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# A Survey of Energy Efficient MAC Layer Protocol in Manet

KEYWORDS: Mobile Adhoc Network; Energy Efficient Protocol MAC layer; IEEE Protocol

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**ABSTRACT** Mobilemeans to roamany where, Adhoc means temporary connection for certain time limitation and limited range. When A node sending the datain Network Then Multiple node create cluster which are in frastructure less and Receive rreceive the data which sending By Thesender. This is more the power consumption and also required more time for sending data.Now in this proposalEnergy efficient mac layer protocol isspecially design for Mobile Adhoc Network for reducing the energy using different efficient technique which is not use earlyyear. Sender nodes sending also wakeup message to multiple destinations the Node. So lessen ergyor less time required for sending the data.And now in earlier time, Sending, Receiving, Idle and sleeping mode would be betteror ess power consume in now a days. Were present the the oretical analysis relate with different protocol and technique.To show the comparing resul to fless energy consumption required for all Mode in now a days and previous days.

## I.INTRODUCTION

Now recent refining the enactment of the wireless communication system.Also Manetmeans Mobile AdhocNetwork[1].Mobilemeans to ro a many where, Adhocmeans short-termconnectionfor certain time limitation and limited range. Manetisan in fras ructureless anddoesn'trequireany centralize node. But in M anet, cluster arecreate when node connect edeachot heran deach node worki n gassende rand receiver [3].

Medium Access Control: several users can transmit at the same time over the same channel due to medium access control.Various MAC protocols have been defined in literatures that employ different techniques to legalize access. Dispersed and federal are the two categories of it. In the former, every node can choose best possibility to sending data to sender to receiver.If multiple nodes transmit, then these protocols provide mechanisms to resolve collision.

In the centralized approach, A channel access because a node selected, and the this time it will check node overa channel.The centralized node is alsoknown as a base station (BS). Two different ways are available to provide access to channel.BS would regularly check if it has data to transmit or not. Base station can be request mechanism for each every node for sending data to base station. Base station provides a time slot to every node to receiving a request.The next sections discussdifferent MAC protocol.

Aloha: The principle fulfilled the Aloha [24, 30] is that don't wait if you have data to send. If collision occurs then protocols resend the data.The improvement of slotted aloha is discussed in below portion. For this' protocol the finite state mechanism is given figure1.

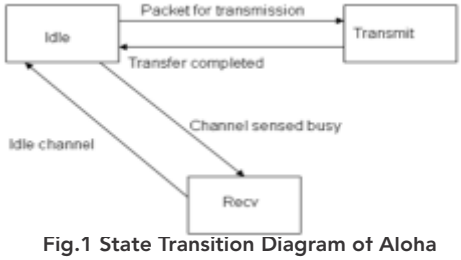



**Fig.1 State Transition Diagram of Aloha**

Time divided in discrete time slot which mechanism provided by slotted aloha. when time slots begin than A node can only transmit. This helps in reducing collisions.

CSMA: This stands for Carrier Sense Multiple Access with Collision Detection. In CSMA, sensing of traffic on same shared medium before transmitting occur.If they detect another node is transmitting then it waits until completion of that transmission.

CSMA/CD: Carrier sense multiple access in cd that verified that when collision occur at any conjunction or cross layer.at that time it will retransmit the nodes. Also time taken for this randomly which t retransmits the frame to the particular nodes. Above technique is used to solve the collision problem and it used in 802.3 networks.

CSMA/CA: Connectionless networks CSMA/CD works but CSMA/CA [32] doesn't works. For that reasons in past transmitter founds very low.In wireless network for that reason of hidden deep problemthat at receiver side very helpful to detect the collision. As shown in figure 3, node A wants to send data to node B and node C also wants to send data to Node B but both are assuming that node B are free and sending the data and both data reaching at node B and collision occurs. Now Author use two way hand shake problem for solving for RTS and CTS between transmitter and receiver. Now first it will check range of Node A, B, C and then it will transmit the data to node. Also sending a data in particular time duration.when data receiving after that data are clear from particular nodes.

