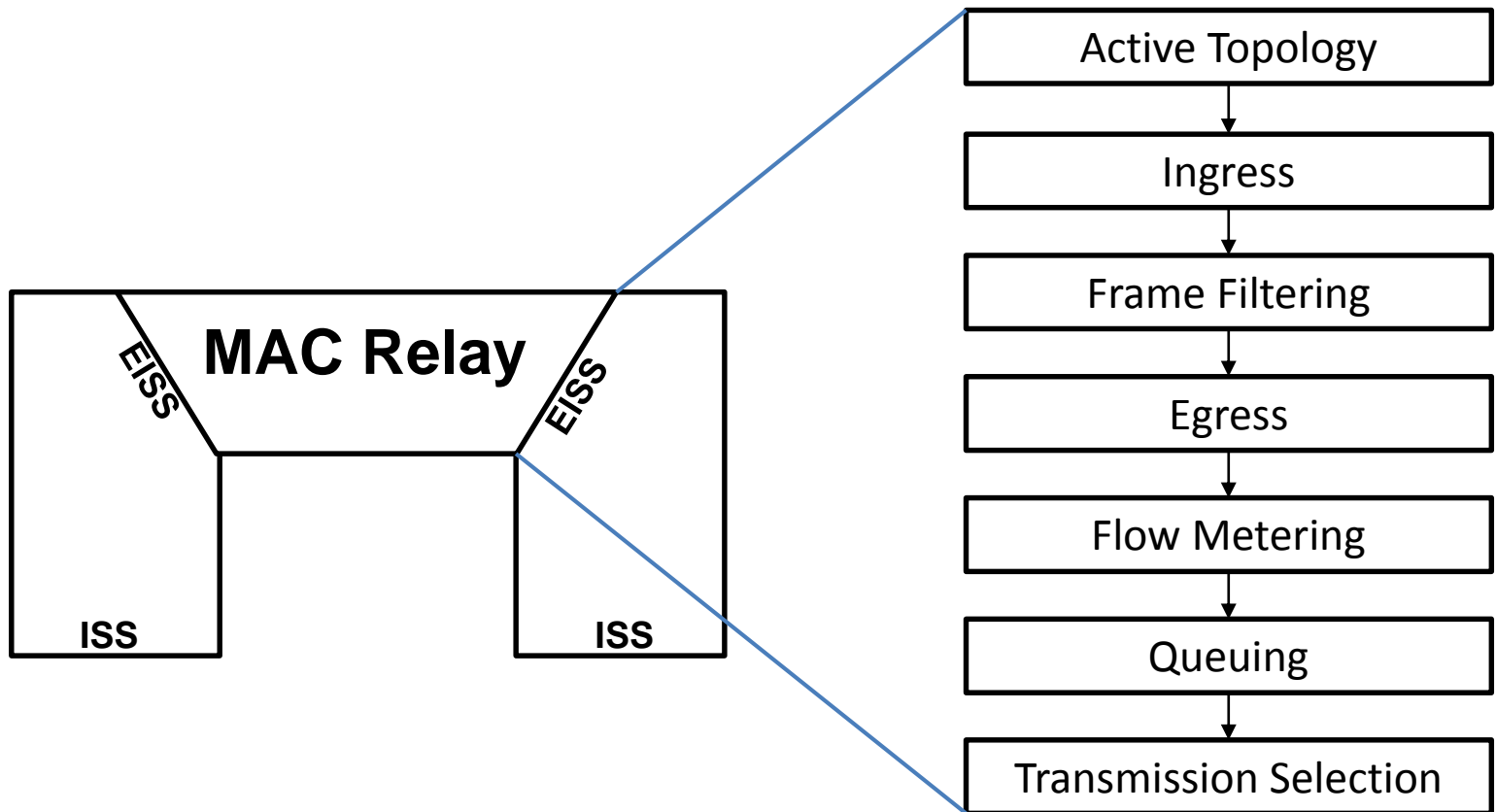


automotive | mobile automation | embedded systems

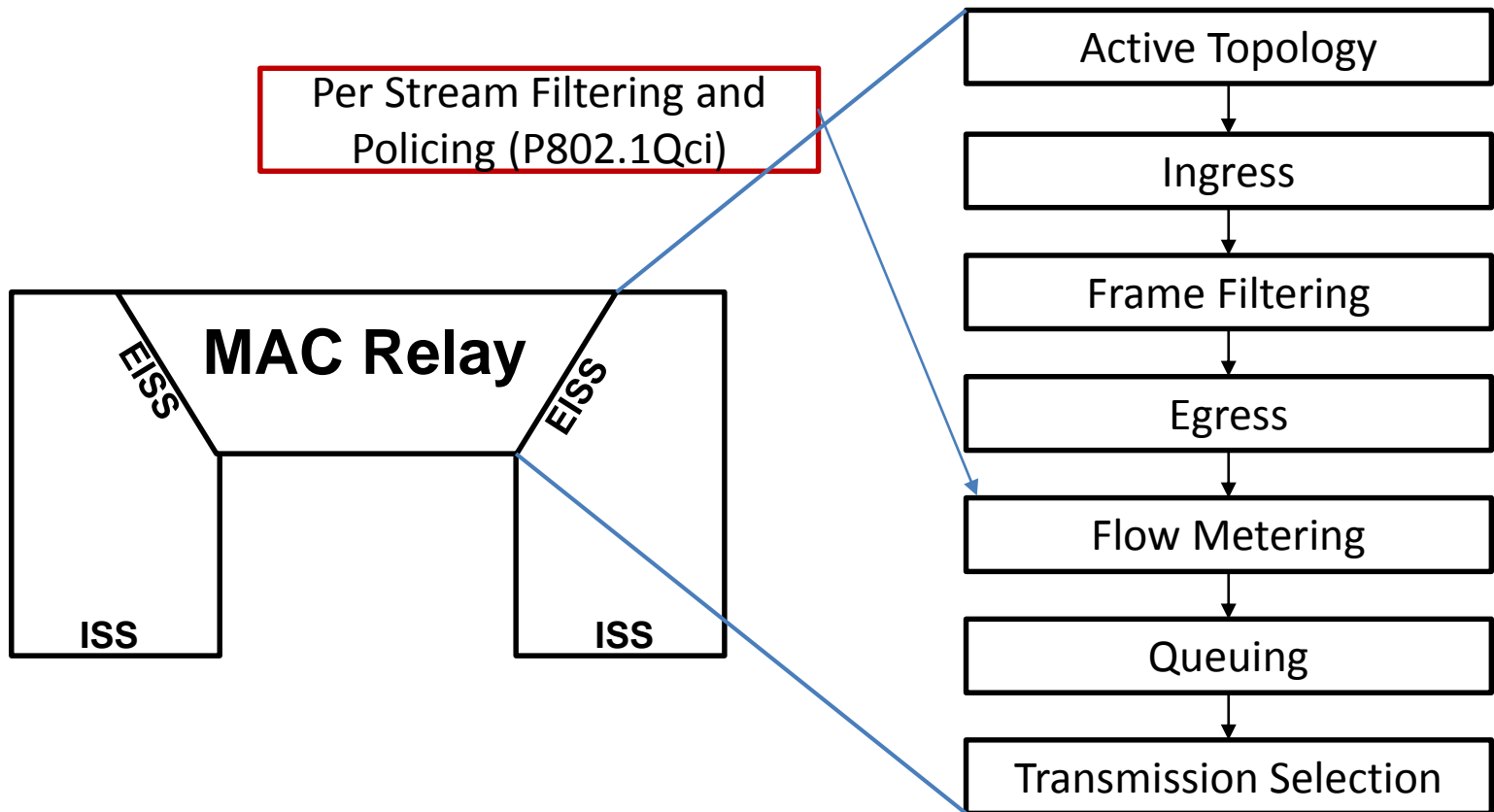
# 802.1CB and Qci Layering

Christian Boiger  
christian.boiger@b-plus.com  
IEEE 802.1 Interim  
September 2015  
San Jose, CA

