ABSTRACT

User Datagram Protocol (UDP) and Transmission Control Protocol (TCP) are a transportation layer routing protocols which are considered of the core protocols of the internet protocol suite. The behavior of these routing protocols with different network metrics and scenarios is still not very clear. Routing protocols perform different under different traffic conditions in different environments. Therefore, this paper presents a comparison of the performance of both TCP and UDP based performance analysis is carried out in reactive routing protocols and proactive routing protocols with different packet size using NS2 simulator under traffic conditions. In this study, we have used the scenario that the packet size hasbeen changed with fixed bandwidth to precisely verify the performance of these protocols. These protocols were examined in terms of the average end to end delay , average throughput , packet delivery ratio.

KEYWORDS

Transportation layer routing protocol , User datagram protocol , transmission control protocol , network simulator , average end to end delay , average throughput , packet delivery ratio , packet size , bandwidth, AODV, FTP ,CBR , MANET

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ABBREVIATION

TCP	Transmission control protocol
UDP	User datagram protocol
PDR	Packet delivery ratio
NS2	Network simulator version(2.35)
AODV	Ad-hoc On-demand Distance Vector Routing
FTP	File transfer protocol
CBR	Constant Bit Rate
MANET	Mobile ad hoc network

CHAPTER-1

INTRODUCTION

TCP/IP helps you to determine how a specific computer should be connected to the internet and how you can transmit data between them. It helps you to create a virtual network when multiple computernetworks are connected. TCP/IP stands for Transmission Control Protocol/ Internet Protocol. It is specifically designed as a model to offer highly reliable and end-to-end byte stream over an unreliable internetwork.

UDP is a Datagram oriented protocol. It is used for broadcast and multicast type of network transmission. The full form of UDP is User Datagram Protocol (A datagram is a transfer unit associatedwith a packet-switched network.) The UDP protocol works almost similar to TCP, but it throws all the error-checking stuff out, all the back-and-forth communication and deliverability.

Mobile Ad-Hoc networks are highly dynamic networks characterized by the absence of physicalinfrastructure . An AdHoc network consists of interconnected nodes which makes a network without any fixed infrastructure and can be arranged dynamically. In recent years, the interest on adhoc networks is at their high because of the availability of wireless communication devices. The ease of deployment and the infrastructure less nature of Mobile Ad hoc Networks (MANETs) make them highly desirable for the present day multimedia communications . Multiple network hops are required to deliver and exchange data across a network . Capabilities and limitations are to be concerned while designing adhoc network that the physical layer imposes on the network performance. The communication links in wireless network is unreliable so it is desired to come up with an integrated design of physical, MAC and network layer . Dynamic and reliable protocols are required inMANETs, as they have no infrastructure (base stations) and their network topology changes frequently .

The primary objective of this paper is to analyze the performance of different routing protocols under different traffic conditions with different packet size. Through this paper it is find that how TCP and UDP will react under different network conditions . The network performance of different protocols varies under different parameters. In order to achieve this, File Transfer Protocol (FTP) and ConstantBit Rate (CBR) traffic conditions is used. In this emphasized on average end to end delay, average throughput and packet delivery ratio. The above parameters are validating with different network size. This analysis is done to check the quality of service provided by routing protocols under different traffic conditions with different packet size.

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RELATED WORKS

Shaf, A et.al (Shaf, A , 2018) proposed that the energy based performance of AODV routing protocol is evaluated under Transmission Control Protocol (TCP) and User Datagram Protocol (UDP) by using different simulation scenarios. NS2 has been used for simulation purposes.

Eljack, A. H et.al (Eljack, A. H , 2019) proposed that the performance comparison of both controllers is tested over different network topologies (single, linear and tree). The analyzing of controllers based on some metrics such as transfer, Delay, bandwidth and jitter using an efficient network simulator called Mininet. The ONOS show better performance compared to Floodlight in both TCP and UDP traffic in network.

