

A Review Study on Comparison of RIP and EIGRP Routing Protocol

Suman¹ Shruti Goyal²

^{1,2}Department of Computer Science & Engineering

^{1,2}OM Group of Institution India

Abstract— Computer network grow day to day. Communication network is used to share the information, resources etc. Routing protocols are used to transmit packets across the Internet. Routing protocols specify how routers communicate with each other by disseminating information. The router have knowledge about the nearest networks, which can assist in selecting the routes between two nodes. There are many type of routing protocol. but this paper include the comparison of RIP and EIGRP Routing protocol based on parameter hop count, throughput, router updates, queuing delay and energy consumption.

Key words: RIP, IGRP, EIGRP, OSPF

I. INTRODUCTION

A network is collection of computer, server and other various device that allowing communication with other device for the purpose of sharing data, file and for the purpose of communication. We can create network anywhere according to requirement ranging from small to large network. According to network size, basically there are three type of network:- LAN network in which device are connected in a limited area such as a home, office and group of building. It can create by only single organization because its size is very small. A Metropolitan area network is a network that covering a city or town. It's can cover higher area than LAN network but smaller than the wide area network. A wide area network (WAN) is a computer network that covers a large geographic area such as a city, country. Wireless networks are network that is different from wired network. It does not require any cabling system and it avoid the cost of cables as a connection between different devices. One of the main disadvantage of wireless network is security, due to less security chances of attack is very high. Wireless network is based on a cellular system.

In computer networks, the routing protocol specifies how routers communicate to select the routes for information or data transfer for that, the routing algorithm is more important [3]. Firstly, the routing protocol inform their all neighbour and share the information with these neighbour related to route. In static routing, the route does not changed, whereas in the dynamic routing, the route can be changed and the routing it is an interior and exterior routing protocols Routing protocol are classified as Where dynamic routing protocol can be used to configuring routing tables in the router. There is Interior Gateway Protocol (IGP) routing protocol used in same domain network such as Routing Information Protocol (RIP), Enhanced Interior Gateway Routing Protocol (EIGRP), Open Shortest Path First (OSPF) and ISIS (Intermediate System – Intermediate System). And Exterior Gateway Protocol (EGP) routing protocol can be used in different network domain. The EGP routing protocol are Border Gateway Protocol (BGP). For the router in the same domain network, there are two types of dynamic routing protocols that can be used on computer networks, namely distance vector and link-state routing protocols. Both types of

routing protocols have advantage and disadvantages[4]. RIP stands for Routing Information Protocol in which hop count is used as the metric for path selection. In Routing Information protocol (RIP), the maximum number of Hop is 15. Compared to other routing protocol, RIP (Routing Information Protocol) is poor and limit size i.e. small network. The main advantage of using RIP is it uses the UDP (User Datagram Protocol) and reserved port is 520. EIGRP stands for Enhanced Interior Gateway Protocol which allows router to share information to the neighboring routers which are within the same area. OSPF stands for Open Shortest Path First which uses link-state routing algorithm. It supports both variable-length subnet masking and classless inter-domain routing addressing models. Since it uses Dijkstra's algorithm, it computes the shortest path tree for each route. The main advantages of the OSPF (Open Shortest Path first) is that it handles the error detection by itself and it uses multicast addressing for routing in a broadcast domain. IS-IS stands for Intermediate-system to Intermediate - system routing protocol for data transmission it uses link state routing algorithm. IGRP stands for Interior Gateway Routing protocol which supports multiple metrics for each node which includes delay, load and bandwidth, in order to compare the 2 routes which are combined into single metrics[3].

II. LITERATURE SURVEY

This chapter presents an overview of earlier work related to dynamic routing protocol. Literature survey is the collection of available document on the topic which contain information, ideas, data and evidence written from a particular standpoint to accomplish certain aim or express certain views on the nature of the topic.

Arsalan Iqbal and Sameer Liaqat Ali Khan (2015) in this study they observed the network convergence time and packet drop for RIP, OSPF and EIGRP while running voice, video and HTTP traffic along some background traffic. When there was single link instability, the convergence time of RIP was better than OSPF. OSPF had the most number of dropped packets. But when the link instability increased then performance of RIP come down. In two flapping links OSPF routing protocol performed better than RIP routing protocol while same applications and background traffic are running. In both situations EIGRP protocol is better than OSPF and RIP. The parameters observed for voice traffic were jitter and packet end-to-end delay. From the results they noticed that the performance of EIGRP was better as compared to OSPF and RIP for one link failure. They observed instability in two links, the RIP had the worst performance in both jitter and packet end-to-end delay as compared to both OSPF and EIGRP. In the paper they also observed packet end-to-end delay and packet delay variation for video traffic. For video traffic the simulated result observe that OSPF did not perform well in both single flapping link and two flapping links. EIGRP was stable and the performance of RIP was the better than other. In both, one and two flapping links the queuing

delay of RIP protocol is more in the network. This resulted in the most number of lost packets. OSPF and EIGRP were considerably the same in terms of queuing delay[1].

