International Journal of Innovation and Scientific Research
ISSN 2351-8014 Vol. 25 No. 2 Jul. 2016, pp. 445-456

http://www.ijisr.issr-journals.org/

A BANDWIDTH ALLOCATION USING GENETIC ALGORITHM TO PROVIDING SOLUTION FOR OPTIMIZATION PROBLEM IN WIRELESS MESH NETWORK

P. Akilandeswari, P. Gopikannan, and C. Balasubramanian

[1]Dept. of CSE, P.S.R.R college of Engg For Women, Sivakasi, India

[2]Asst. Prof Dept Of CSE, P.S.R.R college of Engg For Women, Sivakasi, India

[3]Prof. and head of CSE, P.S.R.R college of Engg For Women, Sivakasi, India

ABSTRACT: Wireless Mesh Networks (WMNs) are a promising technology that could revolutionize the way wireless network access is provided. We allocate the available bandwidth in wireless mesh network to reducing the energy consumption of a user using the AODV protocol. the AODV protocol to reducing energy consumption using the improving parameters are throughput, end to end delay, network overhead, energy spent, packet delivery ratio. The bandwidth allocation using greedy algorithm and gateway load balancing routing protocol. In this paper Genetic Algorithm used for providing solution in optimization problem.Topology of wireless mesh networks with more no of nodes is routed using genetic algorithm with proposed approaches and parameters such as end to end delay, throughput, energy spent, packet delivery ratio.finally comparison done between greedy algorithm and genetic algorithm.

KEYWORDS: wireless mesh network, truthful bandwidth, optimization problem genetic algorithm.

1 INTRODUCTION

Wireless mesh networking is an promising hot topic and is still in immaturity. Key features of WMN are being dynamically self-classify, self-construct, self-mend, scalable, consistent, easy to systematize, and it can establish adhoc network repeatedly and maintain connectivity. The designs are divided into two segments: routing and scheduling. First, a routing tree topology is construct from a given mesh topology. Secondly, channel source is allocated to the edges in the routing tree by a preparation algorithm [4].

The channel resource is bandwidth, which is allocated on the basis of elementary routine parameter. Commonly delay, throughput, fairness, or interference is considered for bandwidth allocation. Since, in wireless mesh networks, the end-to-end throughput of traffic flows depends on the path length, that is, the higher the quantity of hops, the lower the throughput become.

One of the main challenges in building wireless mesh networks is to agreement high routine. The difficulty is mainly caused by the unpredictable and highly-variable nature of the wireless channel. Though, the use of wireless channels presents some unique opportunities that can be used to improve the routine. the broadcast nature of the standard can be used to provide opportunistic transmissions as suggested in Also, in wireless mesh networks, there are typically numerous paths connecting each source destination pair; using some of these paths in parallel can improve routine.

We use network coding to simplify the problem of scheduling packet transmissions across multiple. in optimize all these parameters simultaneously to achieve optimal performance. We use an optimization framework to design a genetic algorithm.

Corresponding Author: P. Akilandeswari

The transportation wireless mesh network is the afford gateway and bridge functionality and the hybrid WMN is the supervise to pay for connectivity to other networks. The individuality of WMN is the multi hop wireless network it having support for the ad hoc network and it is a self forming and self association of network. The mesh nodes are using Mobility dependence type of nodes and the network can be accessed by manifold types the marketplace Bandwidth allocation is the regulars who willing to pay more sharing bandwidth [1]. We design the greedy algorithm resourceful bandwidth allocation to the regulars the wireless mesh network

A **genetic algorithm** (or **GA**) is a search performance used in subtracts to find true or estimated solutions to optimization and search problems. the key terms are Individual Any possible solution Population Group of all folks Search Space All possible solutions to the difficulty Chromosome Blueprint for an character Trait Possible aspect (features) of an character Allele Possible settings of trait (black, blond, etc.) Locus The position of a gene on the genetic material Genome Collection of all chromosomes for an character A representative genetic algorithm requires two effects to be defined: a genetic representation of the solution domain a fitness function to evaluate the explanation domain.

