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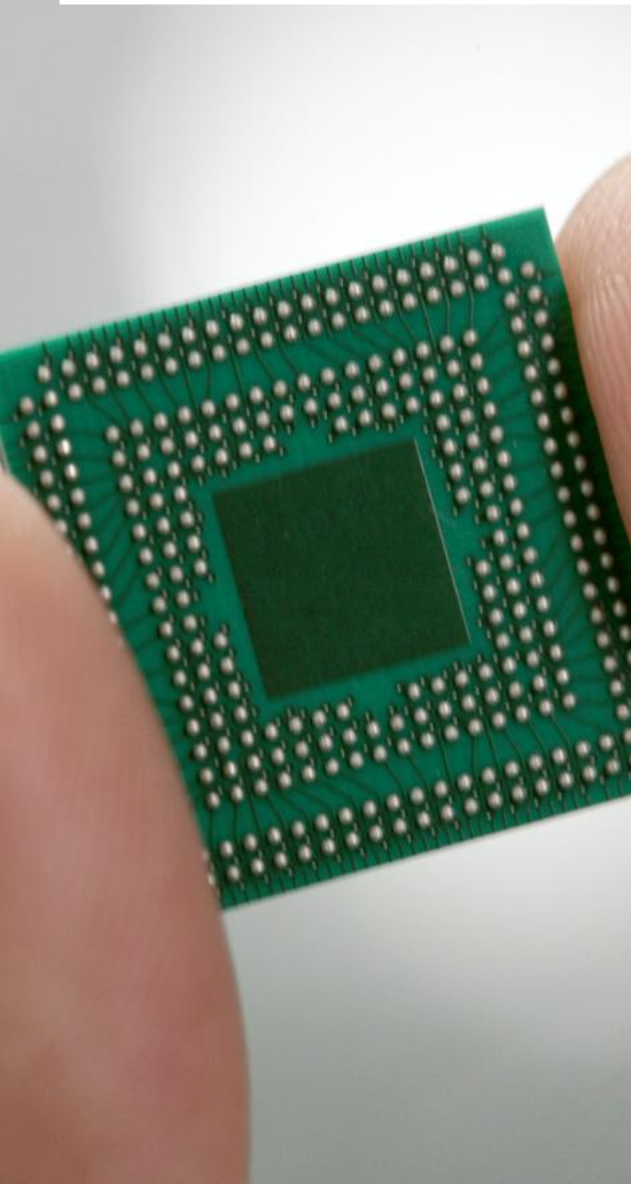

Preemption

January 2014

IEEE 802.3 TG Interspersing Express Traffic

Indian Welss (CA)

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Content

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- Proposal of a possible solution
- Proposal for negotiation between the two peers after LinkUp

Expected Features

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- Preemption shall operate on a link basis
- Preemption should only be active if both sides of the link supports preemption
- A preemptive frame can preempt the transmission of a preemptable frame one or more times
- Support only one level of preemption
- No preemption overhead for Express Traffic
- Minimized overhead at each fragment

Objective: Support full duplex operation only

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- Means no CSMA/CD at MAC level
- With this assumption it may be possible to add an additional MAC which supports preemption.
  - Simple MAC, supports only full duplex operation, maybe we can skip further not required features (Carrier extension, ...)
  - Provides the required service interfaces for preemption, like:
    - StartPacket
    - ContinuePacket
    - PreemptPacket
    - ResumePacket
    - EndOfPacket
- If it is possible we could achieve that preemption packets are "valid" Ethernet packets