Khan, F et.al (Khan, F , 2018) discussed the effect of channel fading on these protocols. Six existing protocols and their performances under Nagagami-*m* channel are the theme of this paper with respect to suitability for multimedia applications, and the performances of these protocols have been evaluated. This paper concludes that extra effort are essential on the transport protocol for achieving better performance of multimedia networks which will fulfill the various necessities of evolving multimedia applications, specifically under fading channels.

Draz, U et.al(Draz, U , 2018) proposed that the routing protocols efficiency depends on the number of packets successfully receive on destination. This paper presents the result based investigation these two main protocols with respect to packet delivery ratio under TCP and UDP environment. For the evaluation, Network Simulator (NS-2.35) is used.

Lai, Y. C et.al(Lai, Y. C , 2019) proposed that two analytical models for predicting the performance of TCP and UDP flows over SDN, respectively, given the assumption of both flow-level arrivals and packet-level arrivals. In constructing the models, the switch and controller are considered jointly and four-dimensional states are used to evaluate the steady-state probabilities of the states.Analytical formulae are derived for the average packet delay and packet loss probability of the TCP and UDP flows. Simulation results very well match with the analytical ones, thereby validating our analytical models.

Yadav, A. K et.al (Yadav, A. K , 2018) proposed that Experimental analysis of working mechanism and functionality of available on-demand routing protocols (AODV and DSR) has been done using network simulator

Elsadig, M. A et.al (Elsadig, M. A , 2017) proposed that performance of three popular routing protocols in MANET systems: DSR, AODV, and DSDV. To measure these MANET protocols' performance metrics (throughput, end to end delay, and data packet ratio); a simulation is conducted for each one using the most popular simulator NS-2 for topologies of 10, 20, 30, 40, and 50 nodes.

Sahraoui, Y et.al (Sahraoui, Y , 2018) proposed that the two most popular transport layer protocols are User Datagram Protocol (UDP) and Transmission Control Protocol (TCP). In this paper, we propose an adaptation of UDP and TCP protocols for video streaming in VANET. In addition, an evaluation and comparison between these protocols are performed in order to choose the better transmission protocol at transport layer level for video streaming in VANET. Some objective metrics are considered in this study namely throughput, packet delivery ratio, end-to-end delay and PSNR.

Kaur, A et.al (Kaur, A , 2017) proposed that compare the performance of TCP/FTP on Normal AODV and UDP/CBR traffic on Improved AODV routing protocol generally implemented in a mobile ad hoc environment. An empirical study has been done using NS-2. Exhaustive simulations have been done to analyze the results, which are evaluated for performance metrics, such as throughput, packet delivery ratio and average end to end delay. The effect of variations in, number of nodes, on the network performance is analyzed over a wide range of their values

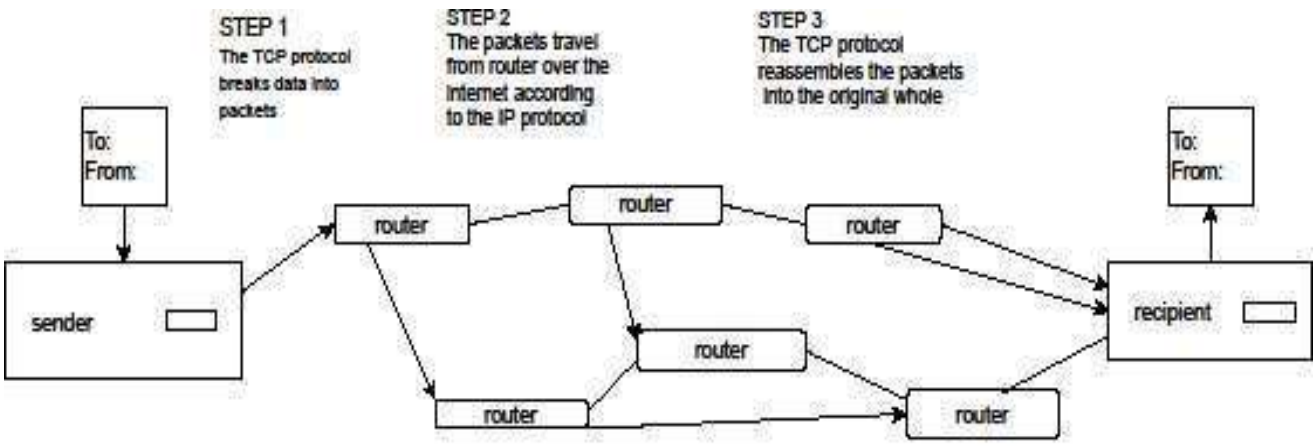
Singh, B et.al (Singh,B , 2015) proposed the performance analysis of different routing protocols is the major step before selecting the routing protocol. Routing protocols perform different under different traffic conditions in different environments. In this paper, the TCP and UDP based performance analysis is carried out in reactive routing protocols and proactive routing protocols with different packet size using NS2 simulator under different traffic conditions.