2 RELATED WORKS

In this session we demonstrated about the existing work related to bandwidth allocation to large number of treatment to analyze the existing system

The D.Benyamina and A.Hafid proposed system is concurrently optimizing the two objectives of network deployment rate and network throughput. Optimal WMN planning solutions below this approach are more pragmatic and much preferred by network conniver in that they have to be both gainful and efficient the deployment rate is minimized while the throughput is exploit. Though the deployment rate objective is straightforward, the throughput objective can be viewed from different viewpoint: each minimizing the aggregation of network interferences or exploit the culmination of the flows over the entire network.

Rastin Pries, Dirk Staehle and Barbara Staehle The performance of these mesh networks is mainly predisposed by the routing scheme and the channel assignment. The manuscript, we focus on the routing and channel assignment in major Wireless Mesh Networks to accomplish a max-min fair throughput allocation. While most optimization approaches fail to optimize large wireless mesh network consumption, we investigate the usability of genetic algorithms for this approach. Our goal is to increase the throughput of the inclusive WMN while sharing the resources fairly among the nodes. The achieved by applying a max-min fair share algorithm obtainable in [3] and by tuning the genetic parameters.

Rastin Pries, Barbara Staehle and Viktor Wendel we investigate the usability of Genetic Algorithms (GAs) for such a planning approach. The plainness of GAs allow us to examine a large number of network arrangement in order to optimize the network throughput and to fairly allocate the resources. The complete with a max-min fair share throughput Distribution and by evaluating node location, routing configurations, and channel assignments.

Usama Mehboob, Junaid and Athanasios Vasilakos The design of wireless networking is challenging due to the highly active ecological condition that makes parameter optimization a complex task. Due to the active, and often unknown, in service setting, modern wireless networking standards gradually more rely on machine learning and artificial aptitude algorithms. Genetic algorithms (GAs) supply a entrenched framework for implementing artificial aptitude tasks such as classification, learning, and optimization. GAs is recognized for their extraordinary overview and flexibility, and has been applied in a wide variety of background in wireless networks.

Moheb R. Girgis Tarek and M. Mahmoud In WMN, gateways connect to the Internet via cable line links and provide Internet access services for users. Due to the partial wireless channel bit rate, multiple gateways are usually required in a WMN, which costs budget and takes time to set up. WMN is a shows potential technology that provides wireless broadband access to end users. It offers a high quantity of flexibility compared to traditional networks; however, this characteristic comes at the expense of a more composite structure.

3 SYSTEM DESCRIPTION

A bandwidth allocation using genetic algorithm to providing solution for optimization problem in wireless mesh network done by the following methodologies we analyzed from the related work.

1. Topology creation of wireless mesh network
2. Topology of wireless mesh networks with more no of nodes is routed using genetic algorithm to increase the efficiency of qos parameters.
3. To find solution for optimization problem in wireless mesh network and using GLBRP protocol.
4. Evaluation Between the genetic Algorithm and Greedy Algorithm.

The node invention in wireless mesh network is the Base file for making number of nodes and convey of packets between the source and destination. Topology of wireless mesh networks with more no of nodes is routed using genetic algorithm to increase the competence of Qos parameters are end to end delay, throughput, energy spent, and packet delivery ratio.

