CIP : QOS Performance Matrices Analysis for Cluster Based Internet Protocol (IP) Over Mobile Adhoc Networks

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Abstract : A Mobile Ad Hoc Network (MANET) consists of a set of the similar mobile nodes communicate with each supplementary via wireless links. MANETs are cautious to be important feature in the scheme since its self-organizing arrangement missing the predefining structure. Such network may use in a stand-alone fashion, or may be connected to the better Internet. For the effective data transmission in the IoT environment for the mobile networks, concept of Internet cluster communication is integrated which is been proposed as CIP (Cluster over IP) which works on the Divide and Conquer Methodology for handling the data traffics and to increase the efficiency.

Keywords : CIP, MANET, Divide and Conquer.

1. INTRODUCTION

Mobile Ad hoc Networks (MANETs) are extremely attractive for military or civilian application in surroundings. In the last decade, big examine labors have been complete to speak to confront cause by MANETs. This trouble was tackle by some researches [1]-[5]. We have analyze these proposal and pointed out their weakness and deficiency in [13]; we have recognized also the very important security supplies connected to this problem.

2. RELATED WORK

Zohra Slimane : Proposed routine IP speak to job in Mobile Ad hoc Networks (MANETs) enable nodes to obtain routable address without any communications. Dissimilar protocol has been urbanized all through the last years to attain this service. However, research first and foremost focused on rightness, competence and scalability; much less notice has been given to the safety issues.[1]

   Mansoor Mohsin : Proposed a Mobile Ad Hoc Network (MANET) consists of a set of the same mobile nodes communicate with each other via wireless links. The network's topology may alter fast and randomly. Such network may work in a stand-alone way, or may be linked to the better Internet. In customary networks, hosts rely on central servers like DHCP for pattern, but this cannot be comprehensive to MANETs since of their distributed and lively nature.[2]

   Armando Fox : Recognized three basic requirements for scalable system services: incremental scalability and overflow growth provisioning, 24x7 ease of use from side to side fault mask, and cost effectiveness. This paper states that clusters of product workstations unified by a high-speed SAN are exceptionally well-suited to meeting this challenge for Internet-server workloads.[3]

   Vaidyanathan : Proposed the extraordinary enlargement and distinction of cluster-based centers has not been accompanied by a system-wide consideration of the various capitals and their use strategy.

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Typical data-center workloads have a wide range of uniqueness. They vary from far above the earth to low chronological area (Zipf coefficient), large papers to small ID (download sites vs book stores), and the number of documents.[4]

3. PROBLEM IDENTIFICATION

Clustering in Mobile Ad Hoc Networks (MANETs) has a lot of reward compare to the customary network.. The process of splitting the system into consistent substructures is known as clustering and the combined substructures are called clusters. Each cluster has cluster head (CH) which act as a manager within the base. [5]

3.1. Existing Drawback methodology

The very active and unbalanced behavior of MANET's makes it hard for the Cluster base routing protocol to split a mobile system into clusters and strength of mind of cluster heads for every cluster. Clustering decreases message and control expenses due to pre-decisive paths of communication from side to side cluster heads. It is very essential for scalability of media right of entry protocols, safety infrastructure and routing protocols [3]. The routing protocols which are considering merely bidirectional links may have link irregularity due to incompetent or irregular navigation. Unused network ability is representing by the undiscovered unidirectional links, which reduces the network connectivity. [4]

One of the major drawbacks of clustering in MANETs is that a number of nodes consumes more power which in terms affects the performance of the whole MANET network when it is connected in the Network.

