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Optimizing Wireless Network Using Combination of Auto Summarization and EIGRP Protocol

Ravjot Singh Syal, Kamaljit Kaur

M.Tech Student, Dept. of CSE, Sri Guru Granth Sahib World University, Punjab, India

Assistant Professor, Dept. of CSE, Sri Guru Granth Sahib World University, Punjab, India

ABSTRACT- Wireless Network in present era spread from one point of the world to the making an overall connectivity between each device whether it's a wired or wireless. Whenever a wireless network is used so there is also a need to optimize it in such a way that its throughput is improved to an extent that the packet always follows the shortest path and routers always have the information of each and every path in the network. This paper discusses a methodology in which EIGRP is combined with Route Summarization. In route summarization the size of routing tables is minimized to an extent to save the network routing table going complex. An important aspect in wireless network is security which is also considered in the research and is improved.

KEYWORDS: EIGRP, Route-Summarization, Wireless Network

I. INTRODUCTION

Wireless Network consists of small nodes with sensing, computation, and wireless communications capabilities over short distances. Each sensor collects data from the monitored area and then it acknowledges data back to the source for the successful delivery of it. In this paper EIGRP and Route Summarization technique are combined together, to improve the packet delivery in Wireless Networks. In this paper network is optimized to a greater extent by increasing the bandwidth of access points, applying password protection at routers and only few computer system are given access to the web server to maintain the security in the network.

EIGRP Protocol: EIGRP stands for Enhanced Interior Gateway Routing Protocol. EIGRP saves all routes rather than the best route to ensure the faster convergence. EIGRP keeps neighboring routing tables and it only exchange information that it neighbor would not contain. This property of EIGRP helps to reduce the unwanted traffic in the network. EIGRP is commonly used in large networks, and it updates only when a topology changes but not periodically unlike old Distance-Vector protocols such as RIP. EIGRP metric is based on its bandwidth, delay, reliability and load [5].

Route Summarization: Route summarization, additionally referred to as route aggregation, may be a technique of minimizing the amount of size of routing tables in network. It works by selected multiple routes into single route advert [8].

II. EXISTING WORK

In[1]this paper discussion of the two operating modes of the IEEE 802.11 is provided along with the an overview of a comprehensive list of research issues and challenges of the wireless network like signal fading problem, mobility problem, power and energy, data rate enhancement, security and the quality of service issues problems of the wireless network. In [2]this paper the role of routing protocols for active transmission of data is shown. Various routing protocols were implemented (Viz. OSPF, EIGRP, RIP) in the network and their performance was measured out of which the performance of EIGRP was higher than other routing protocols. In[3] this paper, authors have considered the Enhanced Interior Gateway Routing Protocol (EIGRP) for IPv6 as a routing protocol, that uses classless routing schemes based on diffusion update algorithm (DUAL) for calculating a shortest path from source to destination IPv6 is



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used along with EIGRP protocol which removes the limitations imposed by IPv4 and provides the large number of address space. In [4] this paper, different types of routing protocols available such as static and dynamic routing protocols are surveyed. Three routing protocols, RIP (Distance vector protocol), OSPF (Link state Protocol) and EIGRP (Hybrid Protocol) are analyzed and a depth comparison of the respective protocols is done on the basis of complexity, bandwidth etc. In [5] this paper, comparative study of RIP, OSPF & EIGRP is done, it is shown how using a routing protocol routers communicate with each other, disseminating information that enables them to select routes between any two nodes on a computer network. [6] This paper is a study based on simulation for comparative performance evaluation between EIGRP and OSPF routing protocols for real time applications by using Best-Effort and Quality of service method in OPNET simulator. The evaluation is done based on different aspects such as traffic sent and received, packet delay variation, packet end-to-end delay as well as voice and video traffic sent/received using simulator. In [7] this paper study of two eminent protocols, Enhanced Interior Gateway Routing Protocol (EIGRP) and Open Shortest Path First (OSPF) protocols is evaluated. Evaluation of these routing protocols is performed based on the quantitative metrics such as Convergence Time, Jitter, End-to-End delay. The evaluation results show that EIGRP routing protocol provides a better performance than OSPF routing protocol for real time applications. In [8] this paper focuses on route redistribution and route summarization of different intra-domain routing protocols such as EIGRP and OSPF. Multiple routing protocols and Autonomous systems are made to communicate in the Hybrid networks (OSPF vs. EIGRP protocols with Different AS) then route redistribution is necessary to advertise route from source network to destination. In [9] this paper compares the performance of intra-domain routing protocols such as Enhanced Interior Gateway Protocol (EIGRP) and Interior Gateway Protocol (IGRP) of IEEE 802.3 LAN by evaluating various parameters including Network convergence time, Delay Variation, Throughput, Utilization, Queuing Delay and IP Processing Delay. In [10] this paper a network model of Cisco routers has been employed in a network simulation software 'packet tracer'. Eventually an EIGRP routing protocol has been configured and run on a network model. The successful communication is established between different hosts present in the network. In [11] this research is a performance comparison of router protocol between OSPF and EIGRP when an internet link fails. Since OSPF and EIGRP protocols are mostly used nowadays, the retransmission time and rerouting time is calculated from both protocols when there is a failure link in a data transmission path. In [12] this Paper a comparison of routing methodology based on logical addressing using subnetting is done, which is a concept of Dynamic Host Configuration Protocol (DHCP). In [13] this paper, Comparison is studied among Interior Gateway Protocols (IGP) protocols with weighted-fair queuing (WFQ) technique on different scenarios using OPNET (Optimized Network Engineering Tool).

