Medium Access Control - 13.04.2006

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I Medium Access Control - protocols

There are namely 3 protocols:

1. ALOHA
2. Slotted ALOHA
3. CSMA Models(carrier Sense Multiple Models)

II ALOHA

Send at any arbitrary time
If collision, then resend
See figure 1 at end.
Mean Number of packets sent = G
P_r(k) = G^{-k} e^{-G} /k!
$P_r(0) = e^{-G}$
$P_0 = e^{-G}$ e^{-G} [for 0 arrival before and zero arrival after]
S=GP_0
S=Ge^{-2G}

III Slotted ALOHA

You can send only at the slots
S=Ge^{-G}

IV Slotted CSMA Models

sense the carrier before sending

1. 1-persistent
2. non-persistent
3. p-persistent

IV.1 Non-persistent

1. If the medium is idle, then send
2. If the medium is busy then wait for a random amount of time and then again try
3. Disadvantage: Underutilization occurs

IV.2 1-persistent

1. If the medium is idle then send
2. If the medium is busy then sense continually
3. Disadvantage: If more than 1 waiting, everyone senses idle and sends simultaneously, thus collision occurs

IV.3 p-persistent

1. If the medium is idle then send with a probability P
2. f the medium is busy then go on sensing

V CSMA / CD(collision detection)

As soon as the first bit collides, send back a jamming signal

1. If idle, send
2. If busy sense continually
3. If collision, send a jamming signal
4. Wait for a random amount of time before starting step1(back off in the case of a collision only)

exponential back-off

1. 10 attempts

2. smaller mean

Next 6 attempts - mean increases, then discard

If two packets collide, power of jamming signal will be more than legally possible- Attenuation

VI Rings- Medium Access Control

see figure 2 at end.

Token Ring: Goes from station to station.

If you want to transmit, catch the token ring and then transmit.

Once the packet comes back, catches the token ring again and validates it.

1. If the packet is too large then token ring might be in the buffer of repeater

2. Scheme works well when there is a heavy load but is not advantageous for light loads

3. Token may get lost or corrupted

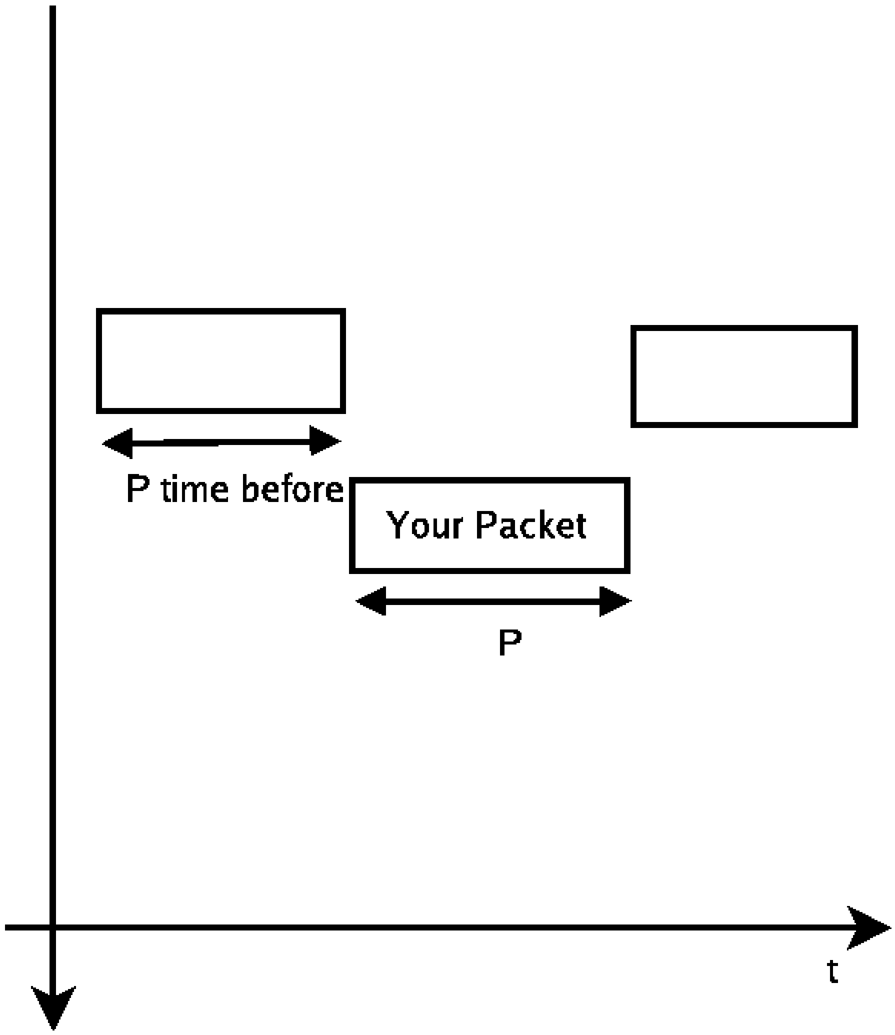

Figure 1:

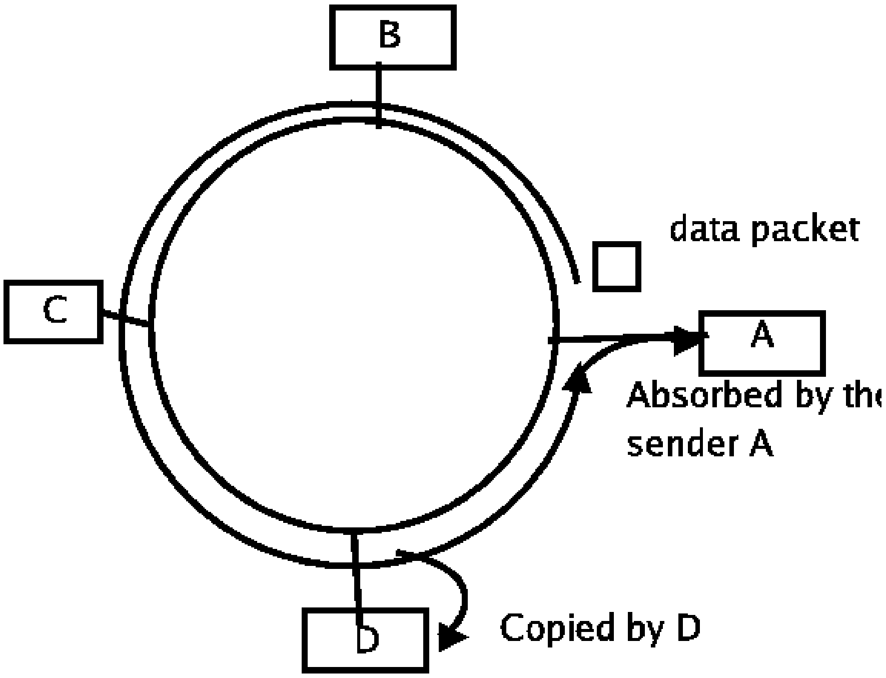

Figure 2: