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Performance Analysis of UDP Based on Traffic Classifier Using NS2

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ABSTRACT: The performance of computer and wireless communications technologies has advanced in recent years. As a result, it is expected that the use and application of advanced mobile wireless computing will be increasingly widespread. Much of this future development will involve the utilization of the Internet Protocol (IP) suite. We found UDP offer a minimal, unreliable, best-effort and message-passing transport to applications. Hence, a further examination of its performance was performed using NS2 on aspects related to traffic size and traffic load and traffic classification. By utilizing UDP for network connection based on the header format, the retransmission difficulties double retransmit as compared to transmission control protocol (TCP). A connection transferred within the network is not TCP within TCP, but rather TCP within UDP. UDP does not support any retransmission components, so it is going to only function as the forwarded TCP connection which will do retransmissions. An additional gain from using UDP would be the smaller header dimensions. UDP features a header dimension of 8 bytes when TCP employ a header dimension of 20 bytes. This may leave space for bandwidth improvement within the network channel To address the issues of packet delay and unfairness among multimedia UDP flows, this paper presents the design and evaluation of network models to study different parameters for quality-of-service (QoS) provisioning in differentiated service (DiffServ) routers using user datagram protocol (UDP) as network traffic agent and constant bit rate (CBR) as traffic generator. Traffic marker algorithms are used to define the treatment an incoming traffic (packet streams) receives at the edge routers in a DiffServ domain.

KEYWORDS: UDP, TCP, NS2, Packet size, traffic load, throughput.

1. INTRODUCTION

The influx of multimedia applications such as Video on Demand (VoD), Voice over Internet Protocol (VoIP), to mention a few, on the Internet in recent years has increased astronomically and this demands for Quality of Service (QoS) assurance due to the sensitive nature of these applications and their varying QoS requirements such as UDP flow, congestion, packet loss rate, fairness, throughput . These applications transits through a network as traffic and they are often confronted with congestive messages such as “try again or network busy” due to weaknesses of ancient TCP/IP protocol suite to provide QoS in a differentiated manner based on different traffic demands of incoming traffic stream. In order to meet the different QoS requirements of different multimedia applications, the Internet Engineering Task Force (IETF) came up with two Internet architectures, namely the integrated service (IntServ) architecture and the differentiated service (DiffServ) architecture The emergence of the IntServ can be described as an evolution of the best-effort service architecture. However, the IntServ architecture is confronted with a number of issues such as scalability which is mostly experienced in the core router. IEFT improved on this problem and came up with a new architecture called DiffServ and it can reduce the congestion in the transmission.

II. RELATED WORK

2.1 ROUTING PROTOCOL PROCESS

The Routing protocol which filters the network traffic and it depends on the router to choose the best path among multiple paths and that enables the routers for communication to other device. Which in turn to intelligently forwarding

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traffic between their respective networks. It can perform three basic functions that is discovery, route management, path determination. The function of the discovery is to find and identify the other router on the network and route management make keep track of all the possible destination and path determination make dynamic decisions for message sending location. AOMDV which offers the two key services that are route discovery and route maintenance.

2.2 AODV ROUTING PROTOCOL

An on-demand routing protocol, AOMDV has its roots in the Ad hoc On Demand Distance Vector (AODV), a popular single-path routing protocol. This can capable of builds a routes between nodes only if they are requested by the source node and does not create any extra traffic for communication along links. Routes remain active only as long as data packets are travelling along the paths from source to destination. While the source stop sending packets, the path will time out and close.

2.3 INTERNET QOS

Quality of Service (QoS) is the capability of a network to provide resource assurance and service differentiation to meet the demands of time-sensitive applications that requires some guarantees to finish within a bounded time period such as VoIP, VoD and so on. QoS is defined as the collective effectiveness of service performance that determines the degree of satisfaction of an end user of a given service. The main essence of QoS in Internet is to provide priority such as dedicated bandwidth, controlled delay and jitter, as required by real-time traffic, and to improve packet loss rate. It is also important to make sure that providing priority to one or more flows does not make other flows fail. Moreover, QoS in Internet determine if the service offered by a network meets the users' quality demands. In this study packet delay and fairness rate were considered as QoS parameters for the experiments.