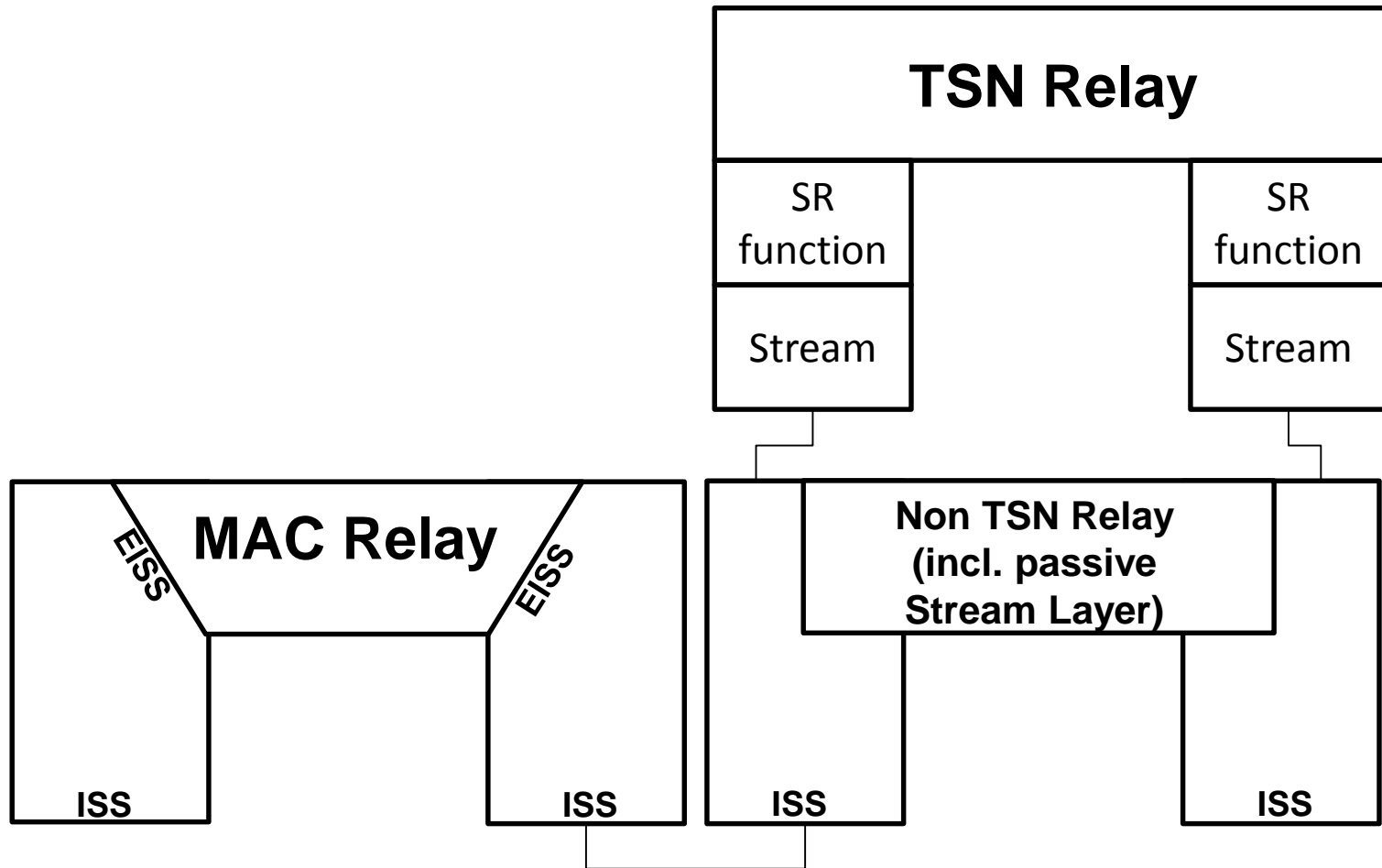
# Current MAC Relay



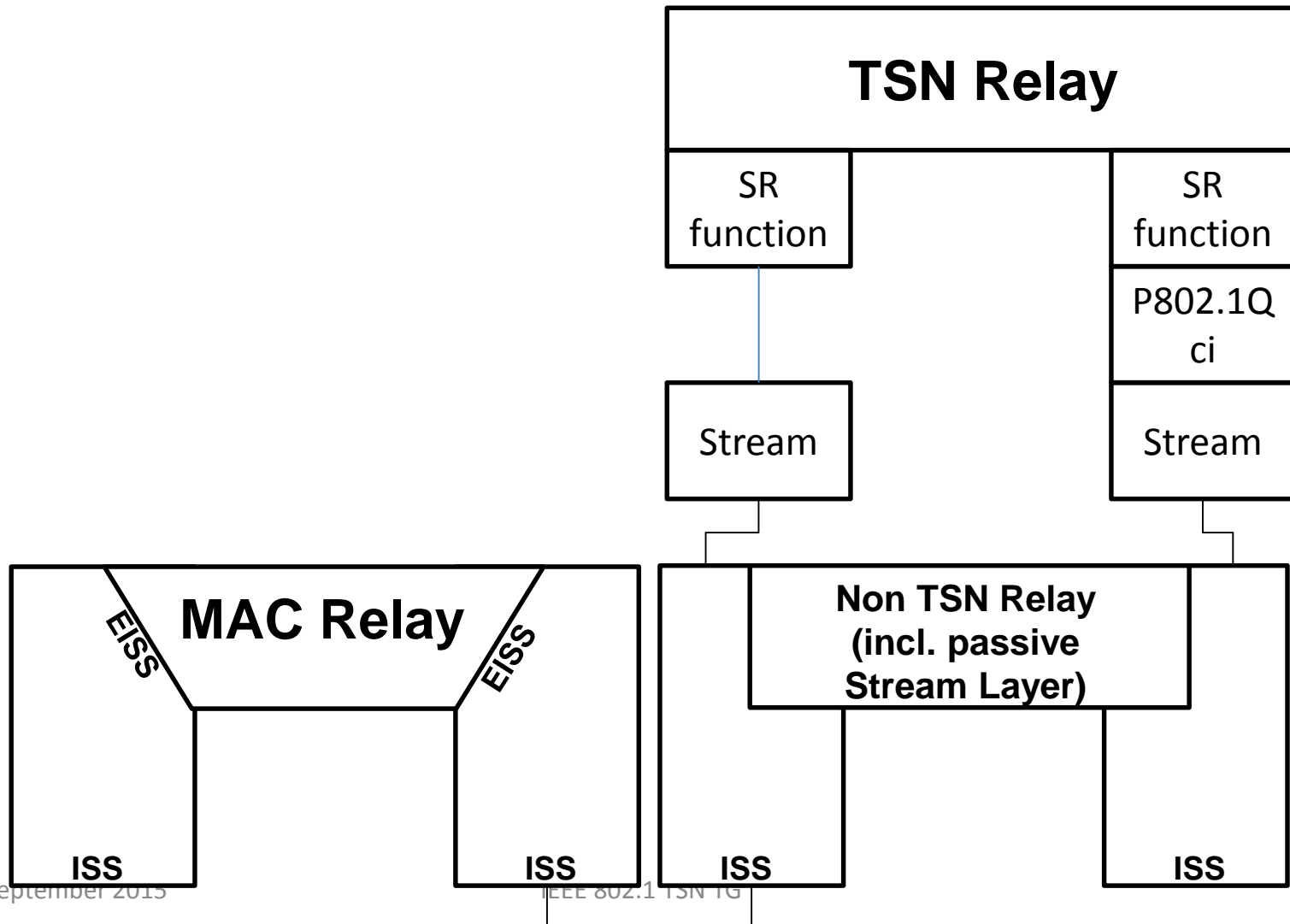
# Per Stream Filtering and Policing P802.1Qci



# Layering Described in P802.1CB D1.1



# 802.1CB with 802.1Qci as shown in 802.1CB D1.1 C.3



## Issues with the current proposal

- The stream identification is needed for 802.1Qci but is defined in 802.1CB (Seamless Redundancy) so parts of Qci need to be in the MAC Relay
- 802.1CB defines that 802.1Qci is used outside the MAC Relay
- This seems to be not a very clean approach and is very confusing for the reader
- Does this mean that there is an additional separate implementation of Qci necessary for each port besides the Qci implementation in the MAC Relay?
- In the CB layering approach the Qci implementation is above the Non TSN Relay -> so the Qci implementation on this side only supports TSN streams?

