

# Enhancing Performance in Terms Of Energy Consumption of Cluster Based Protocol by the use of Priority Queue

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**Abstract:-** The multi channel TCP communication utilized channel estimation in order to transfer the received packets towards destination node. As more and more packets collected at cluster head, congestion takes place causing packet drop. Packet drop ratio subsequently decreases lifetime of network and energy consumption due to packet aggregation increases. The proposed literature tackle problem of packet drop with priority Queue. Packets are assigned with priority and in case of congestion packets with least priority are blocked. By doing so aggregate energy along with packet drop ratio subsequently decreases. Simulation is conducted in MATLAB. The performance analysis indicate enhancement by 22%.

**Keywords:** Multi Channel TCP; Cluster Head; Packet Drop; Lifetime; Priority Queue; Aggregate Energy

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## 1. Introduction

Multi Channel TCP communication is applied in case online communication is needed. Online communication is reliable in nature. In wireless sensor network, online communication becomes critical since sensors need to pass information forward due to lack of storage space they possess. Routing schemes used to facilitate transfer process within WSN. Routing Schemes are many and enhancement is desired as congestion occurs within the system. Routing protocol is all about how routers interact with each other, or how routers communicate with each other. Routing protocol enable routers to select best route between the two nodes on a network. At first, routing protocol shares the information among immediate neighbors, and then throughout the network. There are many types of routing protocols. Some of them are:-

- **Routing Information Protocols (RIP) :-** The **Routing Information Protocol (RIP)** is one of the oldest routing protocol. Routing Information protocol gives their best route for routers to share about how to route traffic among networks. Each router maintains a routing table in RIP, which contains a list of destinations it knows how to reach, along with the distance to that destination. By using this protocol, each router in every 30 seconds, can send its entire routing table to its closest network.
- **Interior Gateway Protocol (IGRP):-** Basically, Interior Gateway Protocol is a type of protocols which is used to share or exchange its own routing information among Gateways. Interior Gateway Protocol exchange its

routing information among routers in an independent network.

- **Open Shortest Path First (OSPF):-** As its name defines, OSPF (Open Shortest Path First) is used to find the best path or the shortest path for packets as they pass through a set of connected networks.
- **Exterior Gateway Protocol (EGP):-** Interior Gateway Protocol is a type of protocols which is used to share or exchange its own routing information among two neighbour Gateway hosts.

EGP mechanisms are:-

- Acquire neighbour.
- Monitor neighbour.
- Exchange data as update messages.
- **Enhanced interior gateway routing protocol (EIGRP):-** Enhanced interior gateway routing protocol is the protocol that lets the router exchange information more efficiently than the earlier networks. The other advantage of EIGRP is it can be used not only for the internet protocol but also for Appletalk and Novell Netware networks.
- **Border Gateway Protocol (BGP):-** Border Gateway protocol is the standardized exterior gateway protocol that able to connect two different network and also enables the Internet to function. BGP didn't built to route within the autonomous system.

Clustering is used to form cluster head. Node with maximum energy is given the status as cluster head. Nodes transfer data towards cluster head. From the cluster head data is transferred towards base station.

The **Objectives** of the proposed literature are listed as under

- A. First objective is to reduce the energy consumption during packets transmission process.
- B. Second objective is to increase the lifetime of the network.
- C. Third objective is to reduce the number of packet drops.
- D. Fourth objective is to compare the performance of the proposed system with the existing system.

## 2. Literature Survey

[1] Multipath TCP (MPTCP) is one of the main conventions that support multipath operation in a vehicle layer. Be that as it may, contingent upon the system and the beneficiary cradle, the first MPTCP can encounter throughput debasement, underutilizing the system limit contrasted with the customary TCP. Besides, MPTCP can bring about a substantial bundle interim. In this paper, we propose another planning plan for MPTCP that performs parcel booking as indicated by the recipient support and system delay. Our plan gauges out-of-request bundles as per execution contrasts amongst subflows and allots information parcels to subflows by looking at the evaluated out-of-request parcels and the cushion measure. Besides, our plan can alter the exchange off amongst throughput and postpone execution utilizing a defer limitation. We execute the proposed planning for the Linux bit and assess its execution over a virtual system structure utilizing NS-3 and genuine systems. The outcomes demonstrate that the proposed booking plan performs effective parcel transmission paying little mind to the execution contrasts of different ways and cradle measure. In addition, the proposed booking can supplement and coordinate with a current non-planning based arrangement.