III. TRAFFIC CLASSIFICATION AND CONDITIONING

The traffic classification is done through classifiers, therefore, two types of classifiers are defined as the Behaviour Aggregate (BA) classifier and the Multi Field (MF) classifier. The task of a traffic classifier is to select a packet in a traffic stream based on some data carried in the packet's header and assign it to one of the service classes supported in the network. This implies that, the classification of traffics is done based on the information in the packet header. This is the first step taken at the ingress router to process packets. Also, the knowledge of the packet classifications is important in order to apply the appropriate metering, marking, shaping and dropping functions to each packet class according to the Service Level Agreement (SLA) [10]. The BA classifies packets based on the DSCP only and the MF classifier selects packets based on the value of a combination of one or more packet header fields. Also, the traffic conditioner contains essential components such as meter, marker, shaper, dropper, but it is not necessarily to contain all the four elements [7]. The traffic conditioning functions include metering, marking, shaping and dropping as illustrated in Figure 1. The traffic marker set the DS field of a packet to a particular code point based on the information from a classifier and meter. This implies that, a packet is assigned to a particular class of service (BA or MF) and may be marked as in-profile or out-profile. The in-profile packets are allowed to enter the network while the out-profile packets are further conditioned. Therefore, the marking of the packets determines the treatment a packet receives as it transverse (pass) through the network domain.

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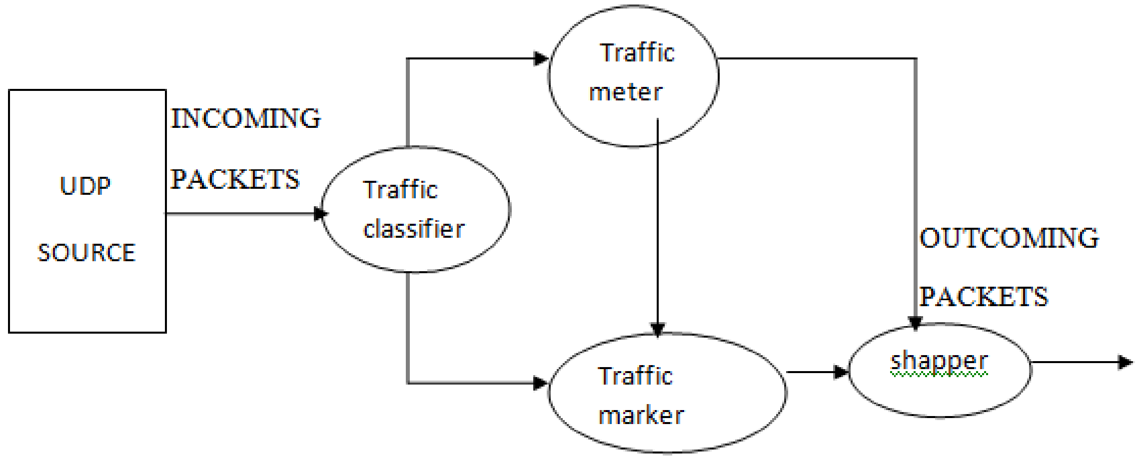

1. Research Approach

In this study, a simulation approach was adopted to design and simulate the network model in Fig 4 to implement TSW2CM algorithm and TSW3CM algorithm so as to create a platform for comparison between the two variants of time sliding window marker algorithms on user datagram protocol (UDP) as network traffic agents while the constant bit rate (CBR) model was used for traffic generation. The designed network model was simulated using a software simulator called network simulator 2 (NS-2) which combines C++ and object tool command language (OTCL) together. OTCL was used as the front end to set up the simulation topology in order to accommodate varying of simulation parameters while the C++ programming language was used as the back end for algorithm simulation. In order to determine the strengths and weaknesses of TSW2CM algorithm and TSW3CM algorithm, throughput, fairness rate, packet loss rate and packet delay were used as performance metrics, and the data generated from the simulation experiments were traced into files, analysed and evaluated.

IV. PERFORMANCE METRICS

The performance metrics used in the simulation experiments are as follows:
1. Throughput: Throughput is known as the number of bits that the destination has successfully received. Expressed in kilobits per second (Kbps). Throughput measures routing protocols efficiency in receiving data packets by destination.
2. UDP flow: Data flow in the UDP is considered and there is no flow control mechanism in UDP protocol.UDP which measures the speed of the data in the transmission that should be measured and make increased the flow by reducing the time delay n the transmission.
3. Congestion: In wireless networks, congestion which refers to the state where a node carries a maximum amount of data that it may deteriorate network service quality, packet loss and make a disconnection of a network.