4. PROPOSED OVERVIEW CLUSTER BASED INTERNET PROTOCOL (CIP) OVER MANET
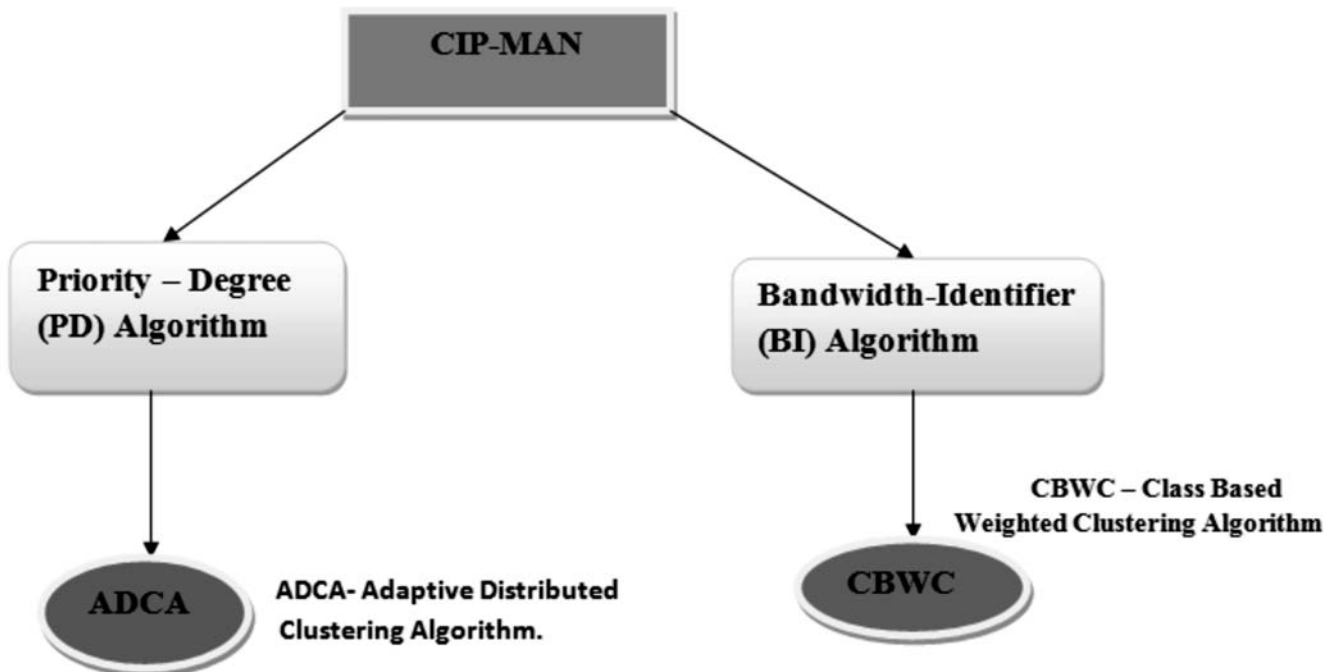

Figure 1: Classification Diagram of CIP-MAN Protocol

The method of splitting the system into consistent substructures is known as clustering and the combined substructures are called clusters. The cluster Weight head (CH) of every cluster act as a manager within the base. Each Cluster Head acts as a provisional base position within its zone or cluster. It communicates with additional Cluster Heads [2]. The Cluster based routing gives a reply to speak to nodes heterogeneity and to boundary the quantity of routing in order that propagate within the network.

The group of network nodes into a form of overlap clusters directs the major idea at the back clustering. A hierarchical direction-finding is likely by clustering in which paths are recorded, flanked by clusters instead of flanked by nodes. It enhances the routing lifetime, thus reduction in the amount of routing manage overhead. The cluster head (CH) coordinate the cluster behavior inside the cluster. The normal nodes in cluster can access cluster head and gateways directly. The nodes that can hear two or additional cluster heads are called gateways. [7]

The proposal introduces the assortment of cluster heads in mobile-ad-hoc network include….

4.1. Proposed Protocol Working Mechanism

CIP-MAN – Cluster

Base Internet Protocol in MANET over IPv6 base direction-finding traffic management to psychoanalysis 128 bit format, the final target is to provide analysis of traffic management in cluster based Mobile ad-hoc environment.

Priority – Degree (PD) Algorithm

It utilizes location information for cluster configuration and it chooses the cluster head from the uppermost degree node in a neighborhood. To analyze the node in small package flow, First comes First Out in priority basic influx device in group of nodes in cluster background.

Bandwidth-Identifier (BI) Algorithm

The node with the smallest amount identifier (ID) is chosen as a cluster head. It causes bandwidth space portion and results in a short lifetime span of the system. The distance opinion flanked by nodes for assigns the traffic flow in specific clusters Head selection.

Adaptive Distributed Clustering Algorithm (ADCA)

ADCA is a customized account of the Cluster Identifier algorithm. Each cluster chooses its cluster skull from its adjacent nodes having the lowest ID. In this ADCA algorithm, cluster is being decided by the nodes in the network itself.

The information is notified by different group of cluster mechanism in to allocate the IPv6 direction-finding in over all traffic scenarios.

Class Based Weighted Clustering Algorithm (CBWCA)

It utilize mutual metrics-based cluster. In order to analyze a weight factor for every node, a number of metrics as well as node quantity, CH serving time and travelling speed are taken into account. Therefore CBWCA the class based mechanism is involved in rare and flow motion in circular mechanism to use more packets without dropping packets in queue buffer management.

4.2. Cluster IP Address Allocation for CIP-MAN

A novel swelling will be assigned randomly, one of the lowly free address restricted in the FAT, which returns that the IP address is assign in an ascending order from a arbitrarily selected IP Address Block. We impose in the direction of the new combination node to get its IP speak to from at least K nodes. So we use the threshold value or threshold name to describe above and the new idea of 'On-line Joint IP speak to and Public Key Certificate'. Each owed IP address in the net is jump to node's individuality by income of this certificate which must be sign by the On-line CA.[5]

