

Interpretation Number: 1-03/97
Topic: CSMA/CD backoff
Relevant Clauses: 4.2.3.2.5
Classification: Unambiguous

Interpretation Request

ISO/IEC 8802-3:1996, section 4.2.3.2.5, Collision backoff and retransmission, says:

“When a transmission attempt has terminated due to a collision, it is retried by the transmitting CSMA/CD sublayer until either it is successful or a maximum number of attempts (attemptLimit) have been made and all have terminated due to collisions. Note that all attempts to transmit a given frame are completed before any subsequent outgoing frames are transmitted. The scheduling of the transmissions is determined by a controlled randomization process called “truncated binary exponential backoff.” At the end of enforcing a collision (jamming), the CSMA/CD sublayer delays before attempting to retransmit the frame. The delay is an integer multiple of slotTime. The number of slot times to delay before the nth retransmission attempt is chosen as a uniformly distributed random integer r in the range:

$$0 \leq r < 2^k$$

where

$$k = \min(n, 10)$$

If all attemptLimit attempts fail, this event is reported as a failure. Algorithms used to generate the integer r should be designed to minimize the correlation between the numbers generated by any two stations at any given time.”

Question 1.

Are compliant devices permitted to be more aggressive than standard CSMA/CD backoff?

Question 2.

Are compliant devices allowed to change the number of slot times from 2^k to 1.5^k ?

Question 3.

Are compliant devices allowed to keep $k=0$, that is, always retransmit immediately?

Interpretation for IEEE std 802.3-1996

Question 1.

No, the standard clearly states in the last paragraph of subclause 4.2.3.2.5 "Note that the values given above define the most aggressive behavior that a station may exhibit in attempting to retransmit after a collision. In the course of implementing the retransmission scheduling procedure, a station may introduce extra delays that will degrade its own throughput, but in no case may a station's retransmission scheduling result in a lower average delay between retransmission attempts than the procedure above defined." In order to be IEEE802.3 compliant, devices have to conform to this.

In addition, stations which exhibit behavior more aggressive than permitted by the standard violate fairness and may degrade overall network performance.

Question 2.

See answer to question 1 above.

Question 3.

See answer to question 1 above.