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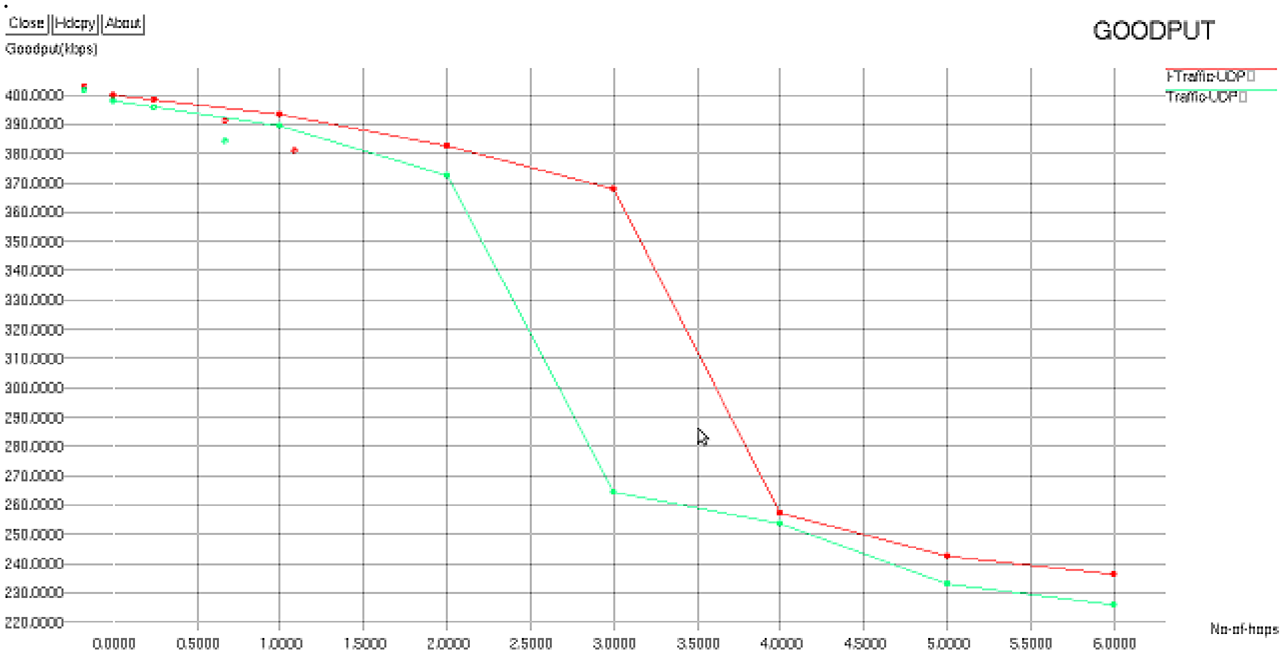
V. RESULT AND ANALYSIS

THROUGHTPUT

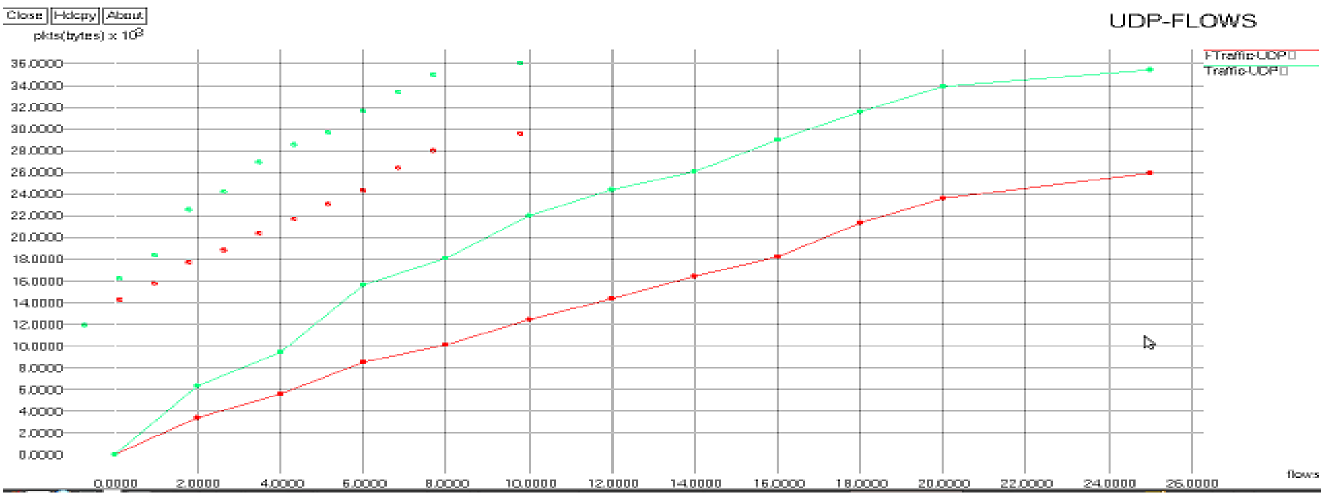
In this graph, we have shown that number of data sending to the node get increased compared to the existing system.