ST.B—Start Bit; NID-Node ID; H.C-Hop Count; DIST: Distance; A-Acknowledgement; DID-Destination ID; STOP-Stop Bit
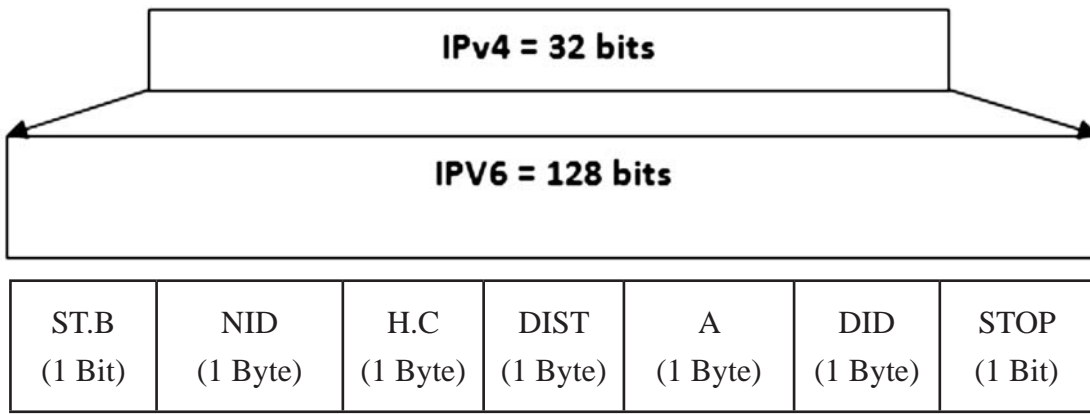
ST.B (1 Bit)	NID (1 Byte)	H.C (1 Byte)	DIST (1 Byte)	A (1 Byte)	DID (1 Byte)	STOP (1 Bit)

Figure 2

Cluster Unicast (One to One head selection in IPv6)

Route Multicast (one –to-many head selection in IPv6)

4.3. CIP –MAN Node's States

Adaptive Unconfigured node: Any node willing to join the MANET, and which is not registered previously by an 'On-line Joint IP deal with and Public Key Certificate'

Configured node: Any register swelling within the MANET with an 'On-line Joint IP address and Public Key Certificate.[11]

Node with pattern in development: Any Unconfigured node which has initiate an auto pattern system that is not over yet.
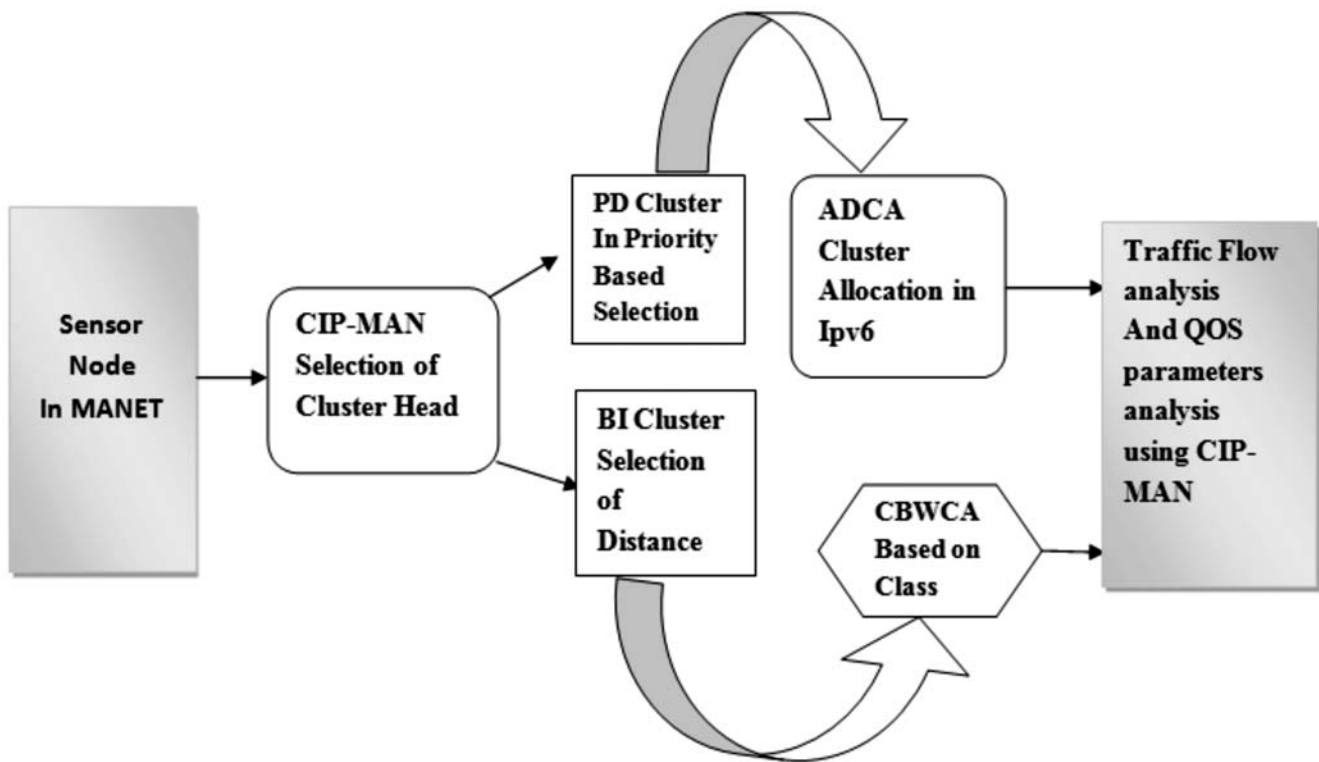