## Issues with the current proposal

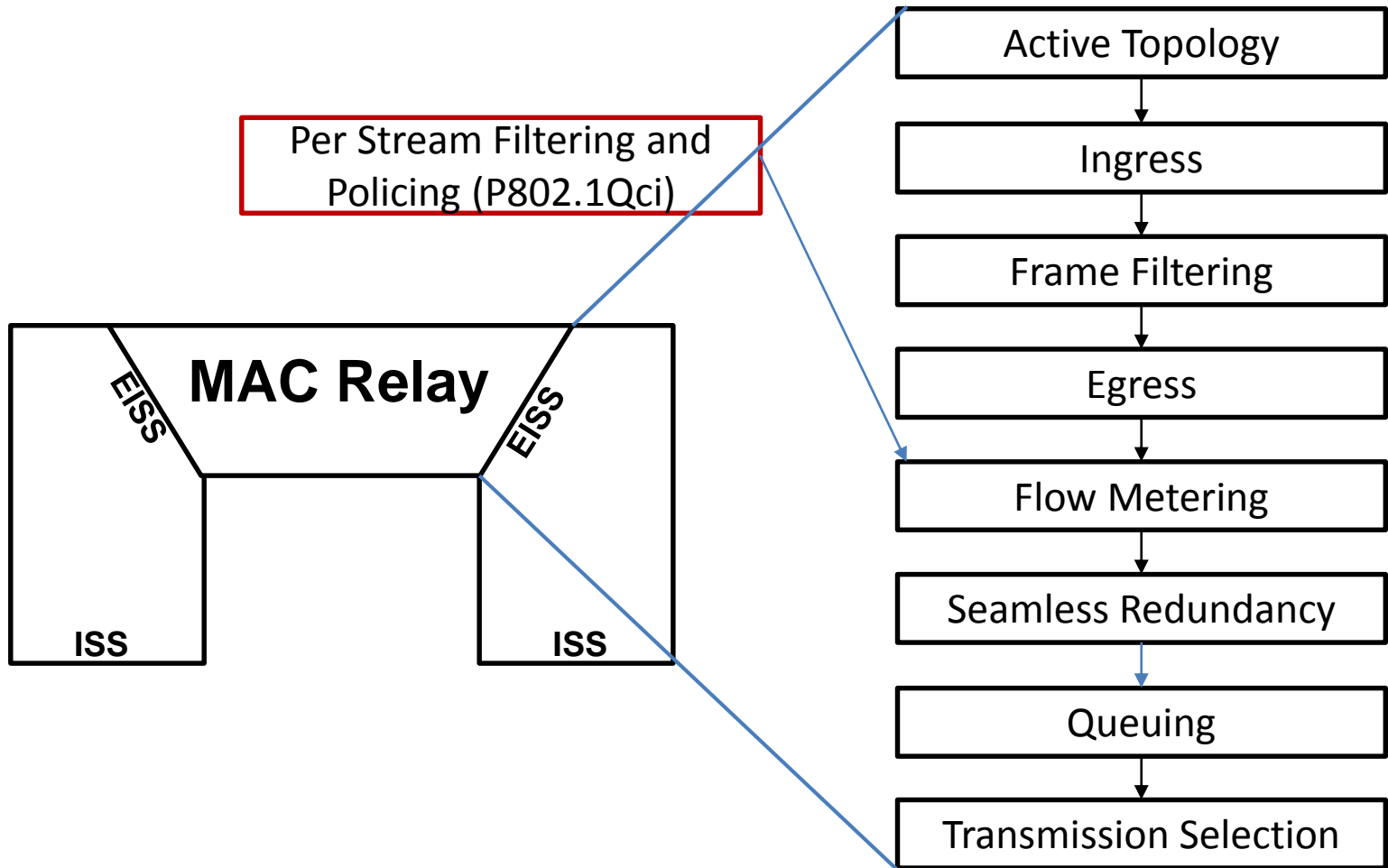
- The main problem of the current approach of 802.1CB seems to be that it tries to define the “whole world of TSN” for all layers (incl. layer 2, 3, 4)
- For seamless redundancy this is not necessary
- Seamless redundancy requires a sequence number, currently this sequence number is encoded in a layer 2 tag
  - layer 2 is required for Seamless Redundancy as defined today
  - there is no reason to try to put layer > 2 related topics in CB (for seamless redundancy)