Throughput analysis of the UDP

UDP FLOW

In this graph we show the flow of data analysis in UDP and makes increase the data flow and decreases the time delay in the data flow.



Output analysis of the UDP flow

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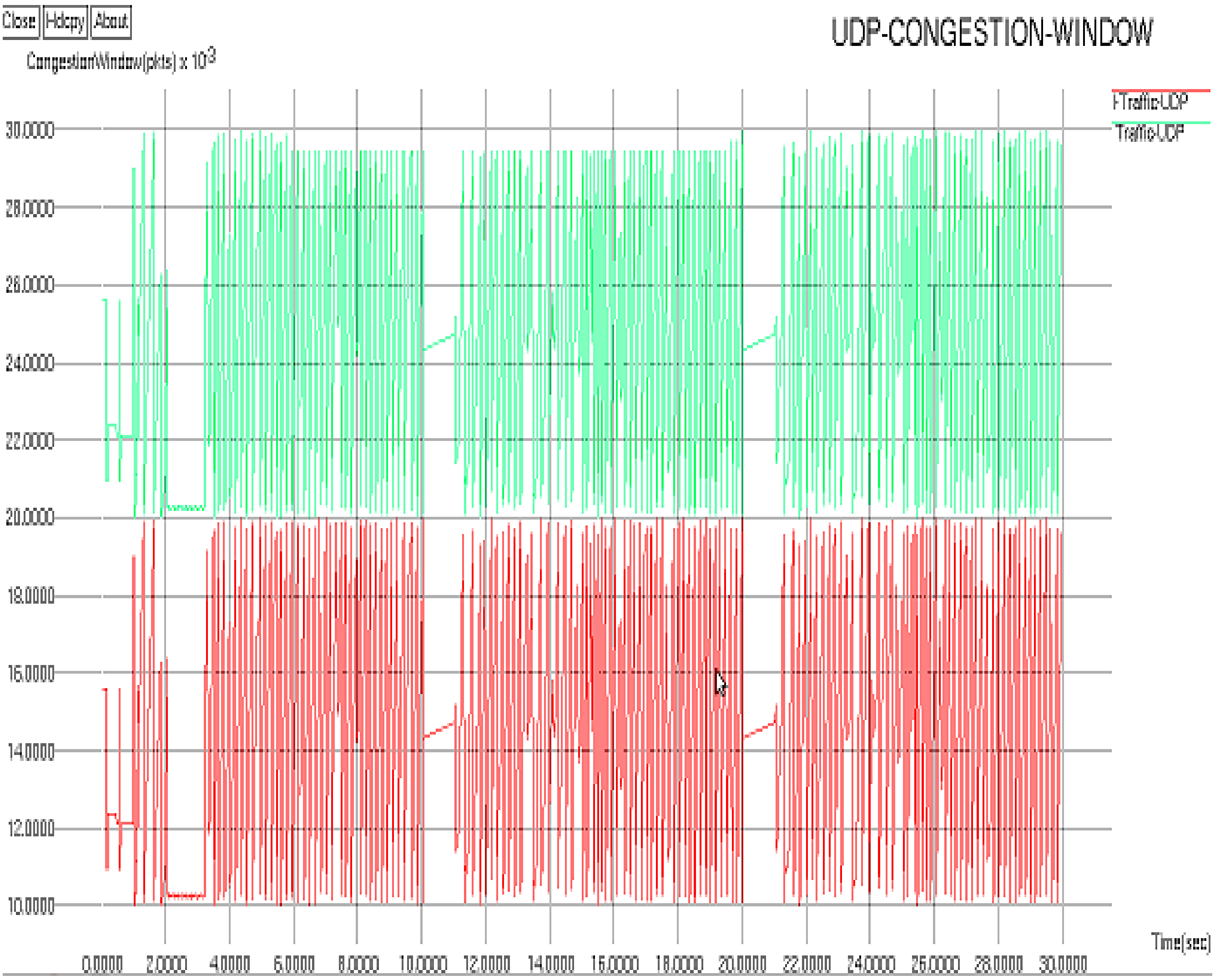
CONGESTION WINDOW
In this graph shows that, the maximum amount of data the sender can send into the network and it is based on the level.



VI. CONCLUSION

In this paper, we discussed the performance analysis of UDP flow, congestion, throughput of data transmission in wireless networks. In this we show that the changes in efficiency increases compared to the existing system. We used the Xgraph for the graph representation of the UDP flow, throughput and congestion window. In this we simulated and analysis the performance using NS2.

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