Figure 3: Functional Diagram of Proposed Protocol CIP-MAN

5.   MESSAGE FORMAT PROPOSED PROTOCOL

Adpt_Config_Request : this is used to initiate an Auto configuration services Requesting after receiving a Discovery message.

Cluster_intiliazed : In different routing mechanism

Sele_Cluster_Head : Selection of Cluster Head in Ipv6 route Mechanism…

Config_Request : This is used to requesting an On-line joint IP address and key options.

Cluster_Alert : Enables new when a malicious node is discovered along with the node.

5.1. Proposed Algorithm CIP-MAN New Cluster Head Formation

1. Income Nodes Packet – Ni
2. **Check** Node Sequence – Ns-#
3. **Check Selection** cluster head highest priority Seq-Ps #
4. **if**

     Seq # → all the nodes

5. **then**

     Check Black List

     if

          Black **List is un-check**

     Then

     Select Cluster Head

     Else

     Reject

6. **endif.**

5.2. Cluster Formation Algorithm CIP-MAN

Input : Set of unicast node

Output : Set of Cluster

Begin Cluster Priority selection = 1*/

Repeat

Select a priority node which belongs to cluster traffic which is 1 hop distance apart from other participating nodes with a small length.

Do

N = ni ; d = $d1$

Compute a cluster the priority based head selection.

While $ni = nj$

Cluster is formed with corresponding lying with in cluster.

5.3. Algorithm formation for Bandwidth

DBl → Distance Bandwidth for long

DBs → Distance Bandwidth for Short

Time$_{arrival}$ → loop counter for Distance Estimation

Evaluated RSSI distance estimation in Bandwidth separation

While

Time – arrival value at dis T A

/************Remains….go while as cluster Head************/

End while

If(Time < DT D1 >D2 > D3)