Rath, H. K et.al (Rath, H. K , 2011) proposed that (i) throughput achieved by TCP-based applications is lower than that of UDP-based applications, (ii) slot utilization of TCP-based applications is lower than that of UDP-based applications and (iii) throughput of TCP-based applications suffers in the presence of UDP-based applications for similar channel states. He also presented that the throughput achieved by both TCP and UDP-based applications with Automatic Repeat ReQuest (ARQ) set in system are higher as compared to that of without ARQ.

CHAPTER-3

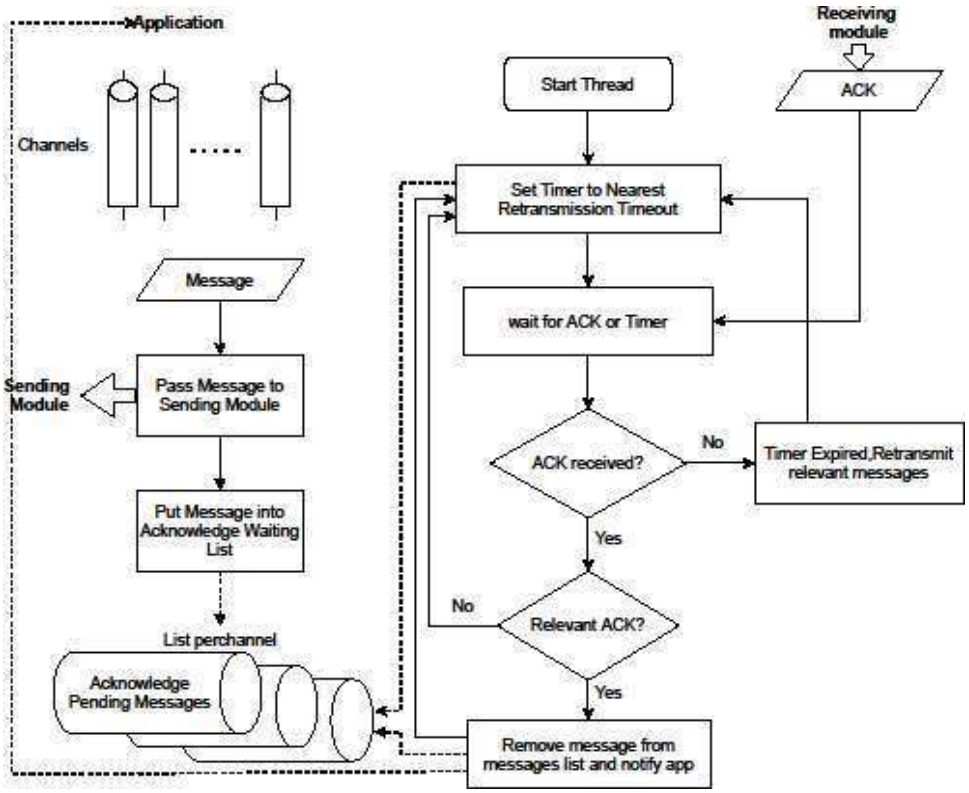
PROPOSED FRAMEWORK

3.1 - HOW TCP WORKS?