## Proposal

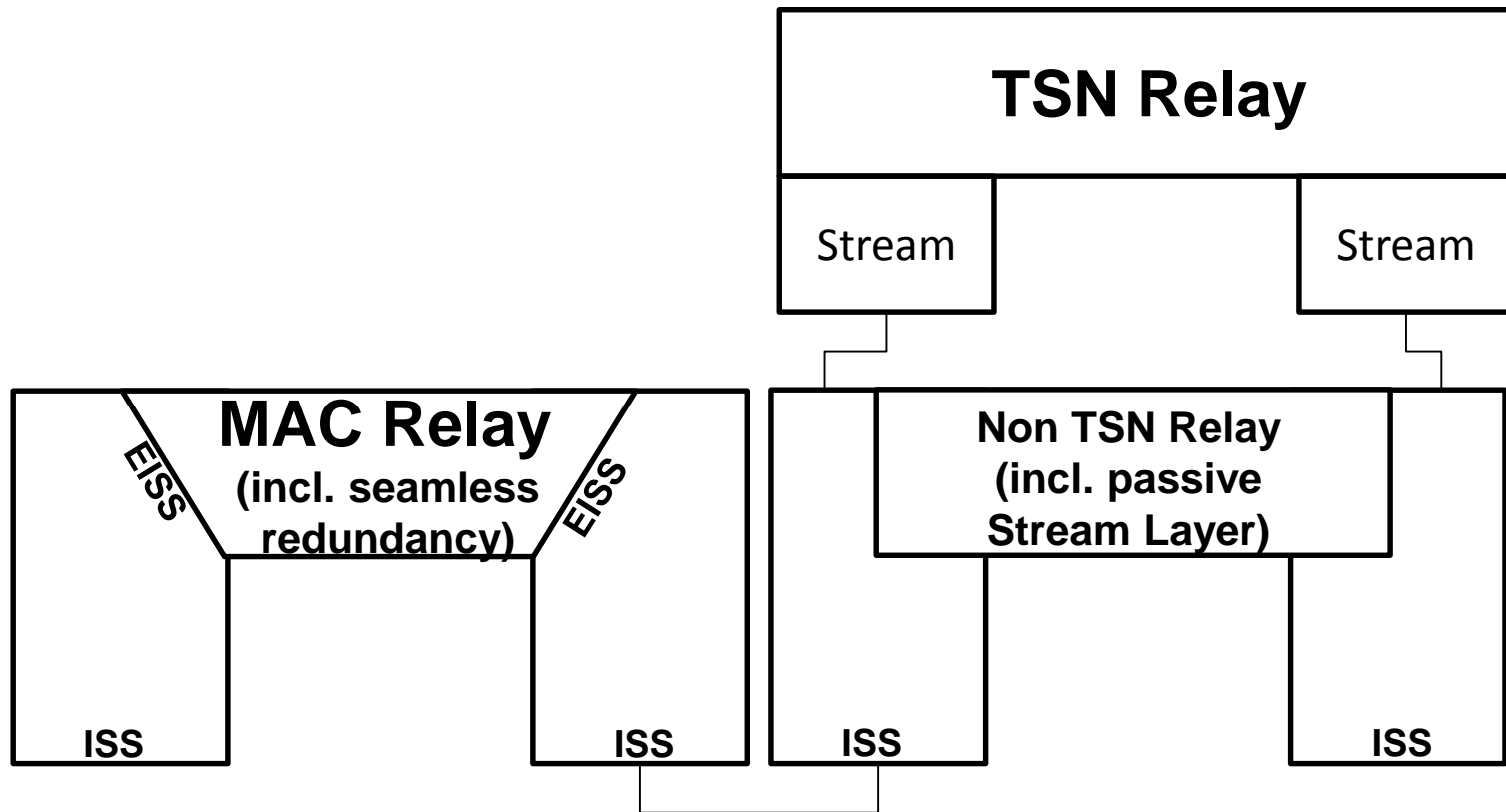
- Get rid of the “Popeye arm” for seamless redundancy, it is not necessary
- All of the seamless redundancy related functions can be handled inside the MAC Relay
- The identification of streams can be based on layer 2 fields as it is done for AVB
- “But we want to tunnel/proxy layer  $\geq 3$ ”
  - Yes, but this is completely orthogonal to seamless redundancy
  - Proxying other traffic is a completely different topic
  - The “Popeye arm” can be used as a middlebox for TSN unaware end stations



