RoE multiplexing examples (also with 1588)

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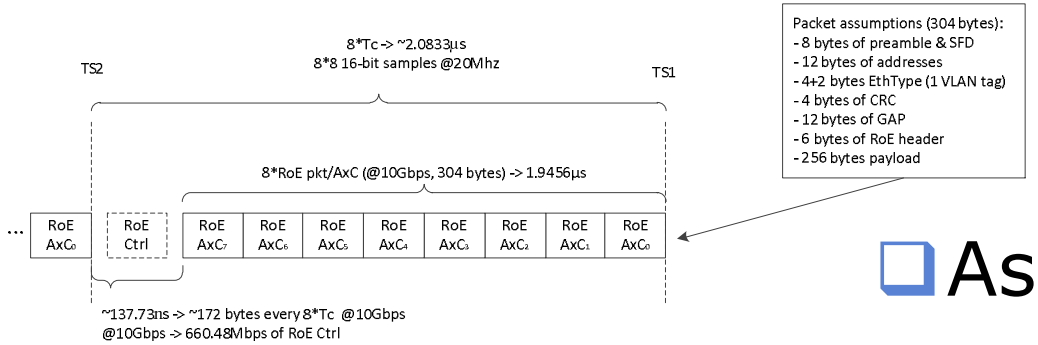
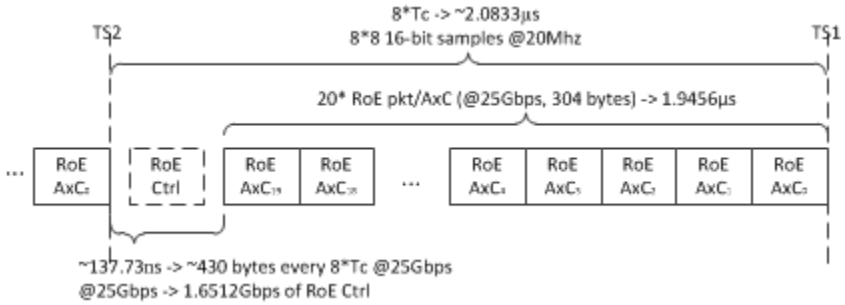
Examples; assumes 8xTc worth buffering to build 256 bytes payload (64 samples per packet)

8 AxC @20MHz, 10Gbps



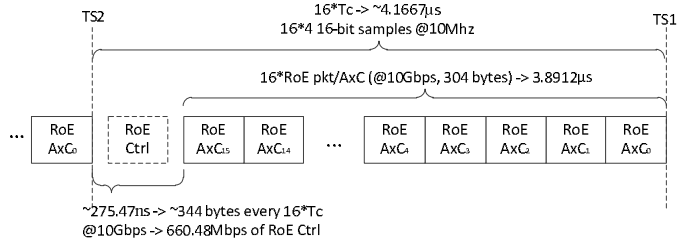
20 AxC @20MHz, 25Gbps



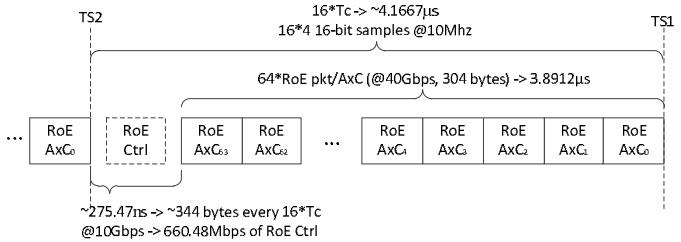
- Assumptions:
  - 10/25Gbps link
  - 16 bits I/Q length
  - 8*Tc interleaving
  - 802.1Q and one VLAN tag in every packet
  - 64 IQ sample pairs per RoE packet

Examples; assumes 8-32xTc worth buffering to build 256 bytes payload (64 samples per packet)

