DTBS Standard Specification Details

By: Wim Diepstraten

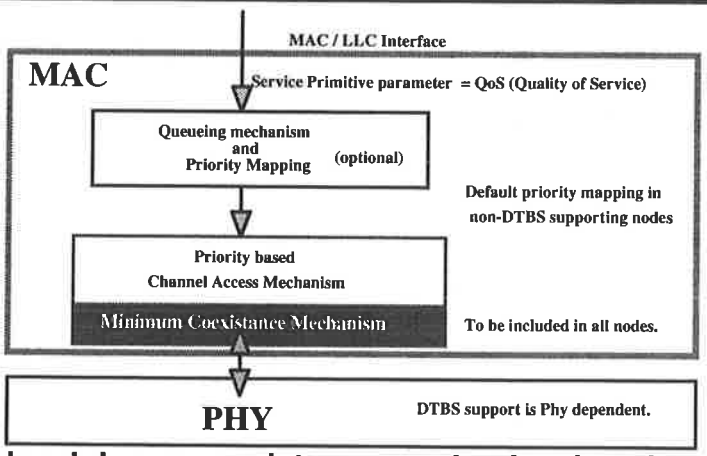
Assumptions:

- DTBS Service support is optional.
  - But all stations need to provide "DTBS-Coexistance" provisions.
- Not all Phy's need to specify DTBS capability support.
- A Single State Machine in the MAC can support multiple mechanisms:
  - A passive access priority mechanism
  - An active access priority mechanism
  - No operational access priority mechanism
- A given PHY standard shall specify only one access priority mechanism.

DTBS Support levels:

- The DTBS service is optional.
  - But coexistence mechanisms need to be implemented in every node to assure proper operation in the presence of stations that do implement the service.
- DTBS support levels can be classified in two different levels:
  - The DTBS coexistence mechanisms
    - » This is the access priority mechanism. A part of this needs to be included in all stations to assure coexistance with the DTBS service, even when it is not implemented.
  - The DTBS Service interface and priority mapping
    - » This is the definition of the LLC interface, and its control by means of the QoS parameter, and the translation of this to the priority levels.
    - » In non-DTBS capable stations a fixed priority mapping is to be assigned.

DTBS implementation options:

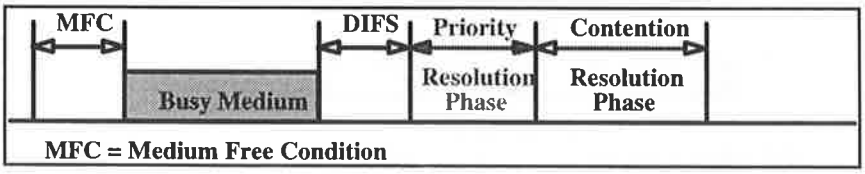


- Only minimum coexistance mechanism is to be included in all implementations.

Coverage of this proposal:

- This proposal will only cover the "Access Priority " mechanism.
  - Describes a MAC State Machine to support the full Access Priority mechanism.
  - Identifies the minimum coexistance provisions needed.
  - Defines the MIB attributes needed.
- Discusses AP versus Station relative priority characteristics.
- Other DTBS support specifications in particular the LLC interface and Service specifications are documented in doc 94/196, but are not covered by this proposal.

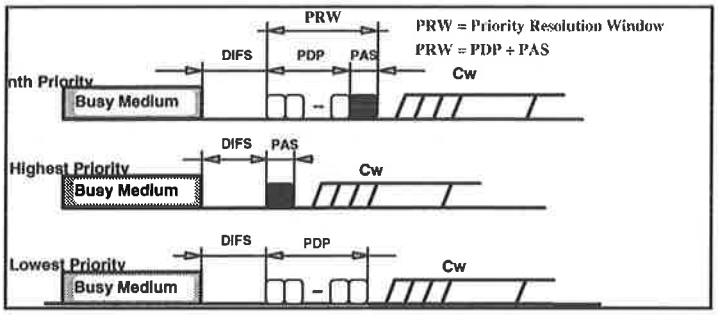
DTBS Generic priority mechanism:



- Extend contention resolution phase with a "Priority resolution Phase".
- If "Medium Free Condition" is met at initial access attempt, then transmission can start immediately without any priority or contention resolution.
  - The MFC can be priority level dependent.

