**INTRODUCTION**

In a packet switched network, packets are introduced in the nodes and the nodes in-turn forwards the packets into the network. When the “offered load” causes certain limit, then there is a sharp fall in the throughput. This phenomenon is known as congestion.1 Network congestion in data networking and queuing theory is the reduced quality of services and it occurs when a network node or link is carrying large amount of data than it can handle2. Other effects include queuing delay, packet loss or the blocking of new connections. The problem that effect in congestion is that an increase in offered load leads either only to a small increase or even a decrease in network throughput. Congestion control modulates traffic entry into a telecommunications network in order to avoid congestive problem resulting from overloading. This is mainly accomplished by reducing the rate of packets and it should not be confused with the flow control, which prevents the sender from overwhelming the receiver. There are many congestion control algorithms used to control the congestion such as accumulation congestion control, internet congestion control, connectionless congestion control etc. Here we discuss such type of congestion control and the comparison with other algorithms and the best method among them.

1. ACCUMULATION-BASED CONGESTION CONTROL

The ACC model serves as a reference for packet switching network Implementations .The possible scheme under this model is TCP Vegas and it is well known that Vegas affect from round trip propagation delay estimation error and reverse path congestion [1]. Here designed a new Monaco scheme that solves related problems by employing an out-of-band, receiver-based accumulation estimator, with the support of two FIFO priority queues from the (congested) routers. From above description can understand that Monaco does not suffer from the problems mentioned above .So, we can understand that Monaco provide better performance than Vegas. The issue regarding with ACC model is the scalability of bottleneck buffer requirement, and a solution using the Virtual queuing algorithm. The main content of this method is allocating router buffer space among competing flows in a distributed manner to meet the rate differentiation objectives. This method estimate the equilibrium in Kelly’s nonlinear optimization frame work [2].There is no admission control instead during overload it degrades to a well-defined, policy controlled bandwidth allocation. It does not require Active Queue Management (AQM) at bottlenecks with sufficient buffer. In AQM, achieve near zero queue with high utilization at bottleneck. Here use ns-2 simulations and Linux kernel implementation experiments to demonstrate the performance of the services.

1. INTERNET CONGESTION CONTROL

The function of internet congestion control mechanism which serves too much offered load to available bandwidth. Congestion control allocates available bandwidth more or less reasonably. When the development of TCP’s Addictive Increase Multiplicative Degrees (AIMD) algorithm. Later, the internet functions are changes significantly that become much more heterogeneous in many areas including link speed and characteristics, and types of applications were provided. Most of the congestion control protocols have been recently introduce in order to avoid the problems occurred by TCP in high-speed networks and wireless links. In this method establish a novel estimation algorithm that is based on online parameter identification techniques and is shown through analysis and simulations to converge to the effective number of users utilizing each link. The algorithm doesn’t require maintenance of per-flow states within the network or additional fields in the packet header and it is shown to outperform previous proposals that we are based on point wise division of time. The estimation scheme is designed independently from the control functions of the protocols and is also universal as in the sense that it operates effectively in a number of congestion control protocols. It can successfully use in the design of new congestion control protocols.

3. DATA CAST

RGDD stands for Reliable Group Data Delivery. It is a pervasive tract pattern in data centers. In an RGDD group, a sender needs to reliably deliver a copy of data to all the receivers. Now current solutions either do not scale due to the large number of RGDD groups or cannot efficiently use network bandwidth. There are two design spaces. That is given below

1) Data cast uses multiple edge disjoint Steiner trees for data delivery acceleration.

2) Data cast leverages in-network packet caching and introduces a simple soft-state based congestion control algorithm to address the scalability and efficiency issues of RGDD.

From the conclusion of this Data cast congestion control works well with small cache sizes (e.g., 125KB) and causes few duplicate data transmissions (e.g., 1.19%). Data cast introduces an efficient algorithm to calculate multiple edge-disjoint Steiner trees, and then distributes data among them. Data cast congestion control works well with small cache sizes (e.g., 125KB) and causes few duplicate data transmissions (e.g., 1.19%).