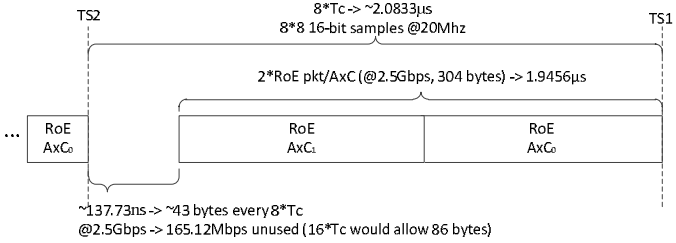
16*AxC @10Mhz, 10Gbps



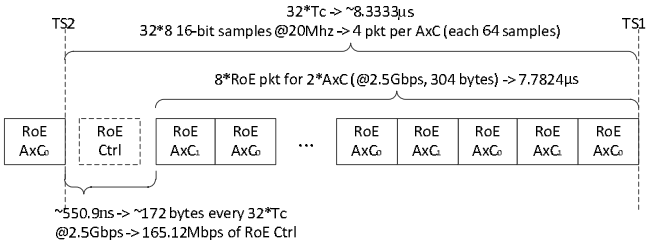
64*AxC @10MHz, 40Gbps



2*AxC @20MHz, 2.5Gbps



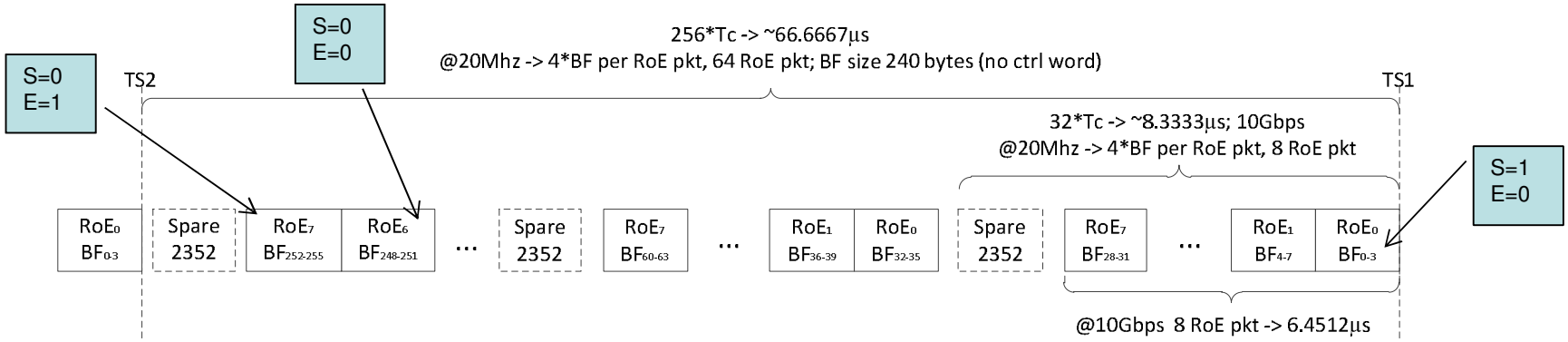
2*AxC @20MHz, 2.5Gbps (32xTc buf)



- Assumptions:
  - 2.5/10/40Gbps link
  - 16 bits I/Q length
  - 16 or 8*Tc interleaving
  - 802.1Q and one VLAN tag in every packet
  - 64 IQ sample pairs per RoE packet

Example of a "dummy" CPRI mapper

- Assumptions:
  - 10G link, 20Mhz, "dummy" CPRI mapper.
  - Control words in RoE Ctrl packets -> 240 bytes payload per basic frame; 128bits word size.
  - Pack 4 basic frames (4*Tc) into one RoE packet -> one RoE packet is 1008 bytes (overhead 42+6).
  - Buffer 32*Tc -> 2352 bytes spare after each 8 RoE data packet:
    - Raw CPRI control word payload is 512 bytes. After reducing "unnecessary words" payload is 424 bytes (and 432 when aligned to 16 bytes words).



Issue with competing "important" traffic

- What if there is a need to send e.g. IEEE 1588 PTP messages in-band the same path as RoE data packets?
  - A "good" rate for PTP messages in 32 PPS.
- Assuming Tc based timing -> 32 PPS is 1 packet every 120k Tc:
  - That aligns nicely with every AxC multiplexing scheme that buffers for 8/16/32/64*Tc..
  - However, PTP would compete with other RoE Control traffic.. Solution: don't send RoE Control message on every slot reserved for it. This lowers RoE Control bandwidth though.

Concluding..

- Assuming Tc based buffering of RoE packets to gather enough data the available link capacity can be "large enough" to transport periodic RoE control packets or other Ethernet traffic:
- Packet must fit into the available slot size & time.
  - This looks like time aware scheduling.
- If the "other traffic" does not fit into the available slot size & time, then:
  - Interleave RoE control over multiple packets.
  - Use new Ethernet features like pre-emption..