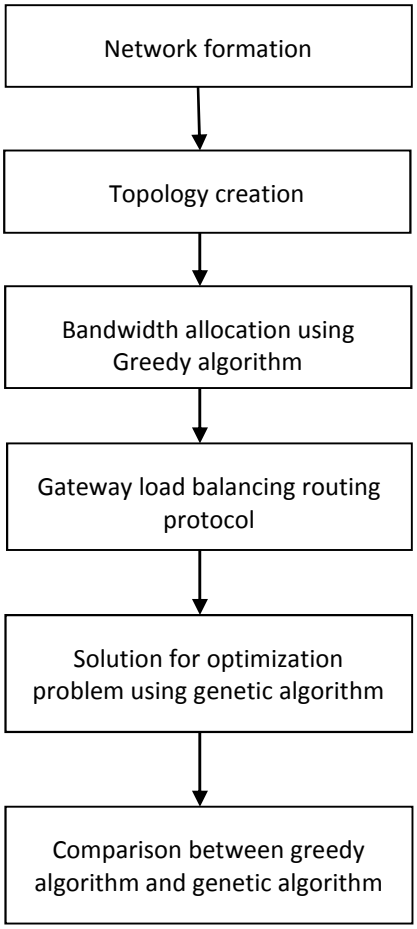

Fig. 1. system architecture

The bandwidth allocation is the process of allocating the range to the topology of wireless mesh network with more number of nodes is routed using protocol proposed protocol with optimal and truthful bandwidth auction, greedy bandwidth auction and the gateway load balancing routing protocol using bandwidth allocation using constraint. Gateway load balancing routing protocol is set precedence based on the disparate gateway routers, the gateway load balancing can be endure a weighting parameter to be situation. Load sharing is one of the enhancements the load sharing is client can be sharing the multiple routers in this approach sharing the traffic load understandably surrounded by reachable routers.

The optimization solution for genetic algorithm Initialization initially many individual solutions are randomly produced to form an initial population. The population size depends on the nature of the predicament, but normally contains several hundreds or thousands of possible solutions. Conventionally, the population is generated randomly, layer the entire assortment of possible solutions (the search space). intermittently, the solutions may be beginning in areas where optimal solutions are possible to be established. The evaluation of graph between the greedy algorithm and genetic algorithm.

4 IMPLEMENTATION

This section describes the implementation of anticipated work. The anticipated system implemented with the following modules:

- Topology creation of wireless mesh network.
- Topology of wireless mesh networks with more no of nodes is routed using genetic algorithm to increase the efficiency of Qos parameters.
- To find solution for optimization problem in wireless mesh network and using GLBRP protocol.
- Comparision Between the genetic Algorithm and Greedy Algorithm.

TOPOLOGY CREATION OF WIRELESS MESH NETWORK

AODV- Ad-hoc On-demand Distance Vector. Launch a route to a intention only on demand. On-Demand are self-motivated and do not maintain a routing stall. Discriminate to the most popular pro-active protocols. Network is still until a association is needed. The network node that needs a association transmits the association request.

Further nodes encourage the message and record the node they heard it from, creating temporary routes back to the dispossessed node. As soon as a node that beforehand has a route to the favorite node gets the significance it sends significance back during the temporary route to the demand node. They require node then uses the route with the smallest amount hops to join.

