## Current simplifications

### No MTS package

I will not simulate the more data flag or the More-To-Send packet. Therefore the delay between two packet transmissions .

### No inter-frame space

The real expression is:

BP and SP are two inter-frame spaces where.

For simplicity, I will not consider BP or SP.

# Nodes states

* UNRESP: It is unresponsive to receptions. This may be because:
  + The node is transmitting
  + The node is sleeping

In either case, the node stores a field WkT (wakeupTime) that indicates the next listening time.

* BO: listening and backing off
* Li: listening waiting for an incoming packet
* RX: receiving a packet

Note: the transmit

# Event attributes

* ID is an integer that the simulator chooses. They are unique consecutive numbers.
* Time is the instant for which the event is scheduled.
* Type can be:
  + StartCt: Start contending
  + StartTx:
  + EndRx

# Timing

Let be the time sleeping time of the system.

Tx

Rx

Tx

Rx

Tx

Tier 3

Tier 2

Tier 1

Tx

Rx

Tx

Rx

Tx

Slot 1

Slot 2

Slot 3

Let be the number of tiers excluding the gateway. The period system will be.

The system

I will choose:

* . Therefore, a node picks a random back-off period between 0 and 4.
* DATA = 6
* ACK = 2

# Simulation planning

## Initialization

* Nodes with packets schedule StartCt events
  + For nodes in tier with data to report, the transmitting time is
* Schedule the StartLi event of all the nodes.
  + For nodes in tier, the first listening time is.
  + If

## Processing events

* Execution of a StartCt event
  + Set status to BO
  + Schedule a StartTx event a random time between 0 and CW later.
* Execution of a StartLi event
  + Set status to Li
  + Schedule a EndLi event later
* Execution of a StartTx event:
  + For all nodes in the same tier within the interference range
  + For all nodes within interference range
    - if it is in Li
      * It cancels its EndLi event
      * It sets the new StartLi
      * If it is not the intended destination
        + enter UNRESP state
      * If it is the intended destination
        + it enters into RX state
        + it schedules a SendAck event
    - If they are in BO
      * Cancel their StartTx event
      * Create a StartCt event
      * Set their state to UNRESP
    - If it is in RX % Collision
      * it cancels its SendAck
      * It enters into UNRESP state
      * Schedule a StartLi event
  + If the destination
    - is in Li:
    - is in RX: %Collision
* Execution of a EndRx event
  + The node
* Execution of a EndLi event
  + Set status to UNRESP
  + Schedule a StartLi in the next period

## Analyzing results

# DMAC's algorithm

Receive

Transmit

# Transmission of a packet

## Beginning of the transmission

### Impact on the intended recipient

When the leading edge of a packet reaches its destination:

* The destination sets the receiving flag.
* The destination schedules an "end-of-reception" event.

### Impact on interfering nodes

A transmission from A to B has a different effect in a node C within A's interference range:

### If C is backing off

C will delete its scheduled event.

C will schedule a transmission for the next period.

#### If C is sleeping and it has not scheduled to wake up before the end of A's transmission

We do nothing.

#### If C is receiving a packet from another node D

C will receive none of the transmissions from A and D. C reschedules an "end-of-reception" to

#### If C is transmitting a packet and it will finish transmitting before the end of A's transmission

C will record as ongoing interference the following:

* + Interference source
  + Time of end of interference.

Tier 1

Tier 2

Tier 0

5

Tier 3

### Impact on the transmitter

The transmitter schedules a Wait-For-ACK event.

## End of the transmission