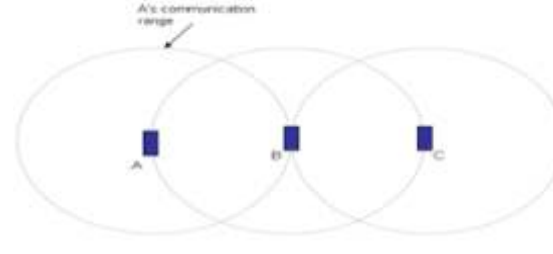



**Fig. 2–Communication range of each node.**

IEEE 802.11: This standard [29] specifies the Distributed Coordination Function (DCF) which is based on CSMA/CA.When channel in idle state for distributed inter frame space for this the transmitter wait for it. When it free it

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can start transmit the data. When it senses the channel is busy using DIFS it random transmitting data to avoid collision.The time after the DIFS period is slotted When it start to time slot and transmit the data.The exponential is the back off scheme which range display of uniformly (0, W). W display contenting window, variable in nature and its initial value Cwmin.Each time a node has to back off for the same frame after the first back off, it doubles the contention window. Window is not increment because of CWmax. When Ack receive by receiver the frame is send successfully or not. Also it is sending a frame 8 times after frame dropped in queue.

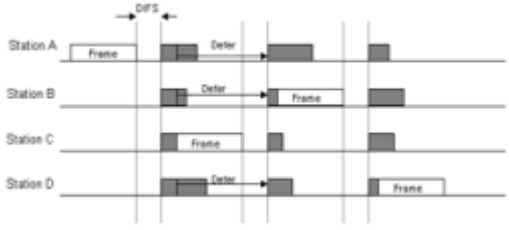



**Fig. 3 Distributed Coordination Function (DCF)**

IEEE 802.16:Thenetwork consist two type of station one is base[12] and other is sub scriber. Both point generated multipoint design structure. Multipleframesis allocated particular time slots and also consists uplink and downlinks. Base station controlled up link and done as scheduling algo. As limited range of the radio propagation,Because of its own ID and the Medium Access Control (MAC) addres sofitsone-hop neighborseach mobile nodehas only limited information. There fore,if any two nodes are not in the Boundary of radio propagation, a for ward packet is required for a multi-hopand one or more in termediate nodes[2].

Each intermediate node consumestimeandre source for the forward functionin the sense of powerandbandwidth. Thisanalysis represent the maximization of mobile node life threw out different mechanisms.

In Mobile node,The energy loss of battery must be smaller to higher its life time [5,6].So, the battery Lapps quickly making use less the mobile nodes.

All the working modes of network which has be type by sending, receiving, idle, and sleeping modes and calculating consumption of energy of each mode which display in section 3. In sending and receiving mode maximum energy required for wake up in inter face and transmit the data.Inonestatedataisneithersendingnorreceivingdatathat mode calledas sleeping mode.In on emode datais sending and receiving are in background that statecalledas id lemode. When it isin the a wake state, A node required the most Energy. So That, the proposed Energy-efficient protocol depend son mobile nodes' stayingin the sleep state most of the time,unless information have to besent[2].

TheReductionof energy consumption by Mobile Adhoc Network has been studied widely. MAC protocol sin energy efficient can be classified in to two categories—synchronous wake up approaches [13-17] and asynchronous wake up approaches [18-23]. In synchronous wake up approaches, all nodes must execute a clock synchronization mechanism. Asynchronous wakeup approaches require no such synchronization mechanism. How ever, the neighbor discovery time is the most important issue in asynchronous wake up approaches.They must adjust the over lapofa node'swake up time with that of its neighbors, resulting in increased power consumption and long trans mission delay [1, 13].

