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Reduction of Impacts of Legacy Traffic on Stream Latency

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IEEE 802.1 Interim Meeting
May 2011, Santa Fe (NM)

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Reduction of impacts of legacy Traffic

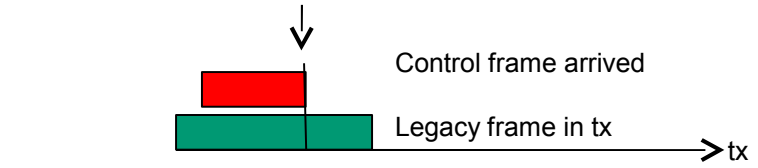
Options to reduce effects of long frames

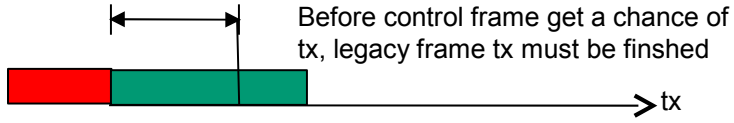
2. Interrupt long legacy Frames
3. Make long Frames smaller

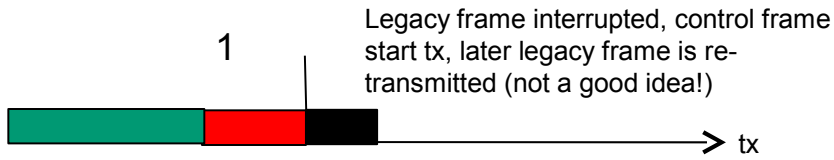
   …Fragmentation! On demand or by default?

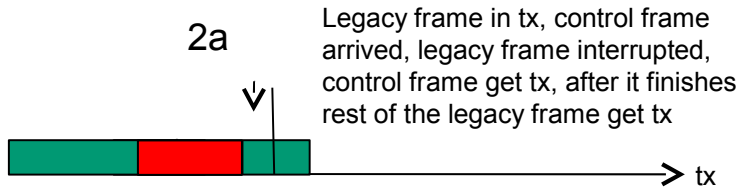
Assumptions:

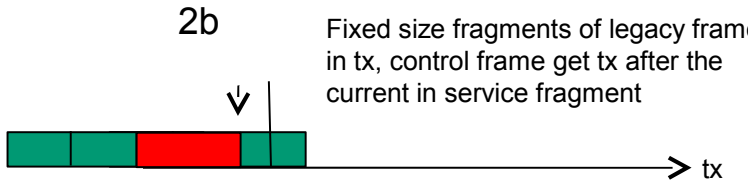
- Store and Forward principle for non stream
- Only small changes in architecture required
- Maintain basic framing rules (min Frame, IFG...)











Fragmentation Protocol considerations

- Both options (2a, 2b) should use same infrastructure
  - Same fragmentation encoding
  - Dissassembly independant from fragmentation policy
  - Reassebly on ingress side operates in the same way

- Must we change some thing in side the MAC?
  - Interruption mechanism (On demand fragmentation)
    - some changes in IEEE802.3 (and others?) needed
  - Fixed Fragmentation
    - restrict max frame size at a link
    - fragmentation at egress and reassembly at ingress without change of MAC function?
    - cost more overhead

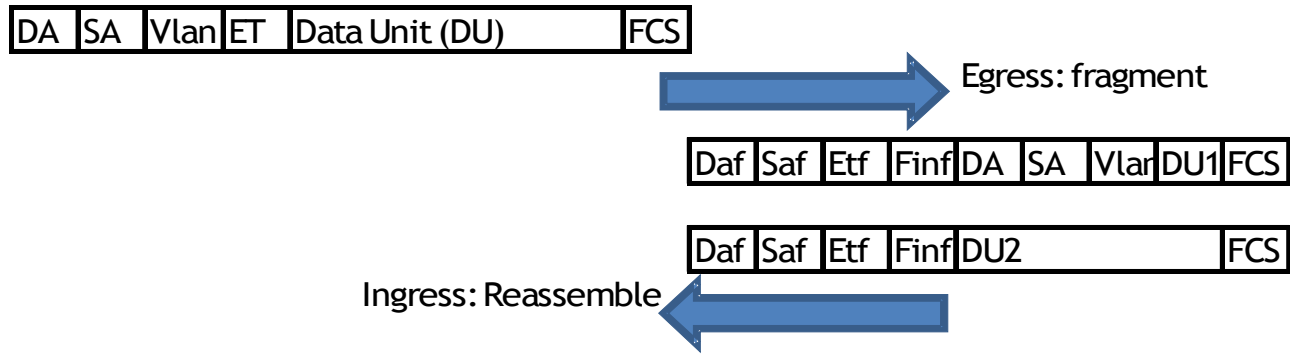
Codeing for frag tag (discussion)