[2] Proposes hybrid LEECH Protocol which is combined with the PEGASIS protocol to reduce energy consumption. Individually both the protocols has advantages and disadvantages. Mainly, LEECH consumes more energy and PEGASIS is not dynamic in nature. To resolve the problem, hybrid approach of LEECH and PEGASIS is proposed.[3]

Energy Efficient LEECH Protocol is proposed. LEECH provides mechanism in order to transfer the data from source towards destination following path from one cluster head to next cluster head. Finally data is transferred towards base station. Shortest path is to be identified and data is transferred towards destination conserving energy.[4] LEECH Protocol is proposed which utilizes random selection of cluster head using probabilistic approach. LEECH protocol provides energy efficiency as compared to other cluster based algorithm. [5.6] Load balancing is the mechanism used widely in virtualization. Server load is the parameter considered in this situation. As the load on server increases, reliability is at stake. Healthy machine is such situation is selected using parameters like [7]energy conservation, [8]temperature etc. The selected machine is selected for undertaking load of deteriorating machine. [9] Primitive migration is used in order to enhance the performance of the system. In this approach functions and instructions are moved to lower level of software or firmware hierarchy. The structural aspect is considered in order to perform selection of primitives for migration [10] Software Rejuvenation is the problem arises due to aging of the software. Set of preventive techniques are utilized to prevent this situation. Initially it is necessary to classify the faults occurring within the software system. Analytical approach is applied in order to determine the optimal number of times rejuvenation is required. The accuracy of modelling is determined using metrics such as root means square error, and absolute error.

These techniques suggested in proactive fault tolerance are most often cited hence are optimal and used in migration operation.[11,12] Live VM migration is optimization strategy in which load from current virtual machine is migrated to healthier machine without shutting down any machine. Both the machine are working during migration hence the name live VM migration.

## 3. Proposed System

The proposed system works towards reduction in energy consumption and enhancement in lifetime of network. The energy consumption is enhanced by the use of Priority Queue. Priority Queue has front and rear end associated with it. As packet arrives, rear is incremented by 1. Packets after passing out towards destination, front is incremented by 1. Congestion cause packet drop to occur and performance of system degrades. The methodology for the same is listed as under.