**II. RELATED WORK:**

F.Liu,K.Xing, X.Cheng, S.Rotenstreich[4]:

In this paper author says that Manet is as an autonomous system of mobile routers and connected by wireless links. Its Characteristics is Fast development, Dynamic mult-ihop Topology, Self organization without typical infrastructure support. The Two Major Reason for Transmit Power Control is Transmit at a high power may increase the interference to Co-existing user and therefore degrade network and Energy efficient scheme can impact battery life, consequently prolonging the lifetime of the network.

**Table 1. Lucent IEEE 802.11 WaveLan PC Card (2Mbps) Characteristics:**

| Modes | Energy consumption (ma) |
|---|---|
| Sleep | 14ma |
| Idle | 178ma |
| Receive | 204ma |
| Transmit | 280ma |

Low-power MAC designs guidelines are minimize random access collision and the consequent retransmission, Minimize idle listening, Minimize overhearing, Minimize control overhead. Explain about Scheduling-based mechanism for CDMA, FDMA, and TDMA for Mac protocol and different mechanism. Power Control Techniques explain different protocol. Power off mechanism explains about P-Mac, S-Mac protocol and mechanism. Multi-Channel Mechanism explain about different channels. Antenna-based mechanism it was explain about the radio base wireless protocols and radio transmission.

**1. M.S.E.soliman,S.M.A.Elkader,H.S.E,H.A.Baraka[7]:**

In this paper author says that Manet relies wireless connections of high rate bandwidth which fail nodes and mobile nodes. When we reduce overhead it reduced bandwidth also increase throughput and decrease latency. They are using Ad-Hoc Routing Protocols Which are listed DSDV, CGSR, GSR, FSR, OLSR are Table-driven (Proactive) Routing protocol, AODV, DSR, ABR, SSA, TORA are On-demand (Reactive) Routing protocol, and ZRP, ZHLS are Hybrid (Reactive & proactive) Routing protocol. In this Paper author using Local repair in AODV protocol. Which are explain in Below.

**Local Repair in AODV:**

**AODV =** (Adhoc on demand distance vector Routing)

In It has used broad casting technique for sending a data

.

**TTL = Max (0.5 * NH, TTLMNR) + TTLLA**

**TTLMNR: The failure of upstream node to the destination for The last known hop count.**

**NH:** the total of stages failure of the upstream node to the currently undeliverable packet of sources.

**TTLLA: constant value**

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**Table 2. Different Range of nodes:**

| Nodes | Area |
|---|---|
| 50 nodes | 1500*600 m2 |
| 100 nodes | 2100 *800 m2 |
| 300 nodes | 3600*1400 m2 |

**Table 3. Overhead between AODV and LRAODV in different range of nodes.**

| Nodes | Overhead for AODV | Overhead for LRAODV |
|---|---|---|
| 50 nodes | 36% | Less than 36% |
| 100 nodes | 29% | Less than 29% |
| 300 nodes | 19% | Less than 19% |

**Table 4. END to End Delay between AODV and LRAODV in different range of nodes.**

| Nodes | END to END Delay AODV | END to END Delay LRAODV |
|---|---|---|
| 50 nodes | Less than 21% | 21% |
| 100 nodes | 35% | Less than 35% |
| 300 nodes | 28% | Less than 28% |

**R.H.Hwang,C.Y.Wang,C.J.Wu,G.N.Chen[2]:**
In this paper author says that MANET is a multi-hop wireless network that is formed dynamically from an accumulation of mobile nodes without the assistance of a centralized coordinator. The power consumption of a battery must be minimized to maximize its lifetime, the battery quickly run out of power, Making the mobile node useless.

**P-MANET:**
IT was used Multihop time Synchronization protocol.In p-MANET, the three mechanisms that are utilized to reduce power consumption and transmission latency are Hibernation – how to remove unnecessary noise, Beacon inhibition - to save energy each node enters PS mode unless it wakes up in beacon interval, Low-latency routing selection - to choose the most efficient next hop forwarding node.