Table I- Comparative Study of Existing Work

S.no	Paper Title	Methodology	Advantages	Extensions
1	Performance Evaluation of Enhanced Interior Gateway Routing Protocol in IPv6 Network	IPv6	Better Security	Can be used in Large Networks
2	Performance Evaluation of EIGRP and OSPF Routing Protocols in Real Time Applications	QoS Method	Improved Network Design	More Methods/metrics can be used.
3	Extensive Reviews of OSPF and EIGRP Routing Protocols based on Route Summarization and Route Redistribution	Route Summarization	Improved Routing Table	Can be Implemented in Wireless Networks
4	Configuring an EIGRP based Routing Model	Configuration	Static IP Configuration	Network Design & Security can be improved.



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III. METHODOLOGY USED

In this paper Route Summarization is proposed with the combination of EIGRP. Route Summarization may be defined as a method of minimizing the number of routing tables in an IP (Internet Protocol) network. The goal of this technique is minimizing the amount of size of routing tables in network. It works by selected multiple routes into single route advert. Summarizing is that the consolidation of multiple routes into one single promotional material.

Routes are summarized by using the Route Summarization and by using the EIGRP protocol in the network all the routers have information of each and every other router, path present in the network. Whenever a new path is added or removed in the network its broadcast is done. Also the broadcast is done only of the required path thus making it more efficient in terms of performance not like other networks where broadcast is done of each and every path in the network thus making the entire network complex.

1 Algorithm of EIGRP

1. if val_of_th = Energy(n) and STATE[n] = false then
2. STATE[n] := true;
3. Allocate queue(n);
4. for each n find position on hop count;
5. receive loop-free distance n and store it in queue(n) by sending get.feasible.dist(n) // CH FORMATION
6. assign ch(n)=FIFO(queue(n))
7. each ch(n) send hello msg to first hop
8. receives update+ack
9. forms dynamic CH //UPDATE THE ROUTING TABLE
10. if STATE[ch(1)]=true then
11. STATE[ch(n<1)]=false //DYMAMIC CH ELECTION
12. if Energy(ch(1))<= val_of_th then remove from table
13. UPDATE the table.

2 Steps of Route Summarization

1. Deploy a Wireless Network node in the network.
2. Configure various cluster of zones in the network (viz: Zone1, Zone2, Zone3)
3. Configure EIGRP in the network.
4. Apply Route summarization scheme on EIGRP (auto mode)
5. Configure auto DHCP, web server, TELNET in the network.
6. Generate results for proposed scheme.
7. Validate results.

3 Combining EIGRP and Route Summarization.

1. Deploying a Wireless Network.
2. Configuring various zones in the network.
3. Checking for loops in the network avoid if present.
4. Update information of neighbor routers in the routing table.
5. Update information of the various paths in the network.
6. If a network node dies then selecting the next shortest path.
7. Performing Route Summarization.