/********The cluster formation is true************/

Else

{

Both D1 & D2

Bandwidth for long in estimation…

End

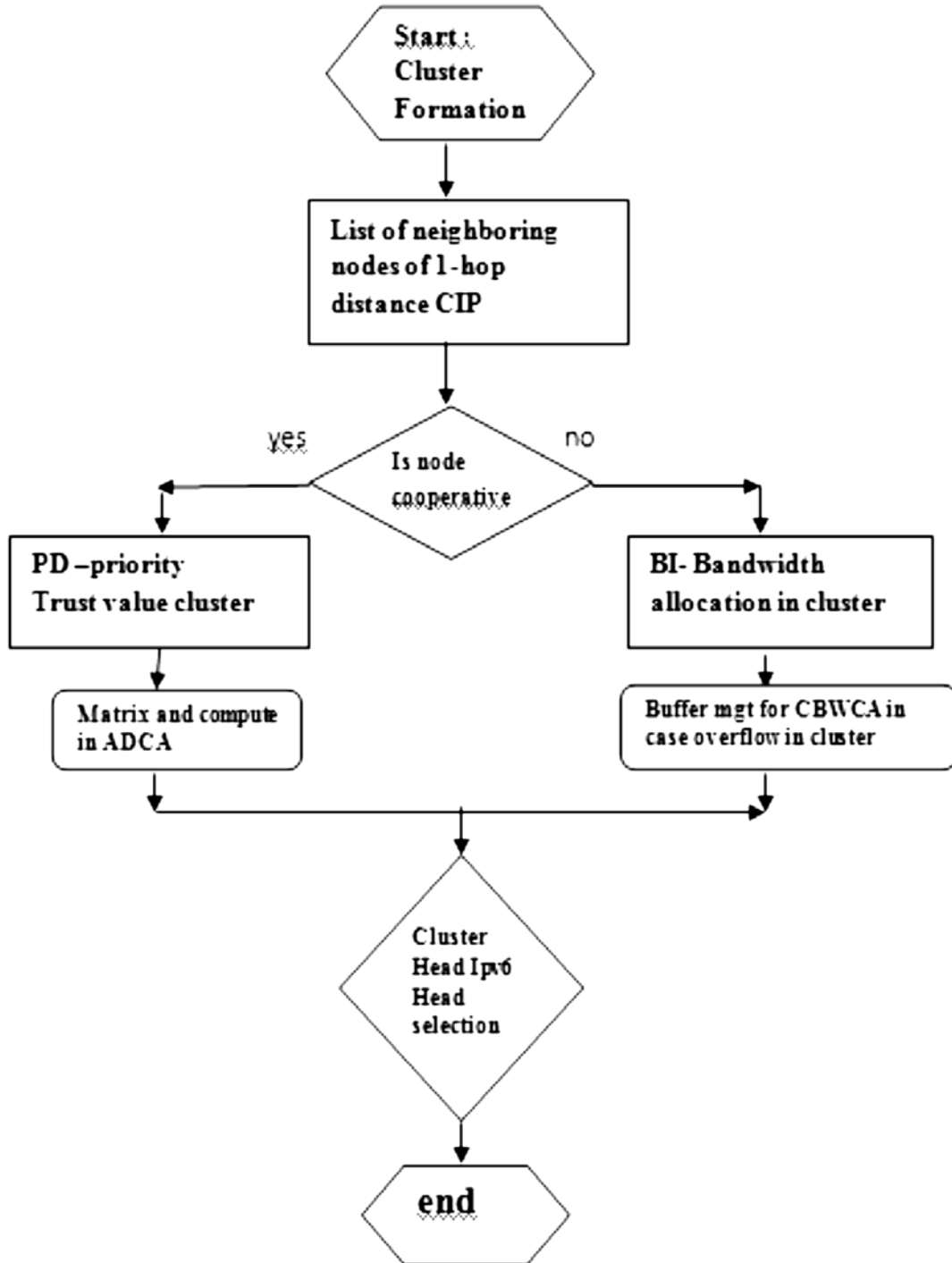**End if**

6. FLOW CHART CIP-MAN PROTOCOL

Figure 4

7. SIMULATION AND RESULTS

Nowadays, has at length conservative to be a valuable tool in many areas where logical method is not suitable and testing is not possible. The mainstream approach in the Wireless sensor network, researchers more often than not follow the growth, imitation, and publish procedure, and WSN publication normally include simulation performance that contrast different protocols.[3] In this research scenario, the proposed aggregator algorithm and power efficiency in WSN are tested[13]

Network Simulator-2 (ns2) [10] tool is used to analyze the performances of the Cluster head (TA) selection algorithm. It includes: trust evaluation of cooperating nodes, non-cooperating nodes as well as their influence of factors on the trust evaluation. The proposed algorithm is validated using the following simulation parameters as shown below.

Table 1

Simulation Parameters in CIP-MAN

No of nodes	*20*
No. of Flows	20
Propagation Model	Two-ray Ground Reflection
Area Size	1000 m X 1000 m
Radio Frequency	2.4 GHz
MAC	IEEE 802.15.4
Simulation Time	600 sec
Transmission Range	250 m
Routing Protocol	CIP protocol
Traffic Source	CBR
Packet Size	512 Bytes
Radio Transmitting Power	7.88 dBm
Radio Receiving Sensitivity	-91 dBm
Radio Receiving Threshold	-81.0 dBm
Initial Energy	100 J

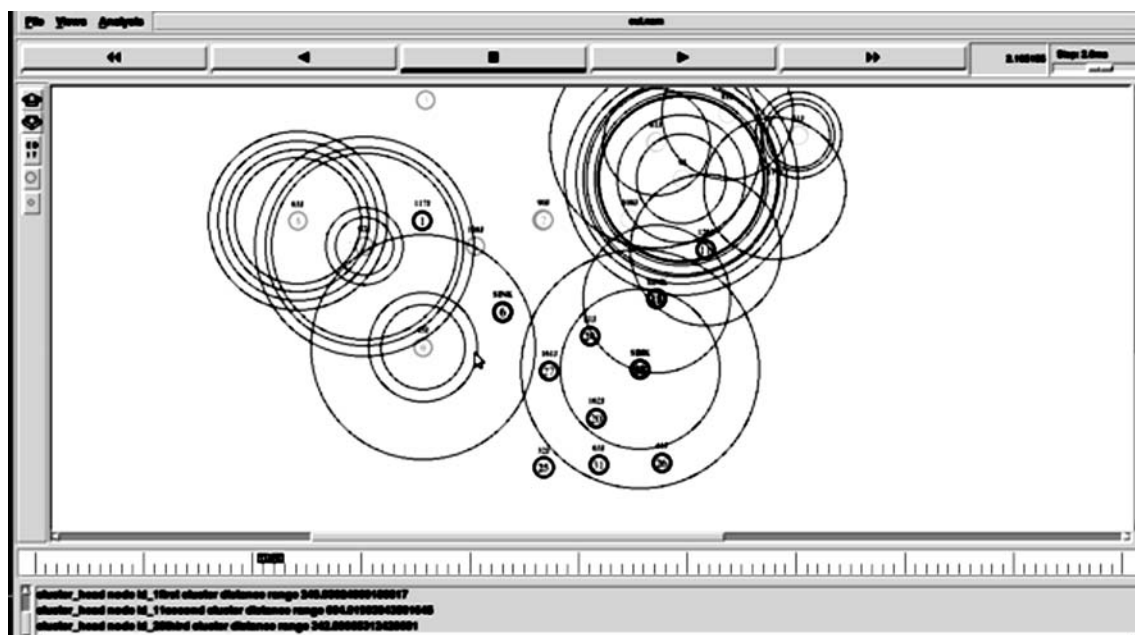**Performance Metrics Network Animation (NAM)**

