

EEE 802.3cb 2.5G/5G Timing considerations for Pause operation

Yong Kim @Broadcom

This work borrows from

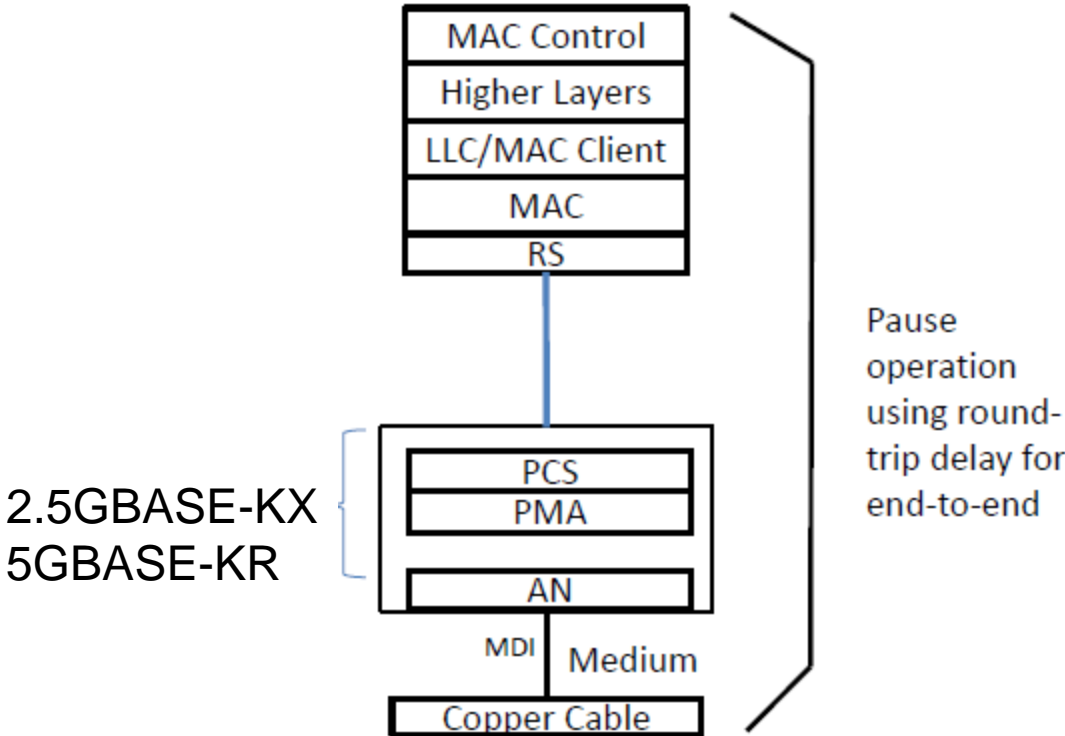
“EEE 802.3bz EEE 802.3cb 2.5G/5G Timing considerations for Pause operation” by Amrik Baines 0316

http://www.ieee802.org/3/bz/public/mar16/bains_3bz_02a_0316.pdf

Background

- Clause 31B.3.7 specifies timing for Pause operation for data rates supported by IEEE 802.3
- IEEE 802.3bz draft 2p0 is missing “Timing consideration for Pause operation” for 2.5G/5G data rates required in the Clause 31B.3.7
- This proposal provides specification and text to be included to Clause 31B.3.7 for 2.5G and 5G data rates

PAUSE operation relationship to OSI model



2.5G PAUSE Operation

- 2.5G IEEE 802,3cb-D0.6A PHY round-trip delay (Table 125-5 page 63)
 - 2 (=1.5+0.5) pause-quanta
 - 409.6 ns (0.4ns per bit and 512-bit per pause_quanta)
- Cable round-trip delay (Clause 44.3, table 44-3)
 - cable delay = $101. \frac{N}{c}$ ns/m . N = length in meters, c= speed relative to speed of light
 - Worst case cable delay of 111.2 ns with c=0.6 and n=10m
- MAC (64-byte pause frame Tx/Rx processing delay)
 - 64-byte => 535.60 ns
- Maximum Delay of 1056.4 ns => 2641 bits => 5.15 pause-quanta
 - Rounding-UP to integer pause-quanta => **6**

5G PAUSE Operation

- 5G IEEE 802.3bz-D0.6A PHY round-trip delay (Table 125-5 page 63)
 - 8 pause-quanta
 - 819.2 ns (0.2ns per bit and 512-bit per pause_quanta)
- Cable round-trip delay (Clause 44.3, table 44-3)
 - cable delay = $101.0 / ncBT/m$. N = length in meters, c= speed relative to speed of light
 - Worst case cable delay of 111.2 ns with c=0.6 and n=10m
- MAC (64-byte pause frame Tx/Rx processing delay)
 - 64-byte => 204.80 ns
- Maximum Delay of 1135.2 ns => 5676-bit => 11.09 pause-quanta
 - Rounding UP to integer pause-quanta => **12**

Summary

- Pause operation for 2.5G –add following text to 31B.3.7
 - At operating speeds of 2.5 Gb/s, a station with a 2.5GBASE-T PHY shall not begin to transmit a (new) frame more than 34 pause_quantum bit times after the reception of a valid PAUSE frame that contains a non-zero value of pause_time, as measured at the MD A station using any other 2.5 Gb/s PHY shall not begin to transmit a (new) frame more than **6** pause_quantum bit times after the reception of a valid PAUSE frame that contains a non-zero value of pause_time, as measured at the MDI. .
 - 2.5Gb/s (using 2.5GBASE-KX) –max_overrun= 384 + frame_length
= 6 PQ * 512 bits / 8 bits/octet + frame_length
- Pause operation for 5G –add following text to 31B.3.7
 - A station using any other 5 Gb/s PHY shall not begin to transmit a (new) frame more than **12** pause_quantum bit times after the reception of a valid PAUSE frame that contains a non-zero value of pause_time, as measured at the MDI
 - 5Gb/s (using 5GBASE-KR) –max_overrun= 768 + frame_length
= 12 PQ * 512 bits / 8 bits/octet + frame_length