Slide 7

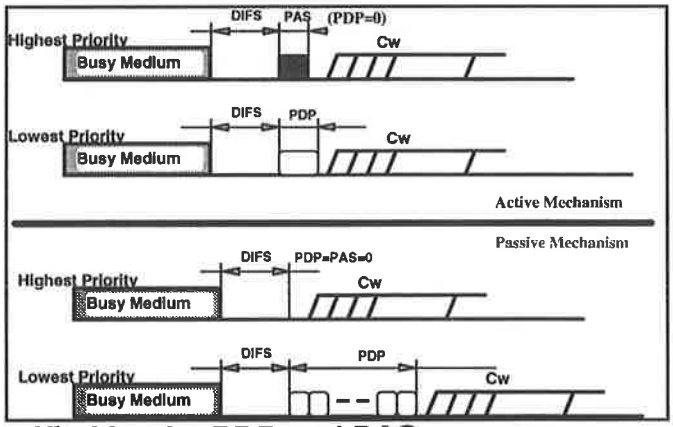
Generic Priority resolution mechanism:



- **Mechanism can support both active and passive priority resolution method.**
- Basic (coexistance) Algorithm:
  - If "Busy Medium" is detected during PDP period, then defer untill the next Priority Resolution Window (PRW).

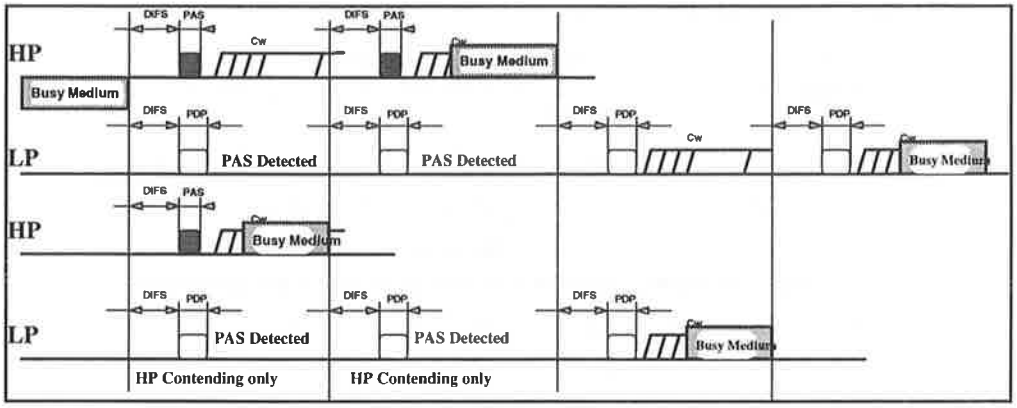
Slide 8

Single State Machine support both mechanisms:



- **Specified by the PDP and PAS parameters.**
  - **A set of parameters are needed per priority.**

Active Priority example:



- Ack is not shown in example.
- LP traffic does not contend with HP traffic.

Priority_Set examples:

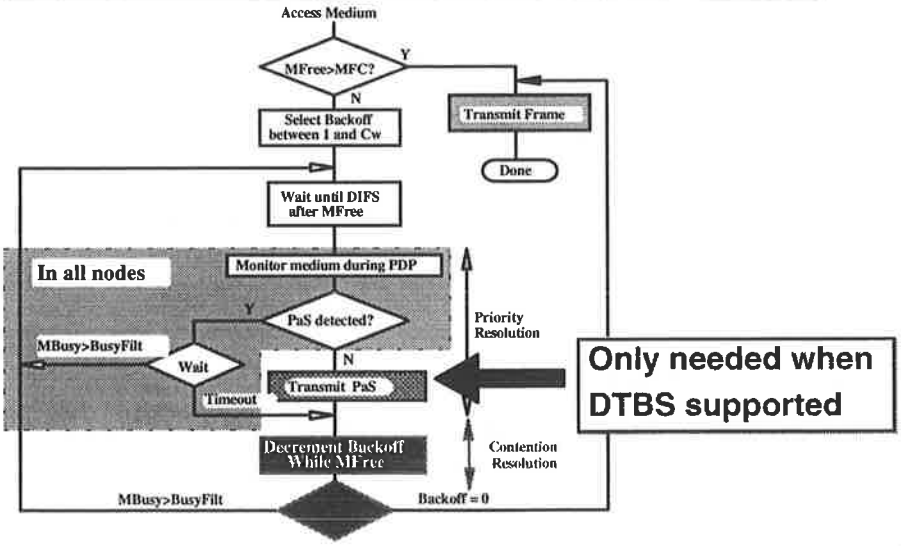
- "Active priority set" example for a 2 priority system:
  - Low priority: PDP = 2 slots, PAS = 0 slots.
  - High priority: PDP = 0 slots, PAS = 2 slots.
- "Passive priority set" example for a 2 priority system:
  - Low priority: PDP = 16 slots, PAS = 0 slots.
  - High priority: PDP = 0 slots, PAS = 0 slots.
- Assume MFC = DIFS + PDP + PAS.
- In a non-DTBS supporting station the default Access Priority setting should be: *Low Priority.*