How the data travels over the net

3.2 - UDP FLOWCHART



Chapter - 4

RESULTS

FIGURE 1:TCP SIMULATION:

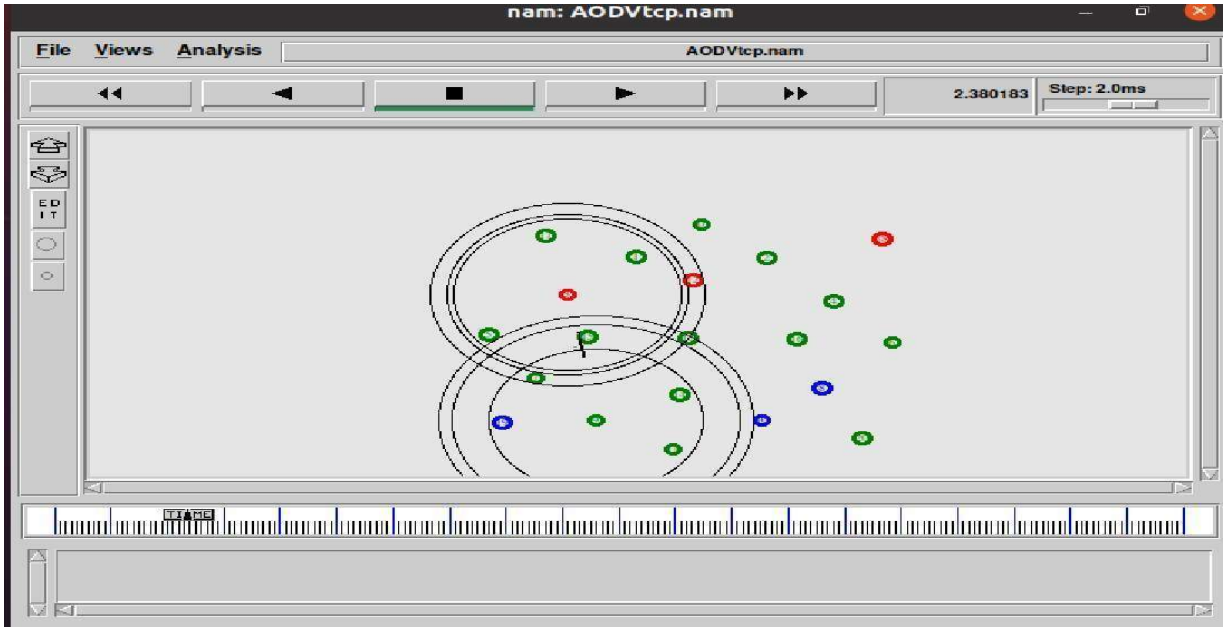
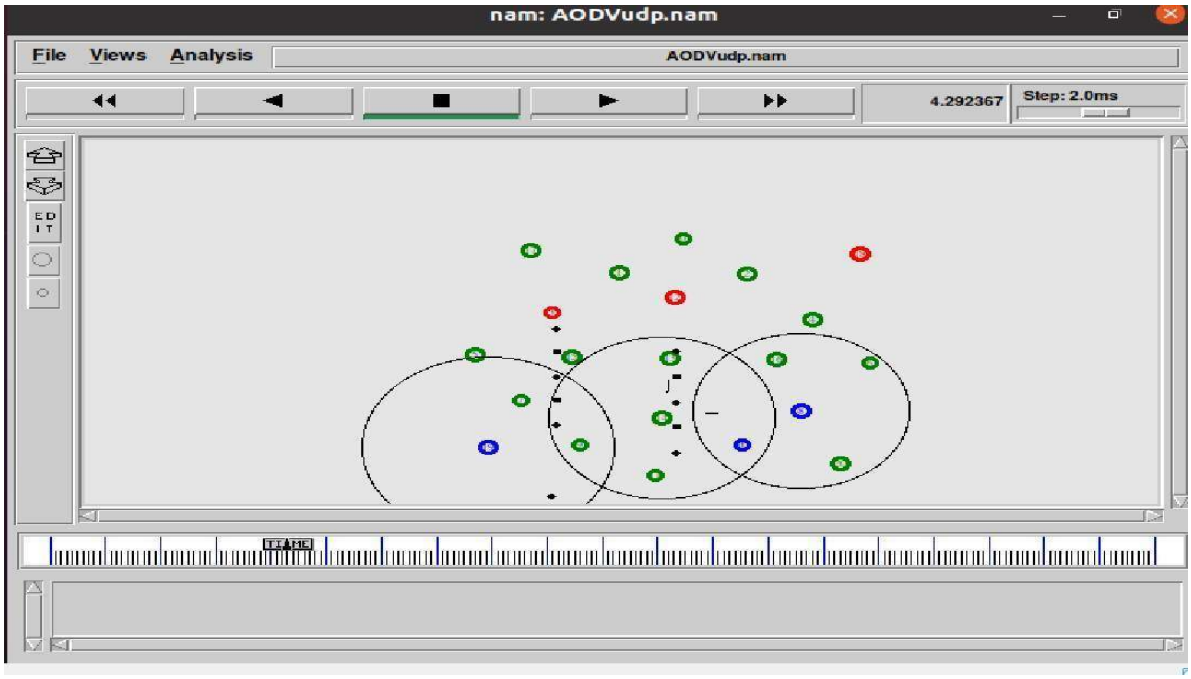