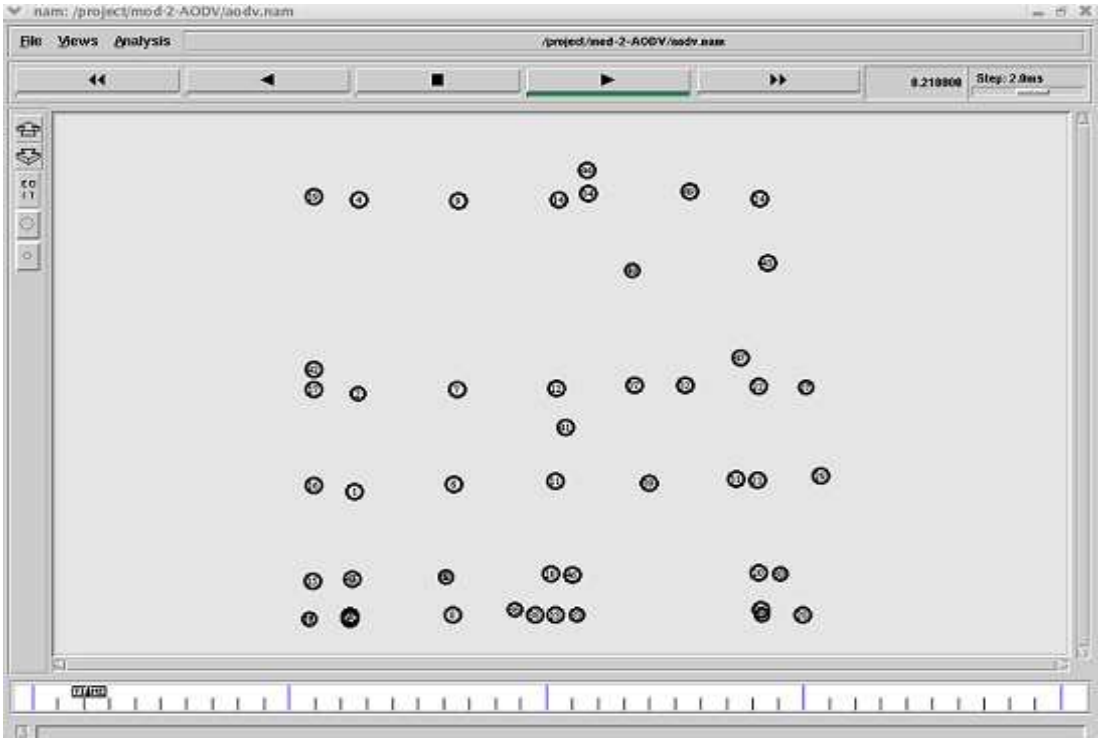

Fig 2: Topology creation

BANDWIDTH ALLOCATION IMPLEMENTING LOAD BALANCING ROUTING PROTOCOL

To allocate the bandwidth using the GLBRP protocol

Step 1: Parameter analysis of GLBRP protocol

Step 2: Parameters are delay, throughput, network overhead, packet delivery ratio, energy spent.

Step3: Parameter presentation is following the graph

GREEDY ALGORITHM

```
Set GBA_app new_app
Proc greedy bandwidth {$destination $transmit $source $RREQ ch_list}{
Set X $x
Set Y $y
Set z lappend $x $y
Set bandwidth lappend $ch_list $z
For{set i 0;i<=$val($nn) incr i}
Set Pmax $bandwidth
$transmit($RREQ) $destination ($source)
$ns transmit “finish”
}
```

ALLOCATION PHASE

```
Proc greedy_allocation_phase
{$bandwidth $UPDATE $GLBRP}{
Set temp1(lappend $x $y)$bandwidth
Set L lsort $temp1
Set random $temp1
Set count 0
Set flag 0
Set temp2(lappend $x $y) $bandwidth
Set L lsort $temp2
Set count 1
Set flag 1
If {$flag ==0&&$val($rp)==$GLBRP}
{
$UPDATE $L}
else
if
{Flag>=0&&$val($rp)==$GLBRP}
{
Set $x 1
Set $y 1
lsort $x $y
}
else{
```

$ns transmit “stop”