MIB variables:

- aNumber_of_Priorities:
  - This indicates the number of different priority levels supported by the Phy. A "1" indicates that no priority mechanism is supported.
- aPAS_Duration: Determines the duration of the PAS.
- Per priority the following parameter sets are required:
  - aPDPx: Specifies the PDP duration in usec for priority x.
  - aPASx: Specifies the PAS duration in usec for priority x.

  Where x indicates the priority level (1 is highest).
- Other MIB variables:
  - aBusyFilt: Specifies the "Busy medium" condition under which the Backoff algorithm will be exit, to defer untill the next PRW.
- MFC can be derived per priority level.

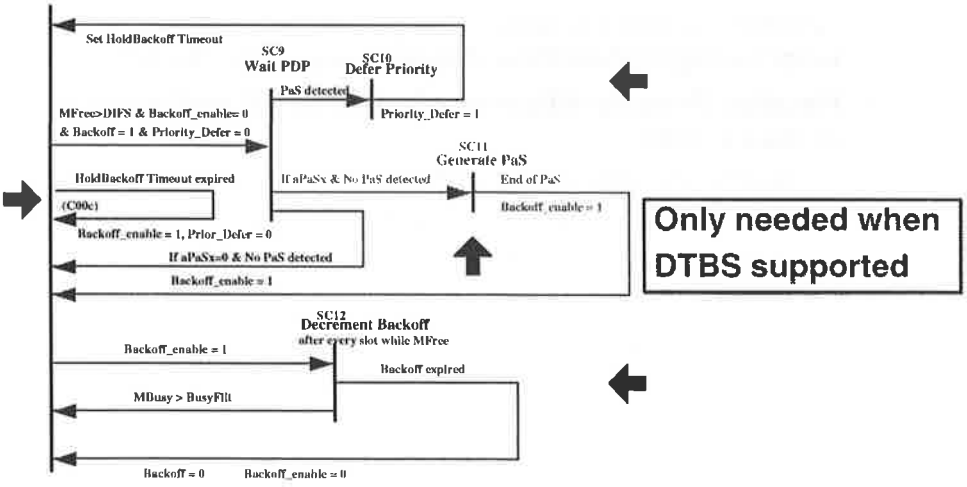
Basic Transmitter State Machine:



Requirements on the Phy:

- A new Class definition is needed to allow a Phy independent PAS signal generation.
  - Ph-DATA.request(SEND_PAS, param)
  - The parameters can be the same as for the START_OF_ACTIVITY class.
- The Phy can choose to use the same modulation as used in the PLCP header, with the length determined by the aPAS_Duration MIB variable.
  - Other modulation suitable for detection by the CCA detection mechanism can be specified.
- The !CCA detection mechanism should be suitable to signal the detection of a PAS signal modulation.

Draft standard updates needed:



Howmany priorities needed:

- MAC service maps to:
  - Queueing priority
  - Access Priority
- At least two hierarchical independent priority levels needed to support the main services:
  - Asynchronous service Low priority
  - Distributed TBS (optional) High priority
- Quality of Service (QoS) should map to priority and Queuing priority.

Additional Priority specification:

- Additional relative priorities possible within a service level using Contention Window size differences.
- Relative Priority difference between AP and station makes sense.
  - Most traffic will be via the AP.
  - So AP would generate close to 50% of frames.
  - Use of separate hierarchical independent levels for AP is not optimum.
    - » So in a Multi-priority environment, the AP should not be given a seperate level.
- Higher relative Priority settings should only be allowed for an AP.
  - Suggest AP_CWmin = STA-CWmin / 2

Possible Motions:

- **Move:**

  That not all Phy standards need to support the optional DTBS service provisions.

Motion-2

- **Move:**

  That the MAC should implement the Access priority mechanism as described in this proposal.

Motion-3

- **Move:**

  That the AP is to be given a higher relative Priority compared to a station by specifying that

  AP_Cwmin = Station_Cwmin / 2.