FIGURE 2:UDP SIMULATIO



Chapter-5

PERFORMANCE EVALUATION

AODV TCP performance table:

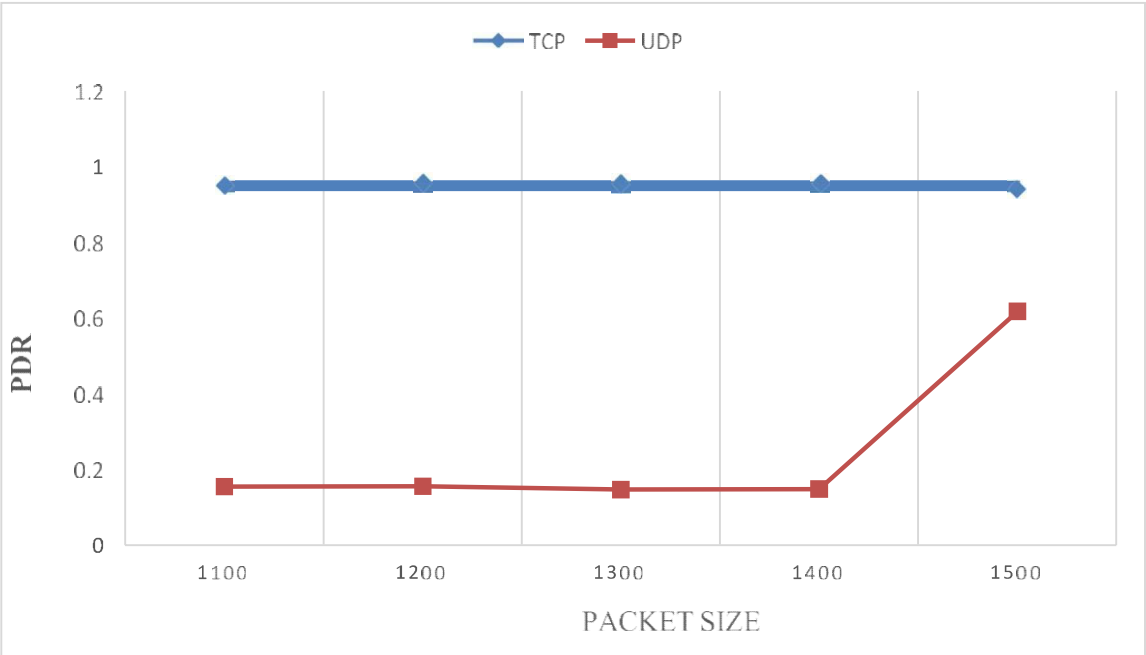
Table 1:Simulation results for AODV TCP

	Packet size=1100	Packet size=1200	Packet size=1300	Packet size=1400	Packet size=1500
Packet deliveryratio	0.950774	0.958470	0.956764	0.958069	0.941541
Average throughp ut	0.724223	0.738871	0.578364	0.635187	0.576512
Average Endto End delay	283.146	312.781	534.386	376.526	341.273