}

}

BANDWIDTH ALLOCATION

Each node can be allocated in bandwidth

The following screen shot

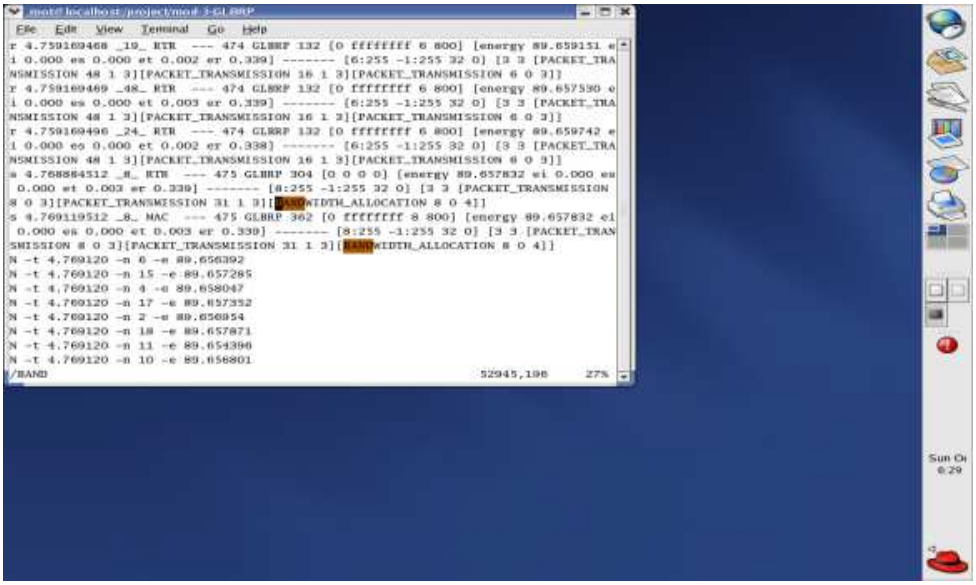

Fig 3: bandwidth allocation

PACKET TRANSMISSION

The packet transmission for bandwidth allocation of each node the following screen shot for packet transmission.

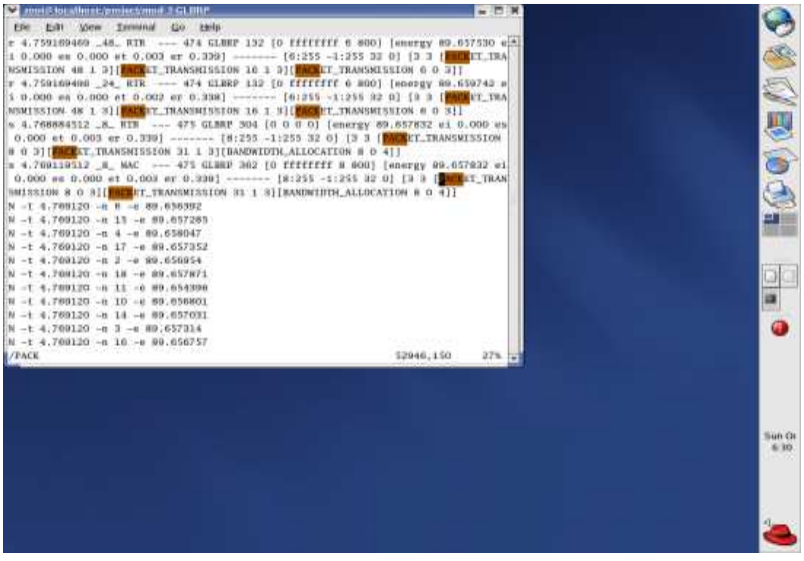

Fig 4: packet transmission

PARAMETERS EXPLORATION FOR GLBRP PROTOCOL

AVERAGE DELAY

The Delay can be high for AODV protocol the evaluate the AODV parameters for delay the performance exploration.

Delay= receive time at destination / transmit time at source

Fig 5: Delay

NETWORK OVERHEAD

The network overhead can be high for AODV protocol the evaluate the AODV parameters for network overhead the performance exploration

Network overhead=large number of packet send from destination / Large number of packet received from destination

Fig: 8: network overhead

PACKET DELIVERY RATIO

The packet delivery ratio can be average for AODV protocol the evaluate the AODV parameters for packet delivery ratio the performance exploration

PDR=Number of packet receive / Number of packet send

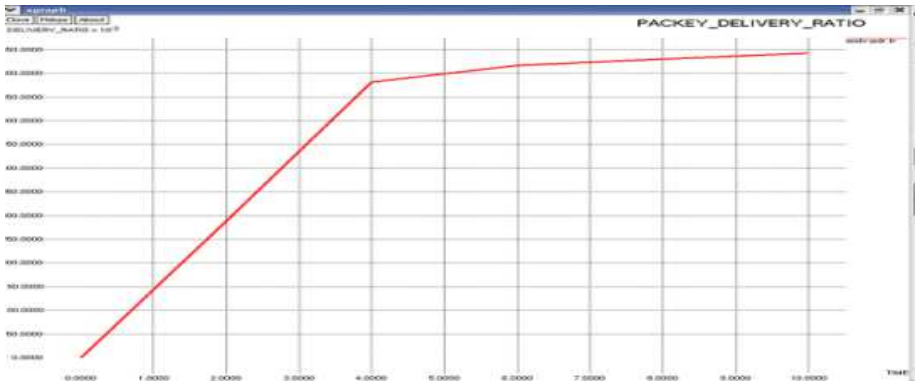

Fig: 7: packet delivery ratio

THROUGHPUT

The throughput can be high for AODV protocol the evaluate the AODV parameters for throughput the performance exploration