Kirti Dangwal, Vinay Kumar(2014)discuss on COMPARATIVE STUDY OF EIGRP AND RIP USING CISCO PACKET TRACER. In this, EIGRP has functions in both link state and distance vector protocols. Therefore, it provides better convergence, delay in than RIP. A detailed simulation study help us to find out best protocol out of any two. EIGRP Convergence time is faster than RIP networks, because EIGRP network can learn the topology information and updates more rapidly. The average approximate round trip time of EIGRP is 14.2ms (millisecond) and round trip time of rip is 16.6ms. This packet sending rate of EIGRP is less as compared to rip. We also found that the packet loss in the EIGRP network is less than in RIP network. In the future, a research work will be done on the explicit features of EIGRP protocols in the IPv4/IPv6 environment. Security analysis for EIGRP can also be done[5].

Muhammad Umar Aftab, Amna Nisar, Dr. Muhammad Asif Habib, Adeel Ashraf, Muhammad Burhan (2014) The RIP, OSPF, and EIGRP are used within an autonomous system to provide the routing. BGP is used for routing between two or more autonomous systems. This paper describes protocols working, scenarios that describe the efficiency or inefficiency of protocols, and the protocol's best selection for a particular networking environment. The study shows the flaws in these protocols which can be minimized with the help of some new algorithms and techniques. They conclude from various articles that routing protocols work efficiently in various circumstances by applying various techniques but they also have some flaws. These drawbacks can be covered by applying some changes in the old routing techniques. OSPF for example has some deficiencies for load sharing and proper utilization of bandwidth of all links and these deficiencies can be covered by applying traffic engineering and MPLS. The notion of this research paper is to review routing protocols and contributing with the concept of traffic engineering and load sharing for the proper utilization of resources on OSPF[6].

Shah.A1, Waqas J.Rana (2013) In this paper Performance of RIP and OSPF is analysed in Network Using OPNET. During this research work, two elected protocols OSPF and RIP are compaired. In simulation environment specific parameters are used to check the performance of RIP and OSPF routing protocol.. Network topology called three tires has been used. Simulation result shows that the convergence time of OSPF single area is greater than OSPF multi area and OSPF multi stub area in any network environment. Result shows that OSPF takes 13.495 seconds in convergence OSPF multi area and OSPF single area takes 12.683 seconds which approximately .812 seconds which means OSPF single area takes .812 seconds more in convergence. Another result is RIP and RIP v2 network convergence results shows that RIP takes 42.33 seconds and RIPv2 takes 39.38 seconds which means RIPV2 network converged 2.95 seconds early as compare to RIP the result is 100% accurate the reason is that RIP is older version and RIPv2 is next version of RIP with some enhancements. Comparison between OSPF and RIP convergence shows that OSPF routing protocol have faster convergence than convergence of RIP routing protocol and it is not depend

that what type of network topology has been used. For future point of view we can continue this research work by analyzing CPU utilization inside core and outside core as well as network traffic[7].

Paramjeet Singh Sandhu, Kamaljit Singh Bhatia, and Harsimrat Kaur(2013) With increasing demand of data on networks .we need maximum utilization of bandwidth. Various protocols are designed to minimize wastage of bandwidth. Here we have discussed about comparison of various router protocols with help of OPNET to compensate in wastage of bandwidth .Four protocols RIP, EIGRP, IGRP and OSPF are used for comparison. They observed two factors THROUGHPUT and QUEUING DELAY on both ends transmitter and receiver. In this paper they demonstrated that from all protocols throughput of EIGRP is very good. Utilization of bandwidth in EIGRP is at maximum level, as considered from protocols; least delay is also calculated in EIGRP[8].

III. RIP AND EIGRP ROUTING PROTOCOL

Routing Information Protocol (RIP) RIP stands for Routing Information Protocol in which hop count is used as metric for path selection. In Routing Information protocol (RIP), the maximum number of Hop is 15, because it prevents routing loops from source to destination. The main advantage of using RIP is it uses the UDP (User Datagram Protocol) and reserved port is 520 [3]. It is kind of a traditional routing protocol. It uses UDP port 520 as source and destination port while sending updates to the adjacent device, RIP also has three versions - RIPv1 is first version of RIP, which uses broadcast to send messages, classful and does lack features like authentication. RIPv1 is obsolete in current networks. RIP v2 is the current version used for IPv4 networks. It uses multicast address 224.0.0.9 to send messages. It also has feature like classless support, route-tags, authentication etc. RIPng is the third version of RIP. It is used for IPv6 networks. Its multicast address FF02::9 and also provide all the features of RIPv2. RIP sends periodic updates as well as triggered updates. The routing information protocol uses four timers to perform its operation that are given below.