Proposal with an additional Preemptable MAC

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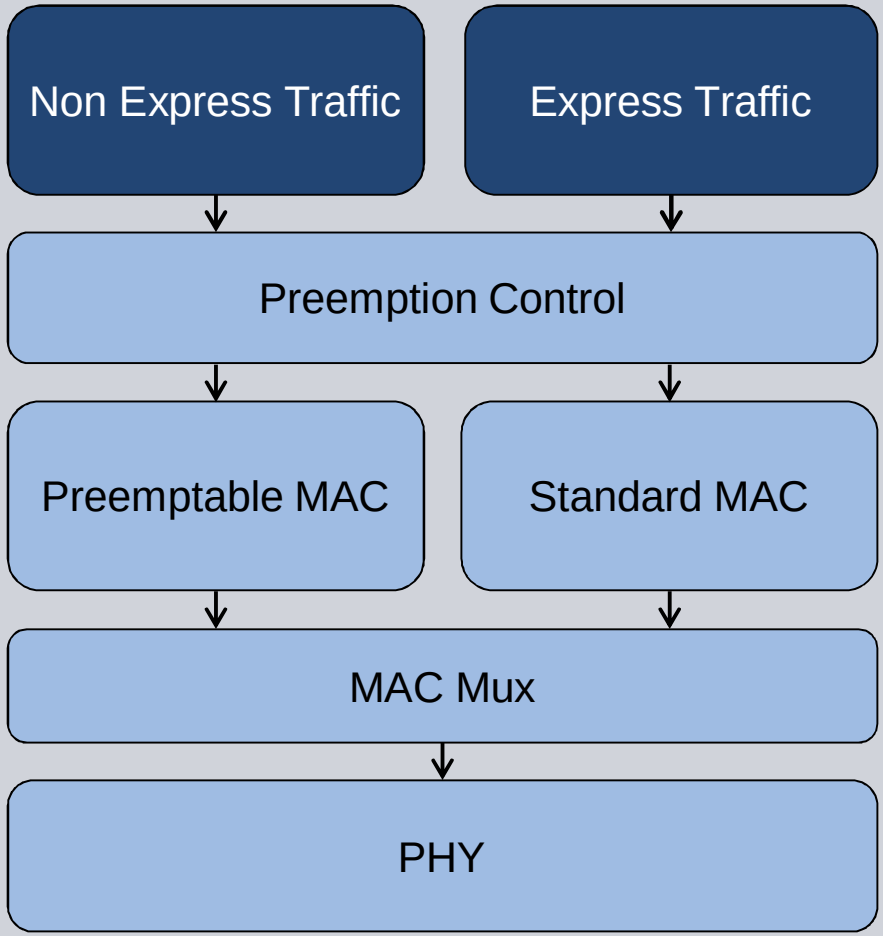
Non Express Traffic :

- Traffic which comes from the transmission selection of the Non Express Traffic queues

Express Traffic :

- Traffic which comes from the transmission selection of the Express Traffic queues



Proposal with an additional Preemptable MAC

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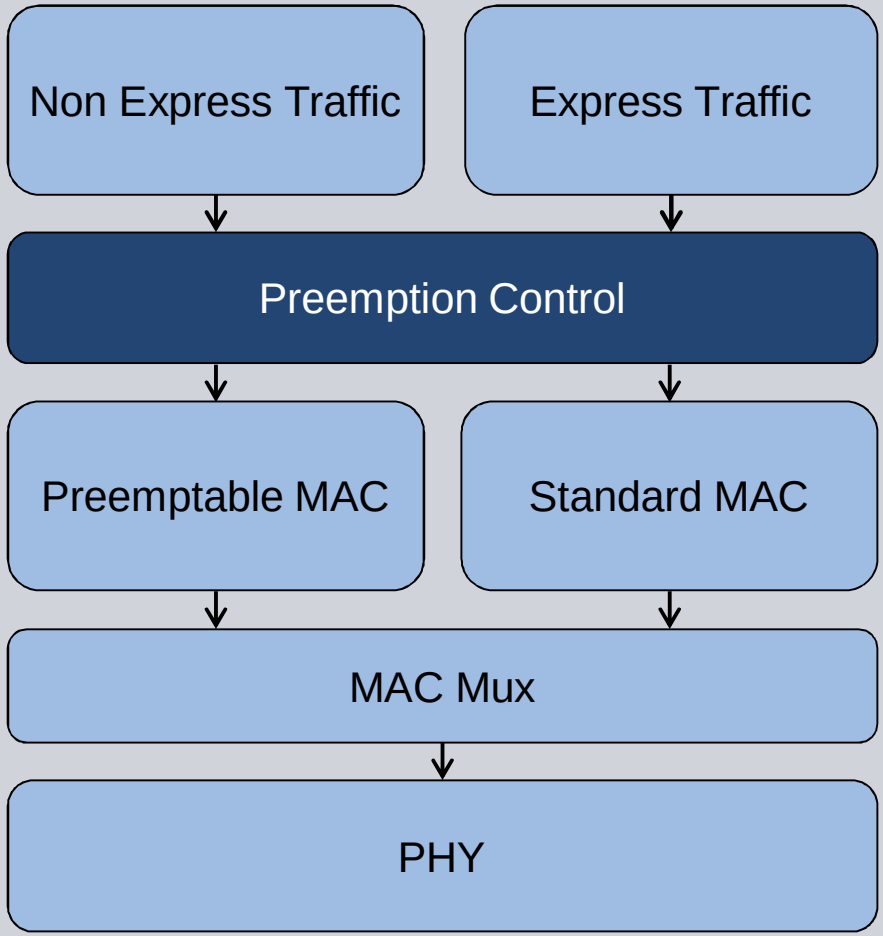
Preemption Control:

- Serves both MAC interfaces
- Controls preemption at the Preemptable MAC



Proposal with an additional Preemptable MAC

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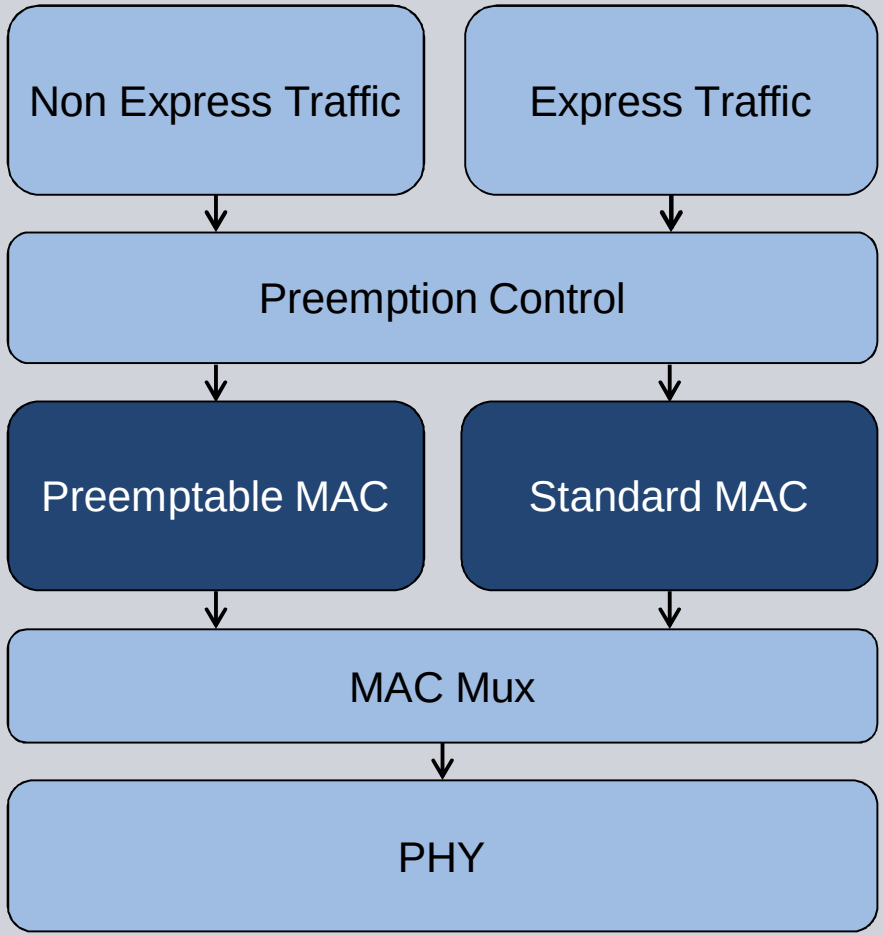
Standard MAC:

- No changes at the MAC Interface of this MAC required (I hope)
- This is a standard MAC, responsible to send the Express Traffic

Preemptable MAC

- Simple MAC, supports only full duplex operation, maybe we skip further not required features (Carrier extension, ...)
- Provides the required service interfaces for preemption, like:
  - StartPacket
  - ContinuePacket
  - PreemptPacket
  - ResumePacket
  - EndOfPacket



