

Multichannel MAC Protocol

This protocol make use of numerous channels for performing data transmission. These channels are spectrally separated with each other. It support the use of a data structure called Preferable Channel List (PCL) by every node wherein the details regarding the channels used are maintained the details are as follows,

(i) High Preference Channel (HIGH)

The channels created by the current node and is utilized by the node that use the mechanism called beacon interval are placed in this category. Only a single channel is supported by this protocol since there is only a single transceiver.

(ii) Medium Preference Channel (MID)

A free channel which is not presently in use within the transmission range of node is placed in this category. HIGH channel, MID channel to the one due to use.

(iii) Low Preference Channel (LOW)

A channel which is presently in use within the transmission range of these neighbouring node is placed in this category low state channels are managed by the counter when the count of source destination that are accessing the channel in the current beacon interval are maintained.

Beacon Interval Mechanism

In this mechanism the time is divided into beacon intervals and every node it made to follow these intervals. The start and end of beacon interval for every node take place in the same time. The node negotiation channels make use of the following.

- (a) A time interval calls the Ad hoc Traffic Indication Messages (ATIM).
- (b) ATIM_ACK (ATIM - Acknowledgement) messages ATIM_RES (ATIM - Reservation).
- (c) A particular channel to exchange the ATIM messages.

The transmission process followed in this protocol is discussed below,

- (i) The sender node transmits an ATIM packet containing its PCL to the intended receiver in the current beacon interval.
- (ii) The receiver node upon reception of this packet selects a channel using its PCL and the sender PCL and sends an ATIM_ACK packet involving this details to the sender.
- (iii) The sender node upon reception of the ack check to see whether the ACK is specified one and that it can be used. If the sender can use the ACK, then it informs the receiver through an ATIM_RES packet of the receiver and sender node.
- (iv) The neighbouring node of the receiver and sender nodes are then informed by ATIM_ACK and ATIM_RES packet regarding the channel that will be used in the current beacon interval data transmission.
- (v) The neighbouring nodes upon reception of these packets, modify their PCL correspondingly.

The source-destination node pairs shift to the decided (in negotiation) channel for communication through RTS/CTS control packets. Incase if the decided channel cannot be used by the sender, then it has to negotiate again for the channel in next beacon interval because it cannot communicate with the corresponding receiver in that beacon interval.

Moreover the collision also affect the ATIM packet results in loss of these packets. This problem can be avoided if every node is made to wait for a randomly selected back-off period (i.e., 0 to CW_{min}) prior to sending the ATIM packet.

The figure illustrates the concept of this protocol.

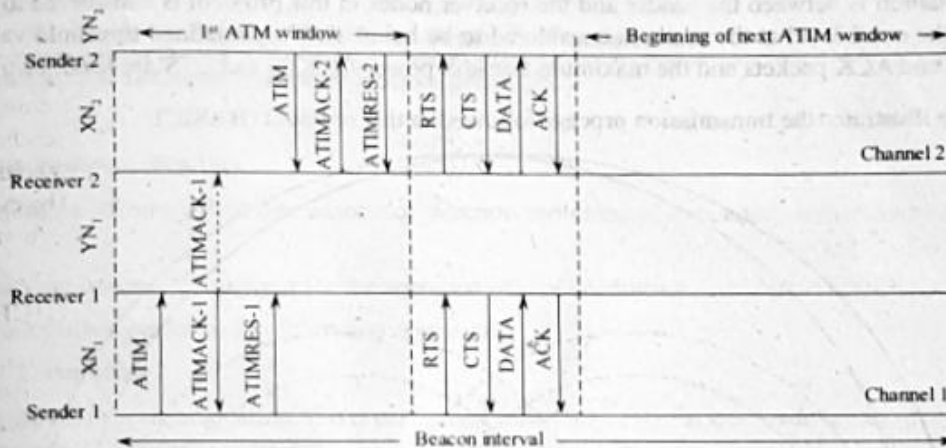


Figure: Scenario Illustrating MMAC Protocol

- ❖ Initially the source (X) node XN_1 transmits an ATIM message to the destination node.
- ❖ The destination (Y) node YN_1 then replies to the sender node through ATIM_ACK packet having ID₁ of the preferred channel.
- ❖ The source node XN_1 upon reception of ATIM-ACK packets transmits an ATIM_RES packet for confirmation to the destination node YN_1 for channel 1.

Similarly the communication between the source node XN_2 and the receiver node YN_2 take place.

The receiver node in this protocol plays an important role incase of channel selection. Since, even though it make use of all the channels it make selection for one of the channel. The contention of the channel by the nodes transmitting packet on the same channel need to be made in this protocol.

The receiver perform channel selection through PCL which it has been received as well as with its own PCL so as to use a best possible channel for transmission. This helps in neutralizing the network load on the channel. The receiver upon reception of ATIM packet from source node XN perform the channel selection as follows,

1. The high state channel is selected if it is present in node YN PCL.
2. The high state channel is selected if it is present in the node XN PCL.
3. The common MID state channel is selected if it is present in both the PCLs of node X as well as node Y.
4. The MID state channel is selected if it is present in one of the two nodes X or Y.