**Table 5. Power Consumption of Network Interface:**

| Modes | Energy consumption (w) |
|---|---|
| Sleep | 0.045 |
| Idle | 1.08 |
| Receive | 1.30 |
| Transmit | 1.875 |

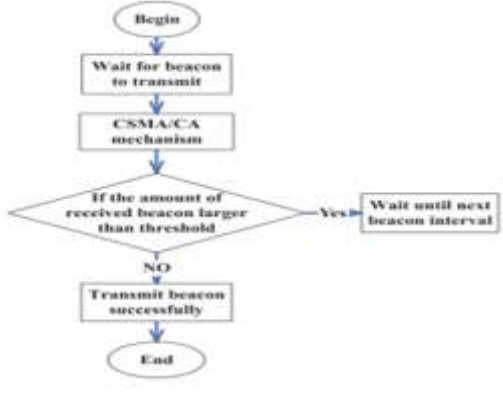



**Fig.4 Flow Chart of Beacon inhibition Mechanism**

**S.Preethi, B. Ramachandran [34]:**
In This Paper author uses Single-hop and Multi-hop Mobile Adhoc Network was used. Base station are used in single-hop network to Accomplish communication between nodes. Broadcasting is use for transmitting data for Replica generation and waste of energy. So that in this paper Expanding ring search technique is used.

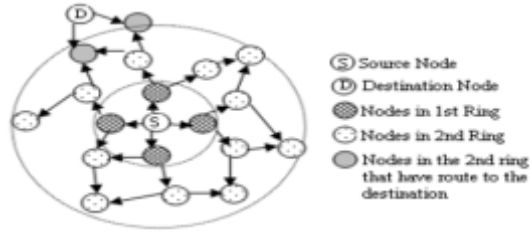



**Fig.5 Expanding ring search Techniques**

Energy Efficient Adhoc on-demand distance vector routing protocol is use in ERS Techniques. Data sending between sources to destination layer by layer. Each and every layer certain node in it. Every node connected to each other for data sending and receiving.

**Dr. R.K. Chauhan, A.Chopra[35]:**
In this paper author says that Power control approaches can be classified power controlled topology management, power aware routing, Power controlled topology management schemes try to find lowest transmission power level for each link as far as network-wide connectivity is guaranteed; Power aware routing schemes try to find routes which consist of links consuming low energy.

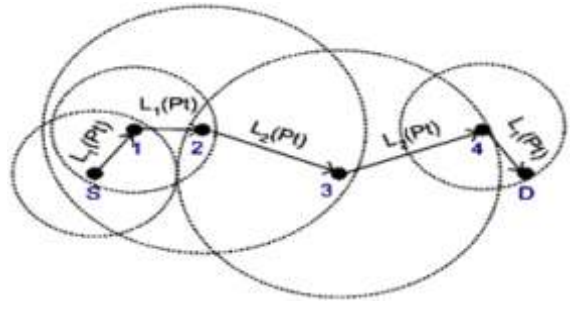



**Fig 6. Routing with power control**

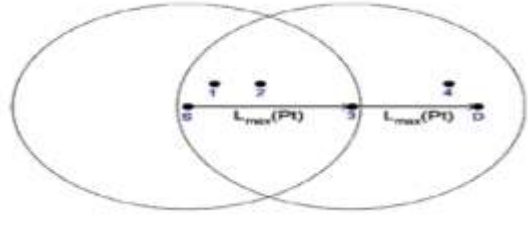



**Fig 7. Routing without power control**

**III. CONCLUSION AND FUTURE WORK:**
In Manet we saw a different techniques, MAC and routing protocol in different paper after we can save more energy from above MAC and Routing protocol and techniques also find minimum loses of energy and increase a survival Ration. Now for future work we will make a new MAC protocol using time synchronization, NAV, collision detection & avoidance mechanism using best routing protocol for find minimum

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power consumption, neighbor discovery time, survival ration, mobility management.

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