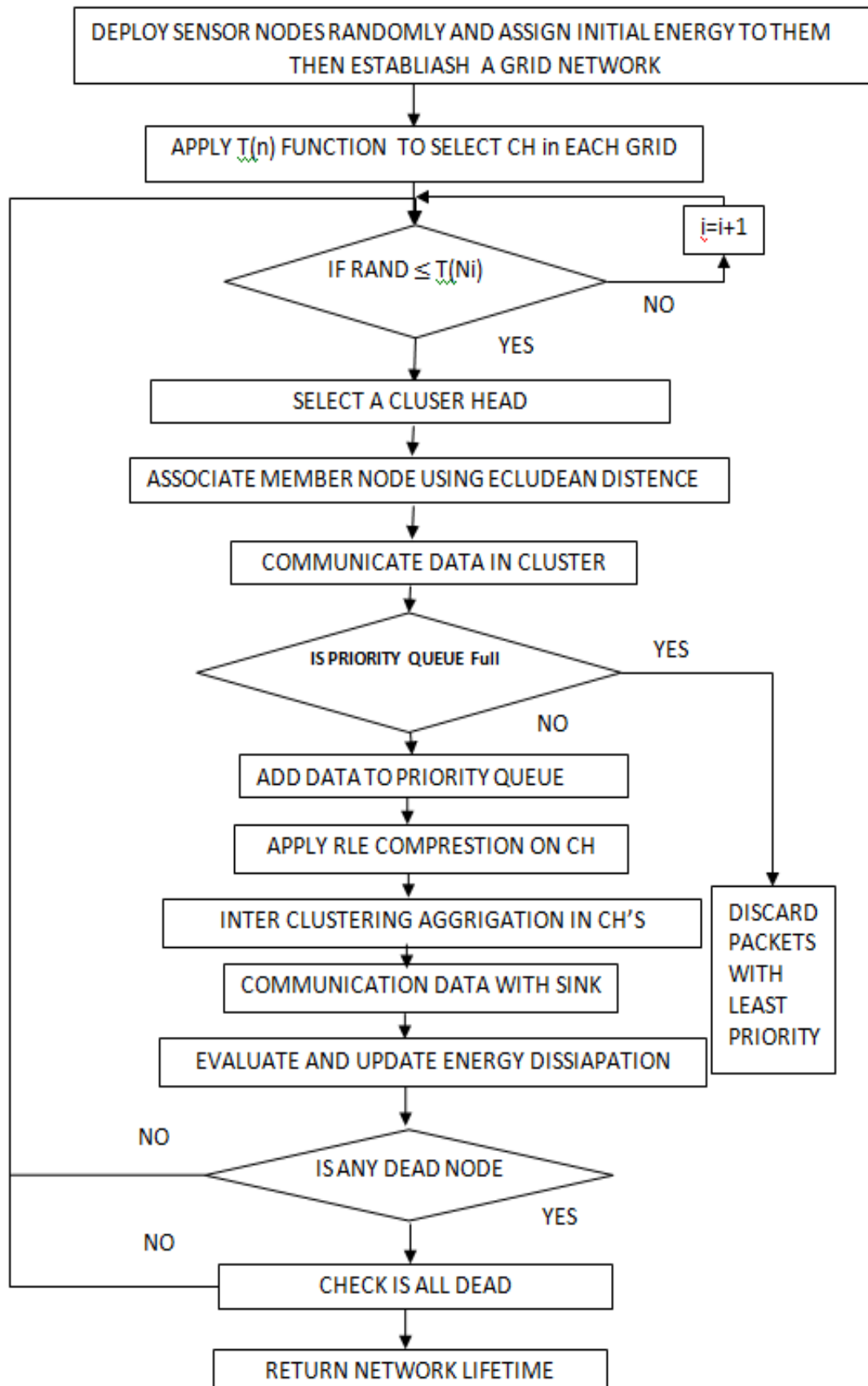


Fig 1: Proposed Methodology

### 3.1 Proposed system with priority queue

Remote Sensor Networks (WSNs) comprises of across the board arbitrary sending of vitality obliged sensor hubs. Following properties exists of proposed system.

- Sensor hubs have distinctive capacity to detect and send detected information to Base Station (BS) or Sink.
- Detecting and in addition transmitting information towards sink requires substantial measure of vitality.
- In WSNs, save vitality and delaying the lifetime of system are incredible difficulties. Many directing conventions have been proposed with a specific end goal to accomplish vitality productivity in heterogeneous condition.
- Multipath TCP with DEEC Priority Queue for the most part comprises of three sorts of hubs in amplifying the lifetime and solidness of system

### 4. Results and Performance analysis

Proposed system uses following parameters list for optimization

**Table 1:** Proposed Parameter List.

Parameter	Values
Area	100*100
Clusters	25
Nodes	100
Energy_Consumed	0.1(Initialy)
Aggregate Energy	0.0(Energy at Cluster
Front	0
Rear	0
Threshold	0(Initial Value)
Packet_Drop	0(Initial)
Lifetime	2000

Simulation is conducted in MATLAB. The simulation results are obtained up to round 5000. Number of dead nodes is evaluated at interval of 5 in rounds. Energy consumed is evaluated on an average and maintaining fixed area of 100\*100. Packets are transferred towards cluster head and then cluster head transfer the data towards base station.