Figure 6: Cluster Head Selection

The performance of CIP-MAN is compared with the Cluster-based protocol, according to the following metrics

The selection of cluster head among group of nodes. According to that the Head mechanism is selected in different scenario.
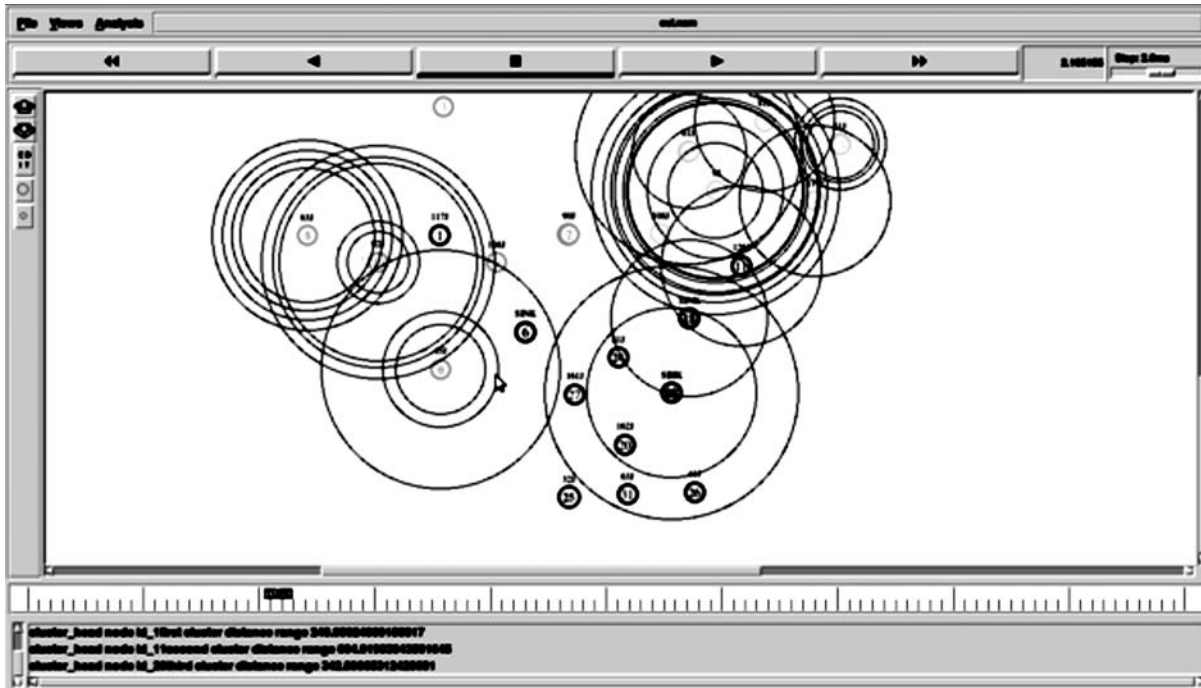

Figure 7: Priority and bandwidth Communication

After selecting the Cluster Head selection, next process is to analysis the mobile to privacy Data aggregation using CIP-Man
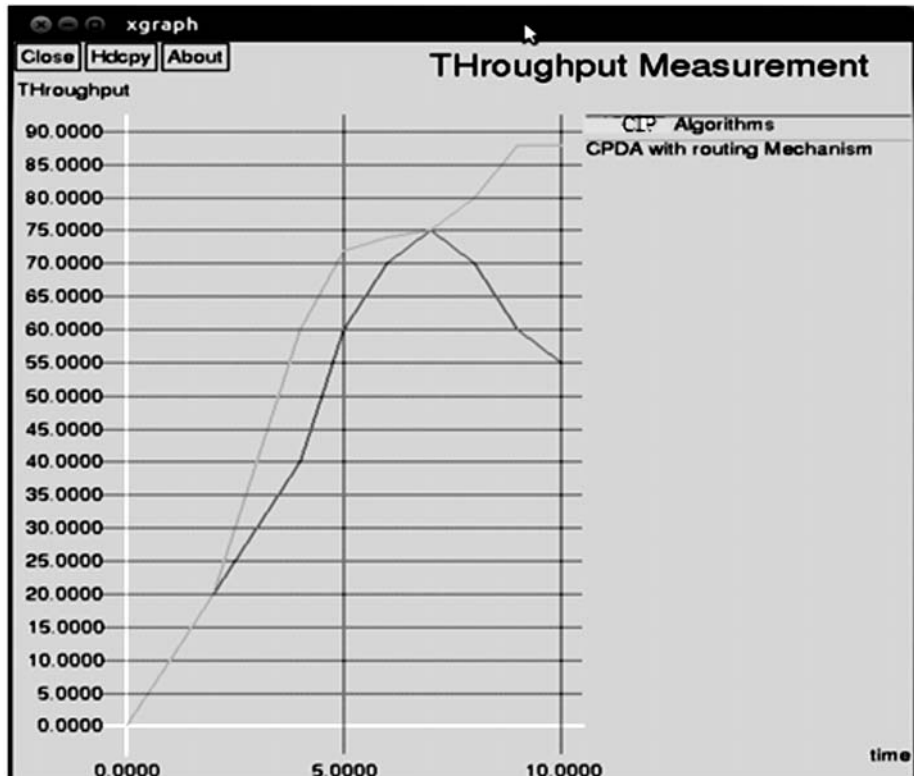
GUI (Graphical user Interface)