- Fragmentation tag
- Length of frame in the first fragment
  - the end of the frame is known in advance
- Fragment Number or Frame Offset
  - Missing Fragments can be detected
- Frame number
  - Needed for a 2 fragment loss in case of a error burst
- Error field to cancel fragmentation?
  - Usful to reset the sender or signal fragmentation
- Length of fragment?
  - Not needed! Problem with the interruption approach
- Open issue: how to set Addresses
  - Use special MAC adresses and code the original ones later?
  - Keep frame addresses

=>Optmized coding to save bandwidth and minimize overhead

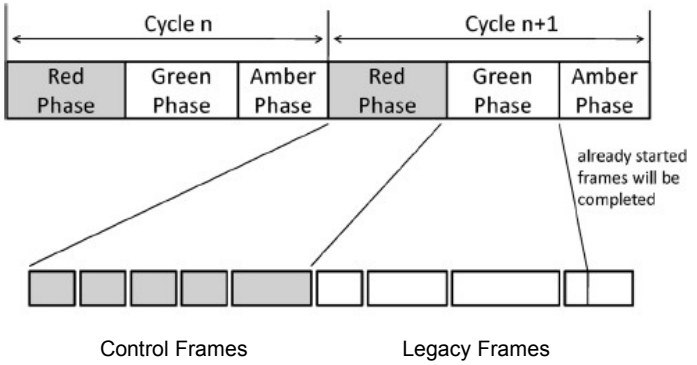
Example fragmentation

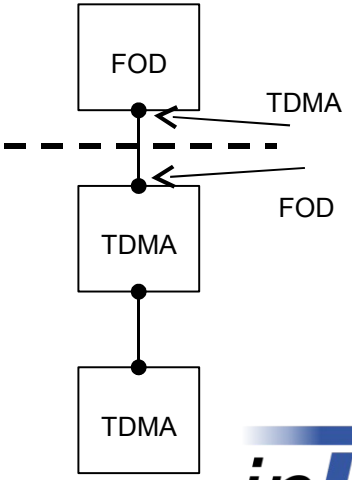
- Min Frame size: if residual fragment <46
  upgrade last fragment to 46
- Additional padding octets are also possible but this will waste bandwidth
- The min Frame Size requirement will lead to 92 octets minimal Frames with Delays in the same order



Zero legacy frame interference Latency?

- Problem Statement
  - Fragmentation can reduce the impact by an order of magnitude
  - Smart stream management with look ahead can improve this further
  - Interruption technology (fragmentation on demand) can reduce fragmentation overhead but not latency
- Possible Solution
  - Use fixed time slots for RT traffic and stop legacy traffic before
  - Zero impact of legacy frames
  - Needs knowledge of the timing from talker to listener
  - Only work with homogenious networks, and need Synchronized bridges/ no legacy bridges
  - High configueraton effort
  - …. both concepts can be combined





Queueing effects

- Problem Statement
  - Queueing delays can increase latency for some streams
  - Timing of the minimal latency streaming requires an efficient stream burst processing
  - Ordering and timing needed to minimize latency!!

- Possible Solutions
  - Smart protocols for topology detection in combination with MSRP
  - Engineered approach: timing information given to senders and bridges
  - Or both...

Thank you!