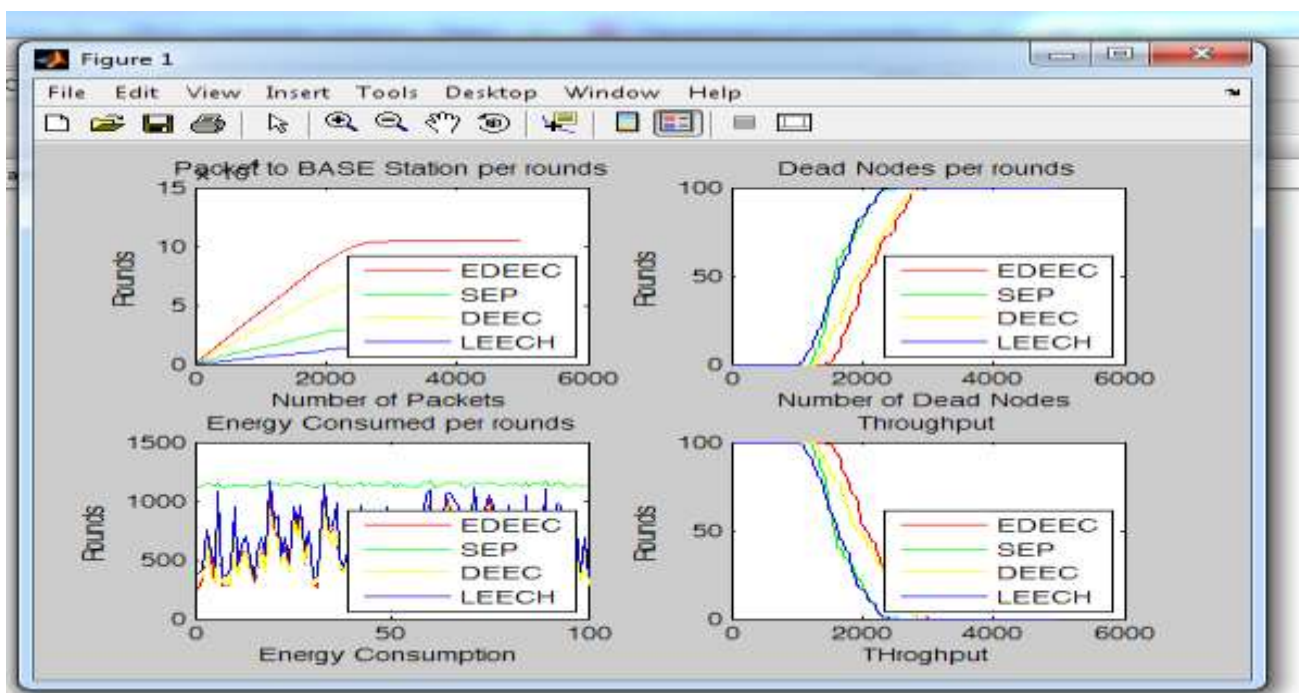


Figure 1: Plots from the simulation showing EDEEC SEP DEEC LEECH

Threshold value specifies the range exceeding which node is termed as cluster head. The result in terms of this parameter list is as follows:

Table 2: Number of Nodes

Parameter	Existing		Proposed	
	Rounds	Dead Node	Rounds	Dead Nodes
Dead Nodes	5	0	5	0
Dead Nodes	12	5	12	0
Dead Nodes	25	10	25	1
Dead Nodes	50	25	50	6