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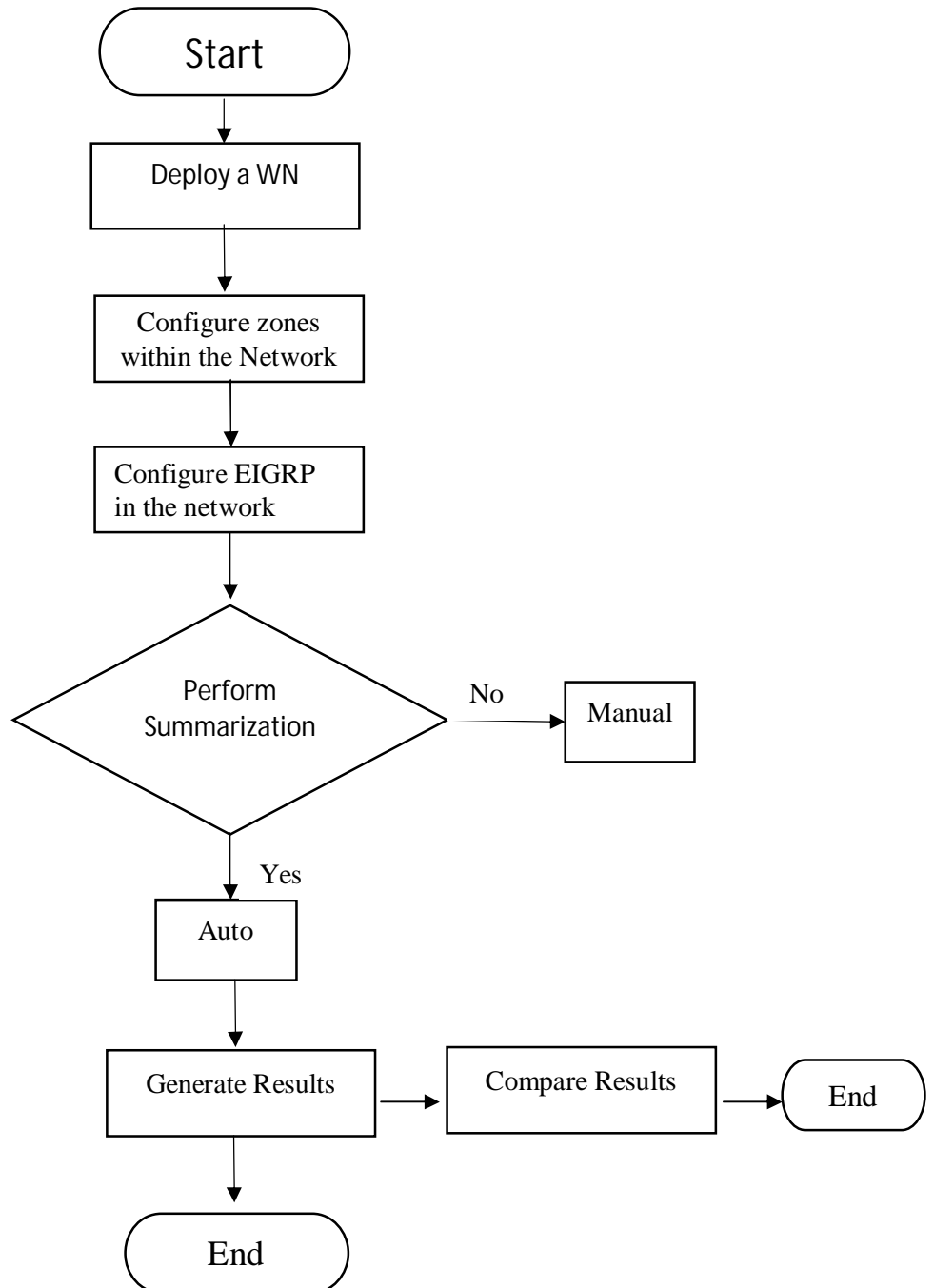


Figure: 3.1 Flow chart explaining methodology of present technique



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IV. CONCLUSION

In this paper using combination of EIGRP and Route Summarization technique the network performance is improved and it also provided more secure transmission between two systems within a network. Better time management in the network, the neighbor nodes can cover the area of a node that has died. Using this approach the data dropped and other Quality parameters are also improved like delay, load and throughput etc.

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