Proposal with an additional Preemptable MAC

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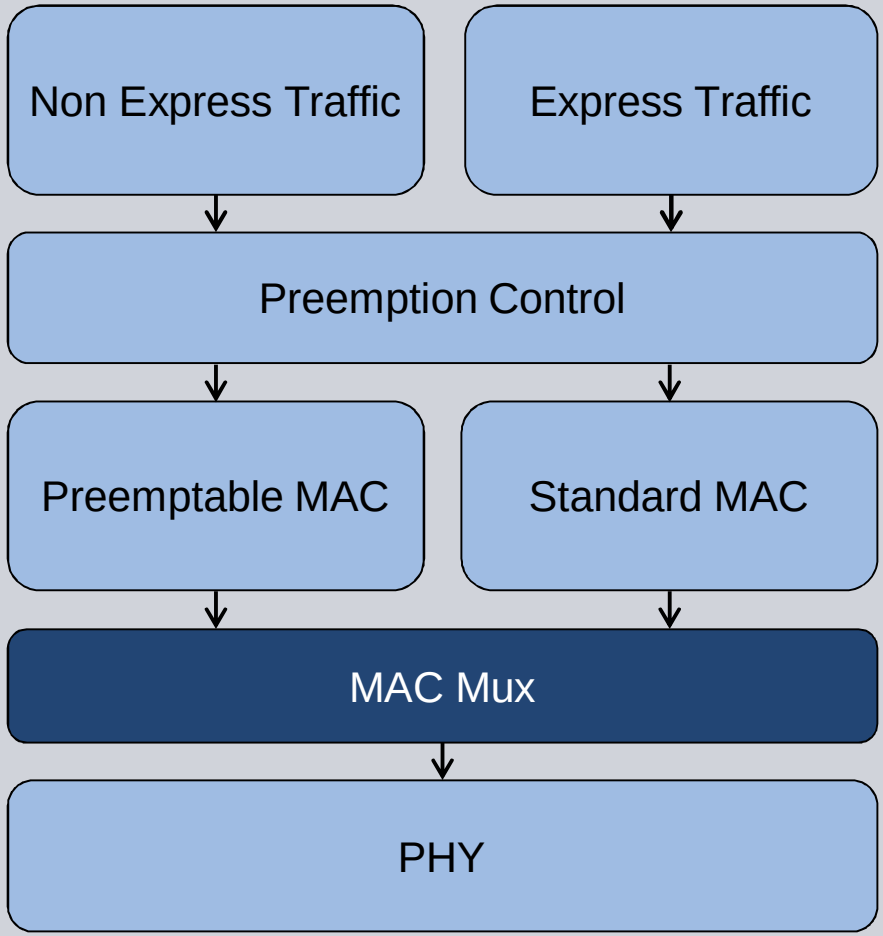

MAC Mux:

- This is only a simple multiplexer between both MACs
- Assumption: Both MACs are never active at the same time