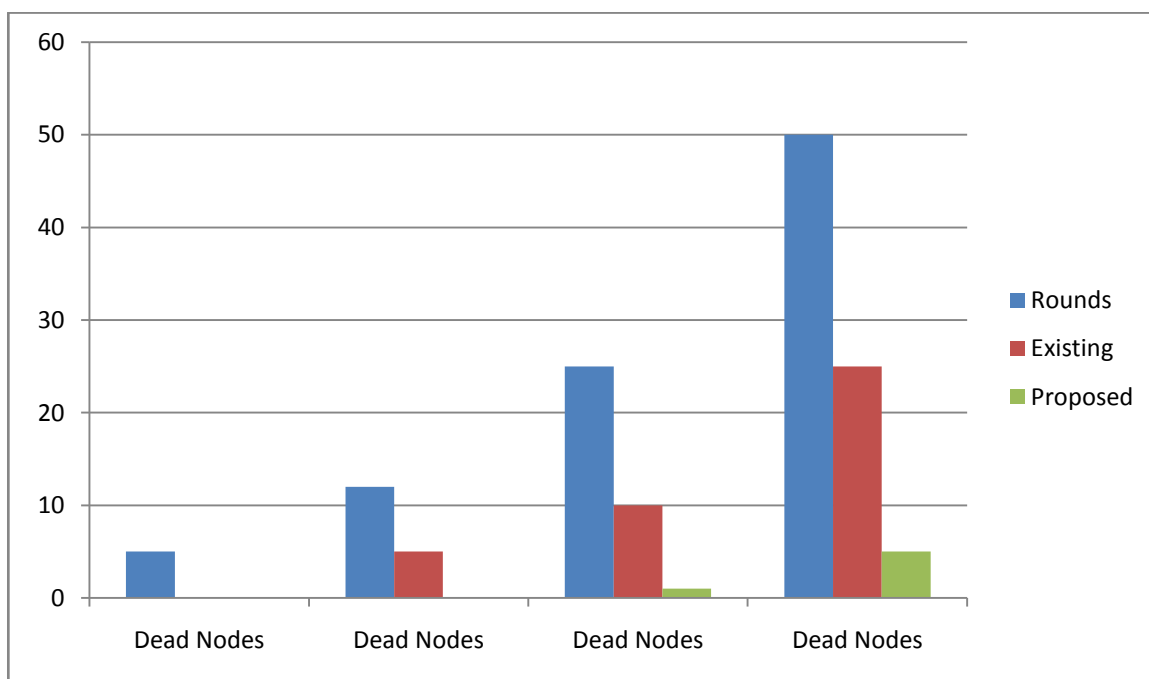


Fig 2: Showing Number of Dead Nodes against Rounds

Energy Consumption greatly enhanced by the packet drop ratio.PDR(Packet Drop Ratio) if high energy consumption is also high. Energy consumption is given in terms of following table

Table 2: Energy Consumption Comparison

Parameter	Rounds	LEECH	Proposed
Energy Consumption	5	0.1	0.001
Energy Consumption	10	0.2	0.0015
Energy Consumption	15	0.7	0.0123
Energy Consumption	20	0.9	0.1
Energy Consumption	25	1.2	0.2
Energy Consumption	50	1.5	0.5

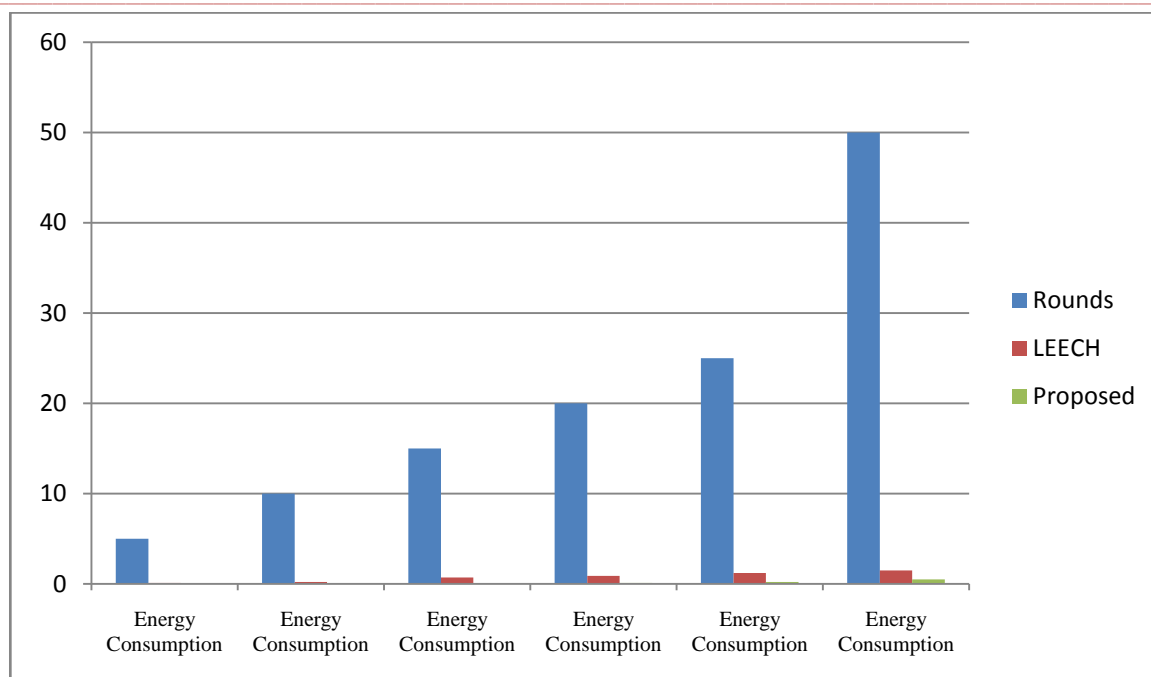


Fig 2: Plots of Energy Consumption

## 5. Conclusion and Future Scope

The result and performance analysis indicates that the proposed system is better in terms of number of dead nodes and energy consumption. Subsequently lifetime of the network is enhanced. The priority queue helps in reducing congestion. The low priority packets are tackled as a result of congestion and high priority packets are retained, resulting in increase in lifetime of the network.

In future, experiments can be conducted with TDEEC and Priority queue to enhance lifetime further.

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