Figure 8: Throughput analyses

Throughput is used to analysis the maximum where number of input and delivered output are analyzed. Here we analysis the peak measurement is the limit taken with respect to throughput as time approaches zero.

To analysis over-all throughput, the following calculation is taken into account,

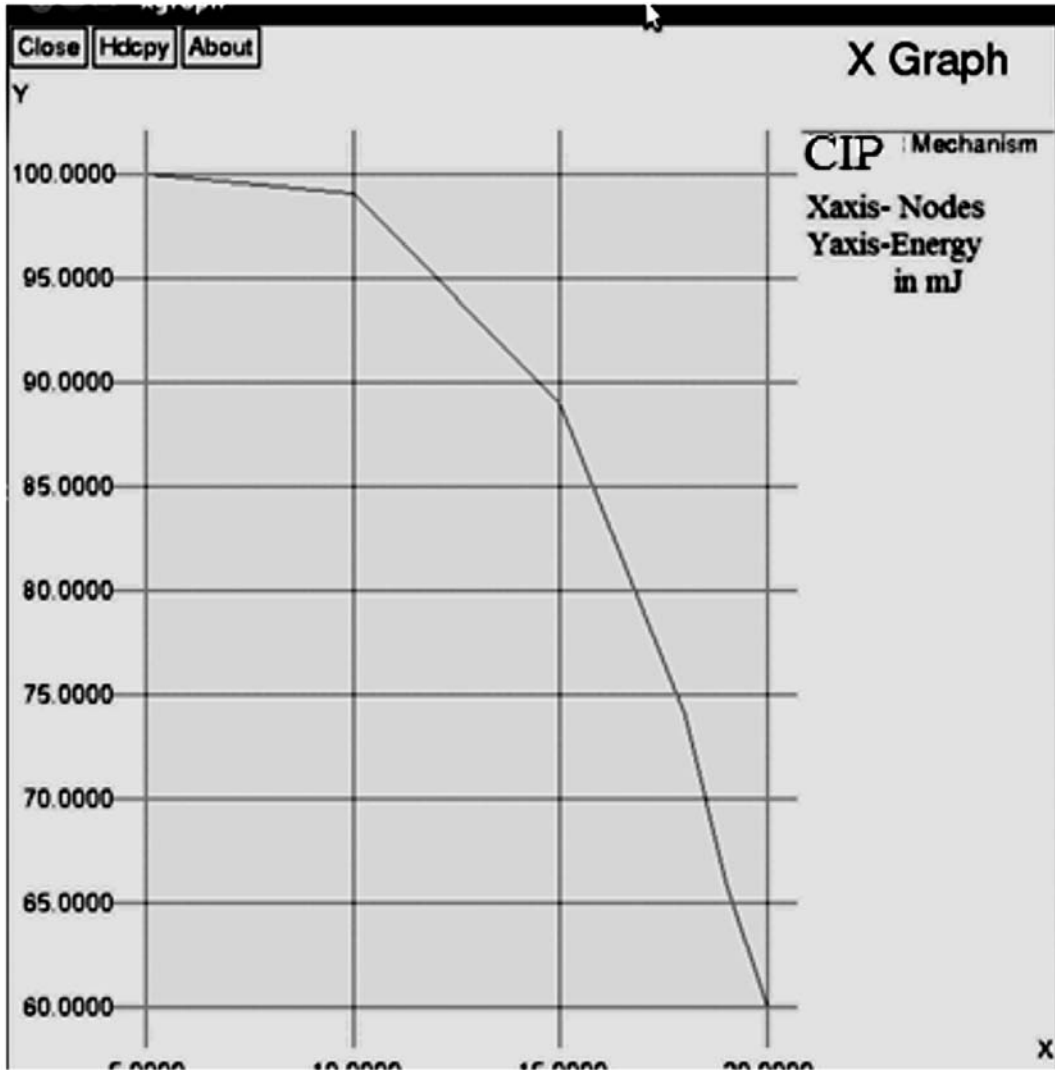$$\text{Throughput Time} = \text{File Size/Transmission Time (bps)}$$

Figure 9: Performance analysis of Power

The Power analysis take place in number of node increases in power remains same in CIP algorithm. The power reduces with respect to time and distance in low adaptive data aggregation. The power will decrease and maintain constant while increase in the number of node.