- Update Timer
- Invalid Timer
- Flush Timer
- Hold-down Timer

Enhanced Interior Gateway Routing Protocol (EIGRP):- The Enhanced Interior Gateway Routing Protocol (EIGRP) is an updated version of IGRP. It provide some significant improvements on IGRP. EIGRP replaced IGRP in 1993. This routing protocol having a higher convergence than any other IGP routing protocol and it is scalable because it support VLSM and propagate routing table changes only when changes occure. To implement the routing the EIGRP maintains three unique tables to assist in routing traffic, they are neighbour table, topology table and routing table. EIGRP have detail of all routes rather than the best route to ensure the faster convergence. EIGRP keeps neighbouring routing tables and it only exchange information with their neighbour when any changes occure in routing table. The EIGRP also helps to reduce the unwanted traffic in the network. EIGRP is used in large networks, and it provide 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. Following four key technologies used by EIGRP routing protocol that differentiate it from other routing technologies: 1) Neighbour discovery/recovery mechanism: Enables routers to dynamically learn about other routers on their directly attached networks. 2) Reliable transport Protocol: It is responsible that EIGRP packets are delivered in order to all its neighbour with guarantee 3) DUAL Finite State Machine: DUAL embodies the decision process for all route computations 4) Protocol Dependent Modules: EIGRP's protocol-dependent modules are responsible for network layer protocol-specific requirements[2].

A. RIP vs EIGRP

Properties	Rip	Eigrp
IPV6 version/update	RIPng	EIGRP
Type	Distance vector	hybrid
Administrative distance	120	90
Max hop count	15	100 (by default)
Network size	small	Small to large
Algorithm	Bellman-ford	Dual
Convergence	slow	Fast
VLSM	Yes in v2 not in v1	Yes
Routing updates	Full table every 30sec	when change
Bandwidth usage	more	Less
Metric	Hop count	Bandwidth n delay

Table 1: RIP vs EIGRP

IV. CONCLUSION AND FUTURE SCOPE

In this paper, we are talking about the RIP and EIGRP protocol from a theoretical point of view and the development in the two protocols, routing protocol has unique challenges work done. In this work, we perform the comparative study of two routing protocols RIP and EIGRP. Finding the best route in wireless LANs. Implementation in various fields works these protocols. From the result, we analyzed that the delay is improved by increasing the transmission rate. EIGRP is more efficient than RIP routing protocols in terms of throughput and load. The EIGRP Routing protocol has least delay than RIP protocol. A comparison between different protocols were analyzed and we can suggest that markets like large enterprises, educational institutes, industrial sites can implement EIGRP and OSPF routing protocol for better performance.

REFERENCES

[1] Arsalan Iqbal and Sameer Liaqat Ali Khan, "Performance Evaluation of Real Time Applications for RIP, OSPF and EIGRP for flapping links using OPNET Modeler", International Journal of Computer Networks and Communications Security, VOL. 3, NO. 1, JANUARY 2015

[2] Archana C, " Analysis of RIPv2, OSPF, EIGRP Configuration on router Using CISCO Packet tracer", International Journal of Engineering Science and

Innovative Technology (IJESIT) , Volume 4, Issue 2, March 2015

[3] P. Kalamani1, M. Venkatesh Kumar , M. Chithambarathanu, Reji Thomas," Comparison of RIP, EIGRP, OSPF, IGRP Routing Protocols in Wireless Local Area Network (WLAN) by using OPNET Simulator tool - A Practical Approach", IOSR Journal of Computer Engineering (IOSR-JCE), Volume 16, Issue 4, Ver. VI (Jul – Aug. 2014), PP 57-64

[4] V.Vetriselvan1, Pravin R.Patil2, M.Mahendran3,"Survey on the RIP, OSPF, EIGRP Routing Protocols", International Journal of Computer Science and Information Technologies (IJCSIT), Vol. 5 (2) , 2014, 1058-1065

[5] Kirti Dangwal, Vinay Kumar, " Comparative Study of Eigrp And Rip using Cisco Packet Tracer", International Journal of Engineering Sciences & Emerging Technologies, Volume 6, Issue 6, pp: 475-480, June 2014

[6] Muhammad Umar Aftab, Amna Nisar, Dr. Muhammad Asif Habib, Adeel Ashraf, Muhammad Burhan," A Review Study of Interior and Exterior Gateway Protocols", Journal of Basic and Applied Scientific Research, ISSN 2090-4304, 2014

[7] Shah.A1 ,Waqas J.Rana, "Performance Analysis of RIP and OSPF in Network Using OPNET", International Journal of Computer Science, Vol. 10, Issue 6, No 2, November 2013

[8] Paramjeet Singh Sandhu, Kamaljit Singh Bhatia, and Harsimrat Kaur, "Comparision Study of Various Router protocols" , International Conference on Innovations in Engineering and Technology (ICIET'2013) Dec. 25-26, 2013 Bangkok (Thailand)