Proposal with an additional Preemptable MAC

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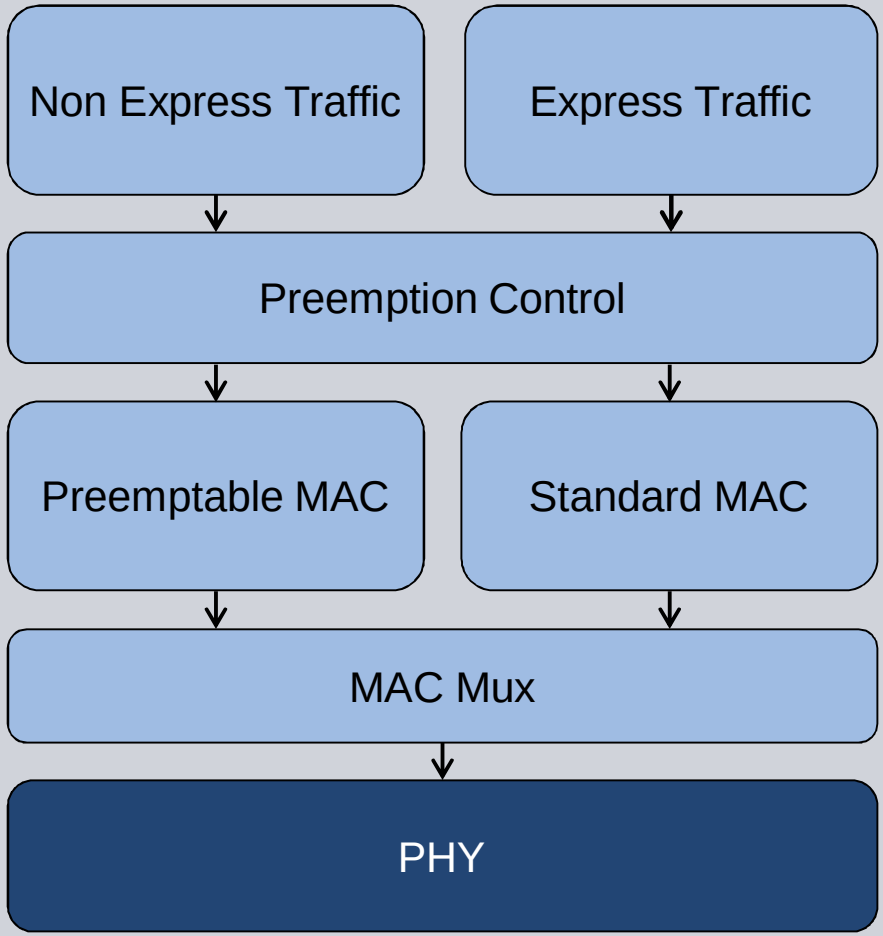

PHY:

- Standard PHY interface
- No change of the PHYs required

Possible Coding

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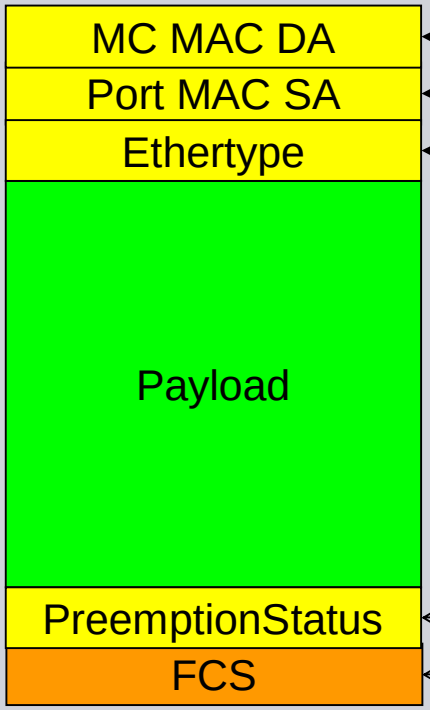

PeerToPeer Multicast Destination MAC Address:

- Used because its a peer-to-peer protocol

Port MAC Source Address:

- Used because its a peer-to-peer protocol

Ethertype for preemption:

- Define an Ethertype for this protocol

PreemptionStatus:

- Contains information for preemption like:
  - NoPreemption
  - PreemptedAndMoreFollows
  - EndOfPreemption
  - FragmentNumber; FrameLength
  - and if required additional parameters