Throughput

Throughput is the average rate of successful data transmission over a communication channel. It is measured in bytes/sec. Instantaneous Throughput = bytes (received in designation node) over one second.

The instantaneous throughput will create a graph showing the amount of information received by the destination node over each second. The formula is as following:

$$\text{Average Throughput} = \text{Total number of bytes received in designation node.}$$
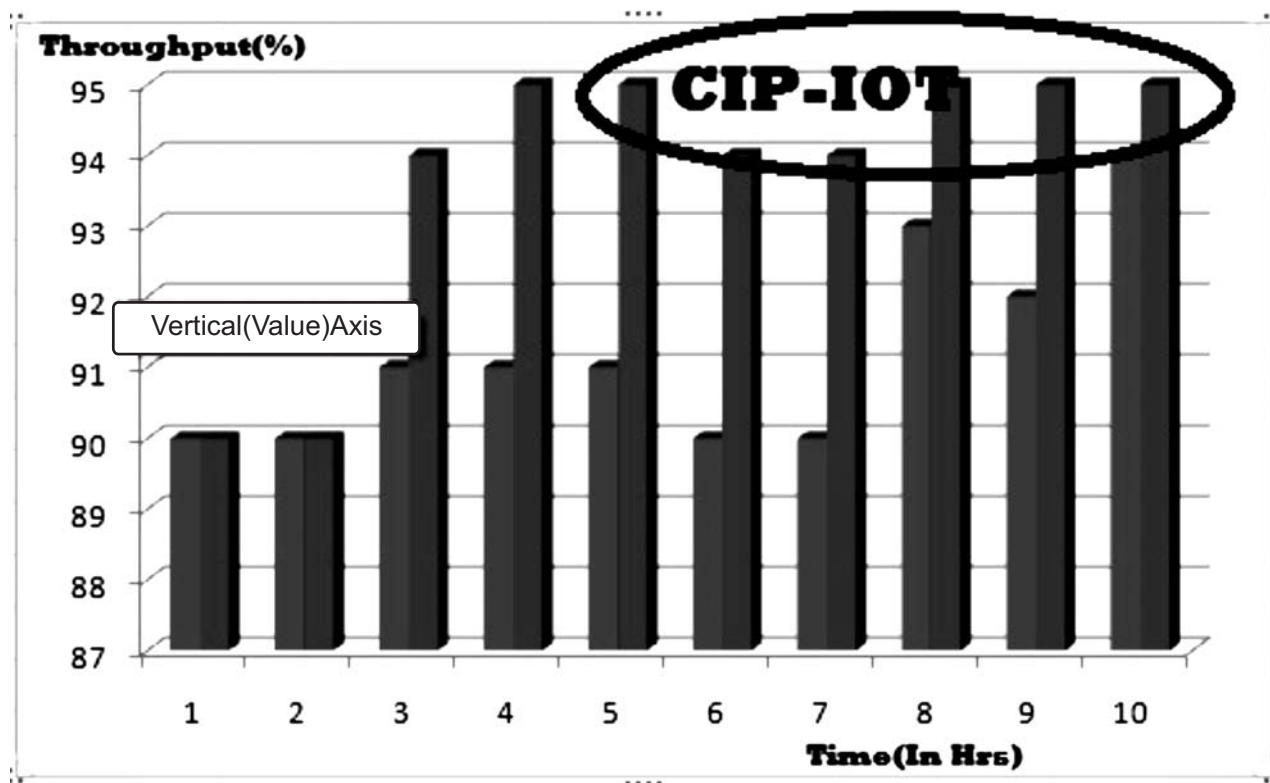
Figure 10: Represents the Throughput Analysis of the CIP-IOT when compared with the Other protocols such as the LEACH Protocols when it is used in the IOT Environment.

8. CONCLUSION

This Research deals about the calculation of the energy consumption of each and every nodes for '*s*' time. At each time, nodes receive the data aggression messages from the Cluster Head (CH) which cause the node to switch over the current state from the sleep to wake up mode. The distance between the Cluster Head (CH) and destination node is calculated efficiently. The set up was examined for smaller number of nodes and the same could be simulated for 'n' number of nodes. Therefore the reduced energy consumption of WSN increases life time of the network since the battery is not be used for the whole time period instead it is used for the particular time as explained in the proposed algorithm.

Also in this paper, QoS Performance matrices Analysis of Cluster Based Internet protocol (IP) over MANET (CIP-MAN) is compared with other protocols such as CPDA(Cluster-based Private Data Aggregation (CPDA) protocol.

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