Throughput=Total data bits received / replication Runtime

Fig: 9: throughput

TO FIND SOLUTION FOR OPTIMIZATION PROBLEM IN WIRELESS MESH NETWORK AND USING GLBRP PROTOCOL

GENETIC ALGORITHM

Step1: To Generate population g(0)

Step2: Generate population g(0)

Do

2.1 evaluate fitness of individuals in p(i)

2.2 do

{

Selection

Apply genetic operators:

Pmax crossover (probability pd)

Mutation (probability pk)

}

While new generation not completed

2.3 execute create-elite

}

While (termination criteria =no)

Step3: print best assignment solution ur

Function create-elite

{

Selection of best individuals

Mutation (probability pk)

Elite=mutated elite+not-mutated elite

Insert elite into population:

p[i+1]=insert(elite,p[i])

}

SIMULATION RESULTS

AVERAGE DELAY

Topology of wireless mesh networks with more no of nodes is routed using genetic algorithm to increase the efficiency of Qos parameters and GLBRP protocol.

Fig: 12: average delay

NETWORK OVERHEAD

Topology of wireless mesh networks with more no of nodes is routed using genetic algorithm to increase the efficiency of Qos parameters and GLBRP protocol

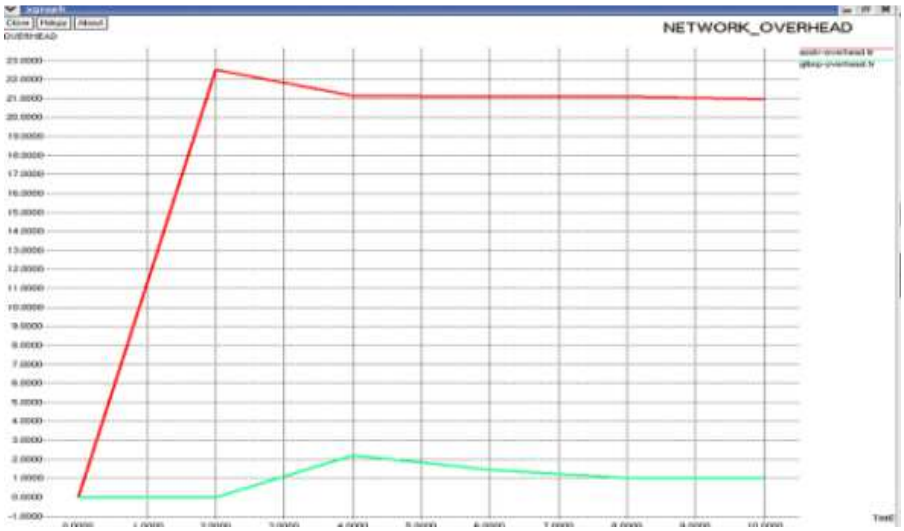

Fig: 14: network overhead

PACKET DELIVERY RATIO

Topology of wireless mesh networks with more no of nodes is routed using genetic algorithm to increase the efficiency of Qos parameters and GLBRP protocol.

Fig: 15: packet delivery ratio

AVERAGE THROUGHPUT

Topology of wireless mesh networks with more no of nodes is routed using genetic algorithm to increase the efficiency of Qos parameters and GLBRP protocol.

Fig: 16: average throughput

5 CONCLUSION

In this paper, we proposed effective protocol we allocate bandwidth using the efficient parameters. To find solution for optimization problem in wireless mesh network using GLBRP protocol the performance analysis of delay, throughput, packet delivery ratio, network overhead for the wireless mesh Community Networks.

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