Standard FCS

Possible Coding of premmpted Frames

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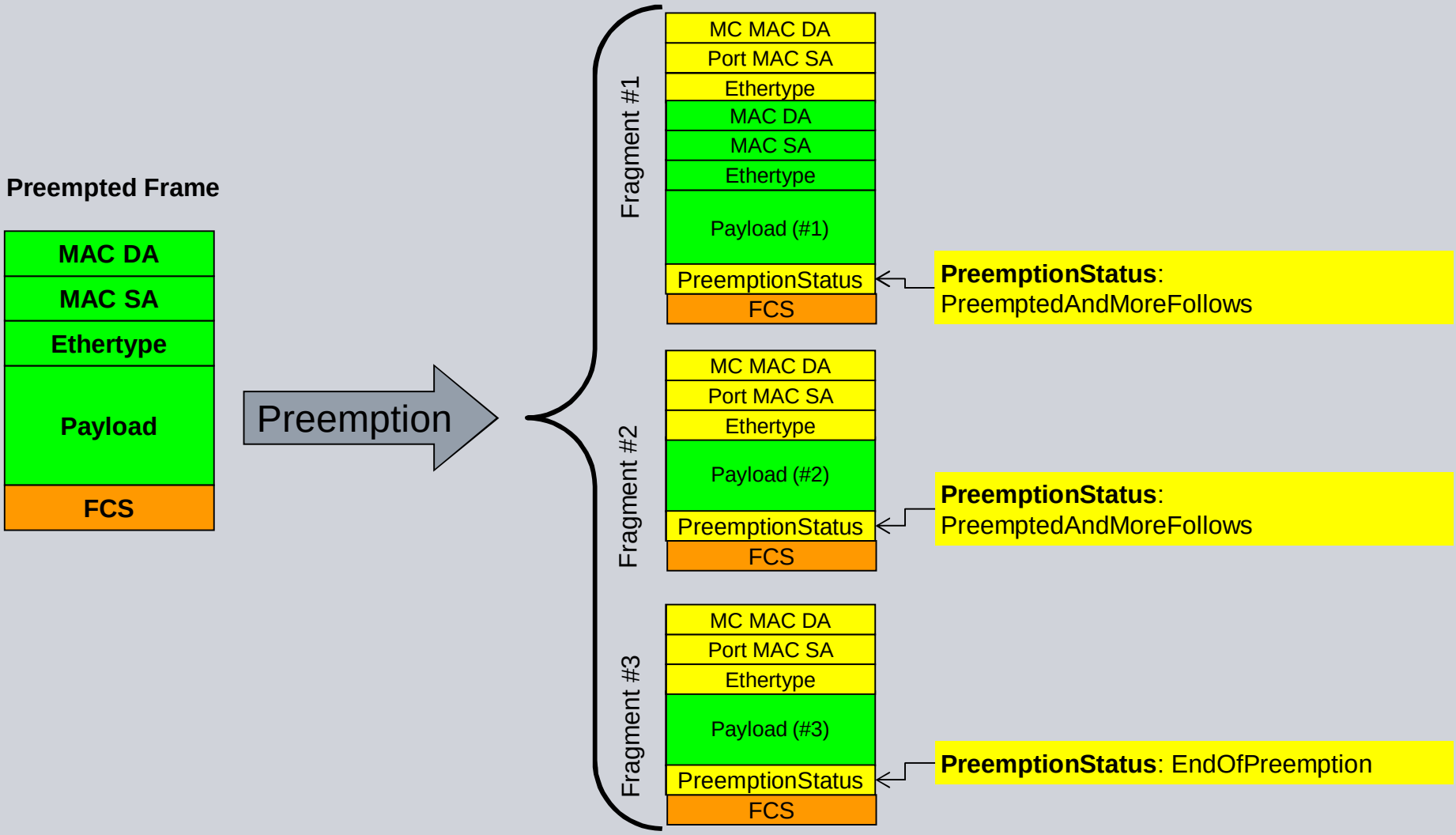

Attributes of this proposal

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- Preempted packets are valid Ethernet packets
  - Existing diagnostic tools are usable, only protocol chances are necessary
- "Non Express Traffic" are always transferred with the preemption protocol
  - This may be penalty for short frames
  - I'm not sure if we get a problem with the maximum frames size?
- The length of the minimum preempted packet of 64 bytes should be possible, depends on the (tbd) PreemptionStatus
- Support of GuardBand signaling should be possible
- Objective: *IET frames will be constructed such that they will not be recognized as valid MAC frames by a non-IET-capable device.*
  - Is it sufficient if we use a "PeerToPeer Multicast Destination MAC Address"?
  - If not we may use a "somehow" altered FCS to mark a fragment? In this case we lose the advantage of this proposal.

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Questions or Comments?

Negotiation between the two peers after LinkUp

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- Objective:
  - *Assure that both ends of the link support Interspersing Express Traffic (IET) mode before enabling it.*
- Proposal:
  - We propose to use LLDP to exchange the capabilities for preemption
  - Receive path:
    - If a device supports preemption it should be possible to activate the reassembly instance quite after LinkUp
  - Transmit path:
    - After LinkUp the sender has to wait till it receives the preemption capabilities of the link partner via LLDP

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Thank You