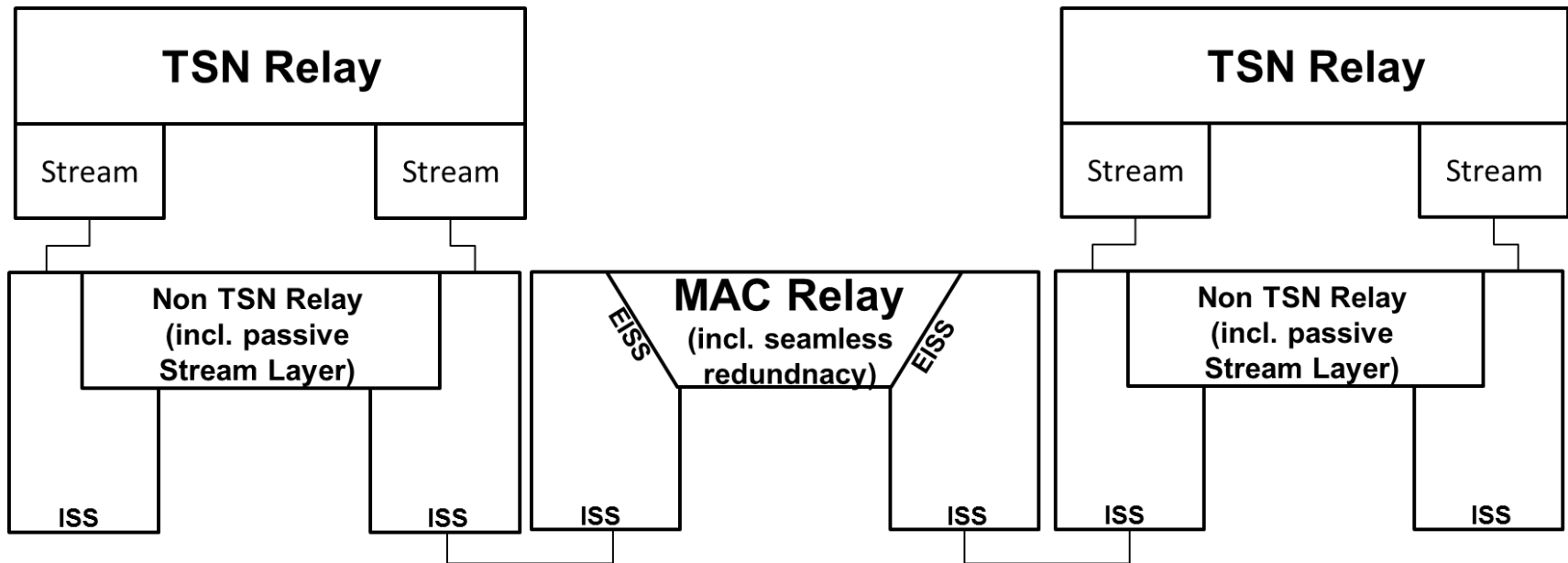
# Seamless Redundancy inside the MAC Relay



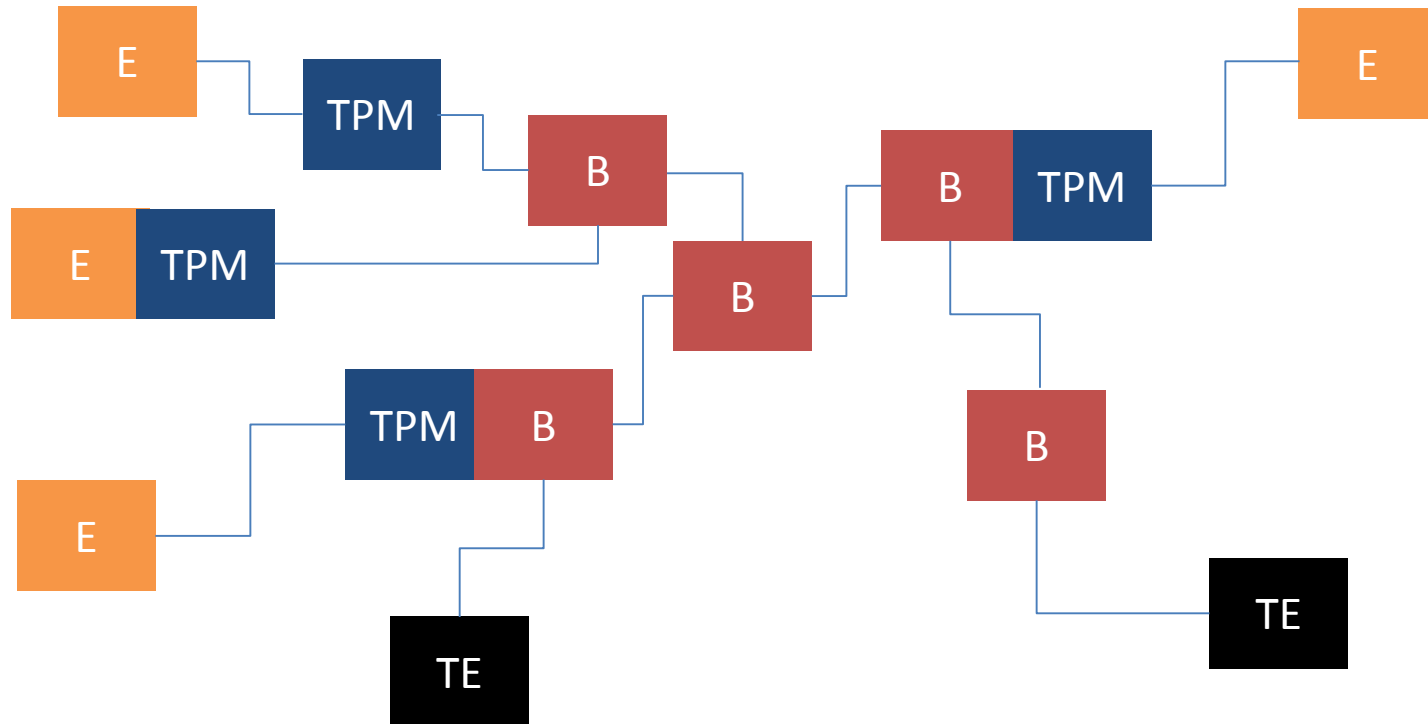
# Seamless Redundancy with TSN Proxy Middlebox



