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Controlling Packet Loss Using Tokens at the Network Edge

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***Abstract*—The simultaneous data transmission in internet [14] without packet loss very much depends upon congestion control [11]. A series of protocols and algorithms [15] have been introduced for controlling congestion. The network congestion plays a major role in data communication. The performance of the network [13] will be improved by controlling packet loss using congestion control algorithm. When the data packets are transmitted without intermediate station then packet loss leads to the retransmission of packets. It takes more time and increases load on network. A new protocol called STLCC (Stable Token Limited Congestion Control) is proposed for controlling packet loss using tokens. It integrates TLCC [6] and XCP [7] algorithms. TLCC uses the iterative algorithm to estimate the congestion level of its output link and the output rate of the sender is controlled according to the algorithm of XCP, so there is almost no packet loss at the congested link. Thus STLCC can measure the congestion level analytically, allocate network resources [3] according to the access link, and further keep the congestion control system stable.**

Keywords: congestion, congestion control, token, TLCC, XCP, STLCC.

I.INTRODUCTION

Internet provides simultaneous audio, video, and data traffic. This is possible when the Internet guarantees the packet loss which depends very much on congestion control. A series of protocols have been introduced for controlling the network congestion [2]. Modern IP network services provide for the simultaneous digital transmission of voice, video, and data. These services require congestion control protocols and algorithms which can solve the packet loss parameter can be kept under control. Congestion control is therefore, the cornerstone of packet switching networks. It should prevent congestion collapse [9], provide fairness to competing flows and optimize [16] transport performance indexes such as throughput, delay and loss.

II.CHALLENGES

The sender sends the packets without intermediate station. The data packets loss happen when congestion occurs and time is wasted. Retransmission of data packets is difficult because which takes more time and increases load on Network. The major challenge is to control packet loss in the network.

III.PROPOSED WORK

This paper proposes a solution by introducing a new protocol called STLCC (Stable Token Limited Congestion Control). It integrates the algorithms of TLCC [6] and XCP [7] altogether. In this new method the edge and the core routers will write a measure of the quality of service guaranteed by the router by writing a digital number in the Option Field of the datagram of the packet which is called a token. The token is read by the path routers and interpreted as its value will give a measure of the congestion especially at the edge routers. Based on the token number the edge router at the source reduces the congestion on the path [10]. The output rate of the sender is controlled according to the algorithm of XCP. XCP allows the routers in the network to continuously adjust the sending speed of any participating hosts. These adjustments are done by changing the contents of the packets (XCP header) transferred between the sender and receiver. The feedbacks from routers are used by the sender to adjust the transfer speed to fit the routers current load. So, there is almost no packet loss at the congested link.

The STLCC can evaluate the congestion level analytically and allocate network resources according to the access link that further maintain the congestion control system stable.

IV.IMPLEMENTATION

This logic can be implemented by assuming transmission of data between source and destination. Consider a multilayer network that consists of source, destination and routers. Whenever source sends data, the data can be transmitted over the network among routers in the form of packets [8]. A packet is a small piece of data sent over a computer network [1] and having an option field of the datagram. The router either may be Edge router or Core router.

An Edge router is a device that routes data packets between one or more local area networks (LANs).A core router is a router that forwards packets to computer hosts within a network (but not between networks).The set of packets transmitted by the sender are forwarded to remaining routers with help of edge router. The edge router evaluates quality of service it can provide and writes this as value in the Option Field of the datagram of the packet and forwards the packet to core routers. This value is called as token.

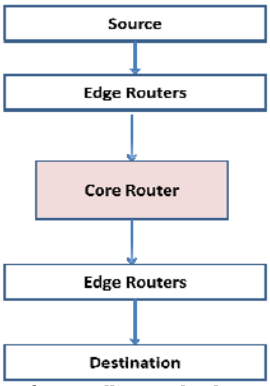

Fig.1 Architecture of Controlling Packet loss using tokens at the network edge

The path routers in the network read the token value and interpreted as its value. Based on the token number the edge router at the source minimizes the congestion on the path.

The outgoing packet rate of the sender is controlled according to the algorithm of XCP. XCP allows the routers in the network to continuously adjust the sending speed of any participating hosts. These adjustments are done by changing the contents of the packets (XCP header) transferred between the sender and receiver. The feedbacks from routers are used by the sender to adjust the transfer speed to fit the routers current load. Because of this process and the congestion in the network is stable.

V.RESULTS

This project results can be shown by creating classes to nodes, edge router and core router.

Initially source node selects the file and transmits the file to another node through routers.

The file is transmitted in the form packets. Initially packets are forwarded to the edge router connected to the source. After receiving the first packet, edge router overwrites the source data rate with its current data rate in the option field of the datagram and gives the acknowledgement [4] to the source and forwards packet to other routers.

When packets are transmitted with limited number of resources then packet is kept in waiting state that gives the result as negative acknowledgement to the source. After receiving negative acknowledgement [12] from the edge router, source adjust its current data rate .So, there is almost no packet loss at the congested link. This way of transmission will be done at each and every router and finally packets will be received by destination.

CONCLUSION

The simple version of STLCC is proposed, which can be deployed on the current Internet. STLCC can evaluate congestion level [5] analytically and allocate network resources according to the access link that leads to stable congestion control system. The network with stable congestion control leads to the good performance and it will be possible to build a network with limited number of resources having fast transmission of data with accuracy and no delay.

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