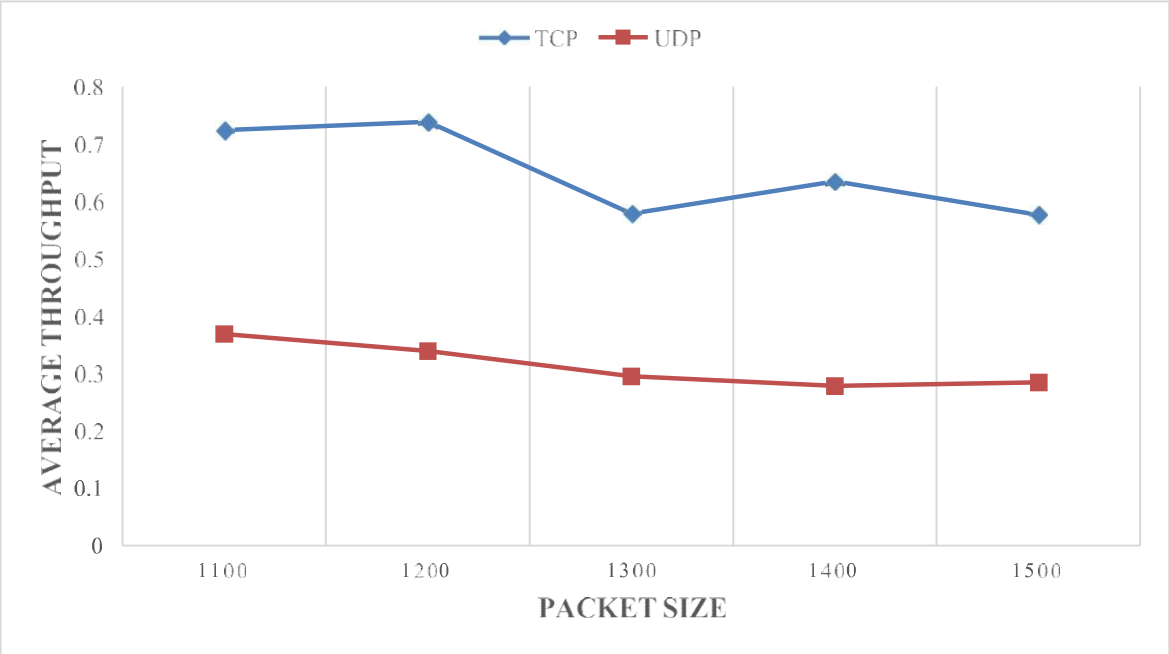
AODV UDP performance table:

Table 2:Simulation results for AODV UDP

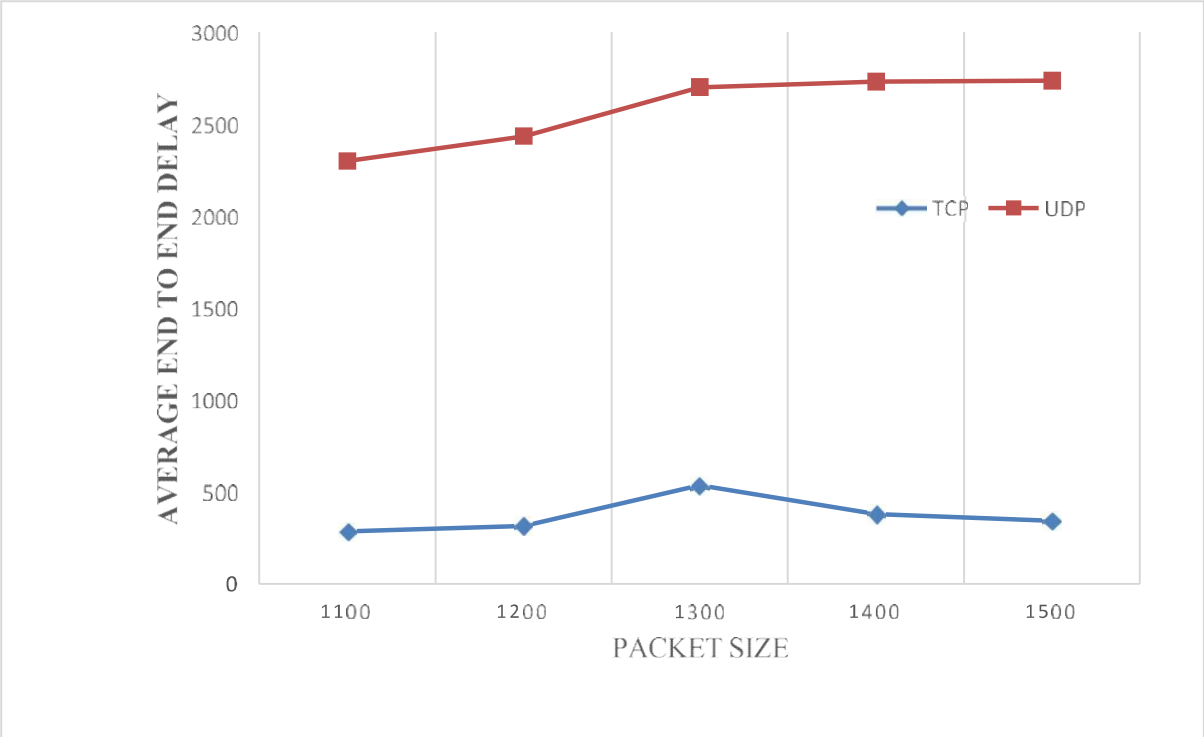
	Packet size=1100	Packet size=1200	Packet size=1300	Packet size=1400	Packet size=1500
Packet delivery ratio	0.153969	0.154511	0.145560	0.147559	0.61708
Average throughput	0.368810	0.339131	0.295011	0.277918	0.284464
Average End to End delay	2300.45	2435.94	2702.66	2731.86	2737.46



In the above figure x-axis indicates the packet size in network and y-axis includes PDR in kbps.It illustrates the variation in PDR of the network with the variation in packet size in the network . Accordingto the analysis,it is observed that PDR increases as packet size in the network increases for UDP and for TCP it remains constant . Comparitively TCP protocol is best in the PDR wise among TCP and UDP.



In the above figure x-axis indicates the packet size in network and y-axis includes average throughput in kbps.It illustrates the variation in average throughput of the network with the variation in packet size inthe network.According to the analysis,it is observed that average throughput decreases as packet size in the network increases for UDP and for TCP it increases as well as decreases .Comparitively TCP protocolis best in the average throughput wise among TCP and UDP.



In the above figure x-axis indicates the packet size in network and y-axis includes average end to end delay in kbps.It illustrates the variation in average end to end delay of the network with the variation in packet size in the network.According to the analysis,it is observed that average end to end delay increases as packet size in the network increases for UDP and for TCP it increases and decreases . Comparitively TCP protocol is best in the average end to end delay wise

Chapter-6

CONCLUSION

The simulation has been used NS2 to access the behavior of TCP and UDP in varying packet size . These two protocols carried out in reactive routing protocols and proactive routing protocols and were measured in terms of average end to end delay , average throughput and packet delivery ratio . The resultshave shown that TCP performance was good than UDP . Therefore this paper concludes that TCP is morereliable and better than UDP in terms of all performance measures. .

FUTURE WORKS

Future works includes the evaluation of TCP and UDP with other layer protocols in other different scenarios such as changing the number of nodes like varying of number of nodes and calculating the average end to end delay , average throughput and packet delivery ratio . And the other scenario is tochage the simulation time and calculating average end to end delay , average throughput and packet delivery ratio .