# Seamless Redundancy with TSN Proxy Middlebox



# Bridged TSN Network with TSN Proxy Middleboxes



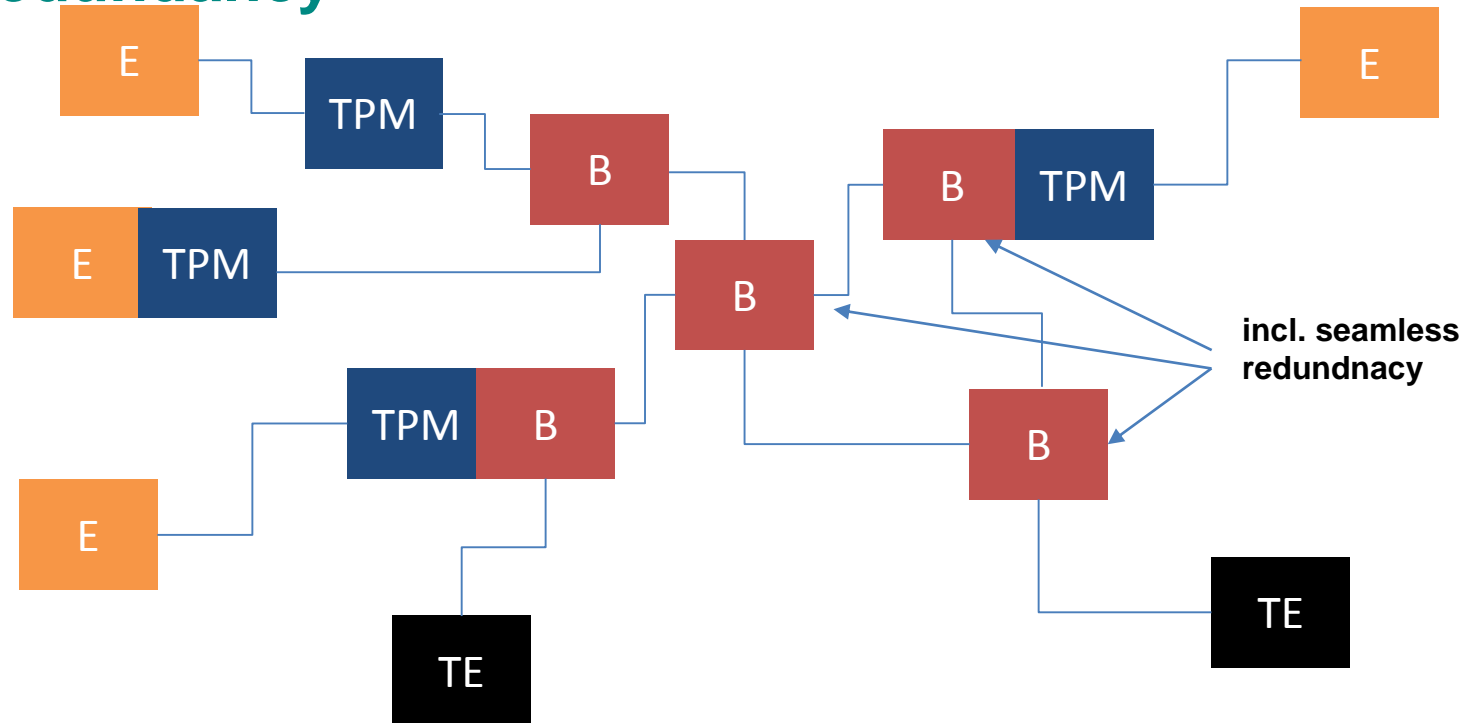
**E** Non TSN end station with time-sensitive streams

**TE** TSN end station

**TPM** TSN Proxy Middlebox

**B** TSN Bridge

# Network with TSN Proxy Middleboxes and Seamless Redundancy



**E** Non TSN end station with time-sensitive streams

**TE** TSN end station

**TPM** TSN Proxy Middlebox

**B** TSN Bridge



automotive | mobile automation | embedded systems

# Thank You