4. MUTIPATH TCP ALGORITHMS

Multi-path TCP proposes a fluid model for a large class of MPTCP algorithms. Using this fluid model identify the uniqueness and stability of system equilibrium. Multi path TCP algorithm uses multiple paths transparently to improve the application performance.

To develop improved algorithm uses the following methods:

1) The design criteria for MP-TCP to converge to a unique equilibrium need to be identiﬁed.

2) The relations among different performance metrics, e.g. fairness, responsiveness and window punctuation, need to be identified [6]. Traditional single-path TCP traverses one route so that only one access interface can be used by the application. This limits performance when there are multiple interfaces/routes available, e.g. most smart phones are enabled with both cellular and Wi-Fi access, and communicating servers in data centers are connected through multiple routes. Multi-path TCP (MP-TCP) has the potential to greatly improve application performance by using multiple paths transparently.

5. A CONNECTIONLESS CONGESTION CONTROL ALGORITHM

Connectionless congestion control algorithm is a congestion control algorithm that used within a connectionless network environment. This controls a source’s transmission rate, with that rate determined by feedback from the point of congestion. The algorithm is well suited to operate from within the IP layer of the TCP/IP protocol suite. To examine the isolated aspect of the algorithm behavior this model uses an analytical model. A simulator was written to further test it s behavior under a variety of topologies, loads, and path bandwidths. The results achieved are presented [5].

Congestion avoidance or control operates within more than one layer in a network. The most common place for it is end-to-end control within the source and destination hosts of a connection. For finding routes between source and destination uses network routing algorithm and it can also responsible for congestion control. For example, dynamic shortest-path-first routing algorithms sometimes choose routes based upon shortest delay. That also controls network congestion, since the delay along congested routes rises and results in those routes being changed to avoid the delay. This is perhaps the second most commonly recognized place within a network hierarchy where congestion control operates.

6. MULTIPATH ROUTING ALGORITHMS FOR CONGESTION MINIMIZATION

In Multipath Routing is different from traditional routing schemes that route all traffic along a single path, multipath routing strategies split the traffic among several paths in order to ease congestion. It is an alternative approach that distributes the traffic among several “good” paths instead of routing all traffic along a single “best” path. It has been widely recognized that multipath routing can be fundamentally more efficient than the traditional approach of routing along single paths [6]. Multipath routing can be fundamentally more efficient than the currently used single-path routing protocols. It can signiﬁcantly reduce congestion in “hot spots,” by deviating traffic to unused network resources, thus, improving network utilization and providing load balancing. Multipath routing algorithms that optimally split traffic between a given set of paths have been investigated in the context of ﬂow control. Accordingly, in this method they focus on multipath routing algorithms that both select the routing paths and split traffic among them. Another practical restriction is on the number of routing paths per destination, which is due to the following reasons. First, establishing, maintaining, and tearing down paths pose considerable overhead. Second, the complexity of a scheme that distributes traffic among multiple paths considerably increases with the number of paths. Third, often there is a limit on the number of explicitly routing paths that can be set up between a pair of nodes. Therefore, in practice, it is desirable to use as few paths as possible while at the same time minimize the network congestion.

7. TCP CONGESTION CONTROL ALGORITHMS

When we want to transfer of large volumes of data and the deployment of the network infrastructures is ever increasing. However, the dominant transport protocol of today, TCP, does not meet this demand because it favors reliability over timeliness and fails to fully utilize the network capacity due to limitations of its conservative congestion control algorithm. The slow response of TCP in fast long distance networks leaves sizeable unused bandwidth in such networks. A large variety of TCP variants have been proposed to improve the connection’s throughput by adopting more aggressive congestion control algorithms. Some of the flavors of TCP congestion control are loss-based, high-speed TCP congestion control algorithms that uses packet losses as an indication of congestion; delay-based TCP congestion control that emphasizes packet delay rather than packet loss as a signal to determine the rate at which to send packets. Some efforts combine the features of loss-based and delay-based algorithms to achieve fair bandwidth allocation and fairness among flows [7].

Moving bulk data quickly over high-speed data network is a requirement for many applications. These applications require high-bandwidth links between network nodes. To maintain the stability of Internet all applications should be subjected to congestion control. TCP [8] is well-developed, extensively used and widely available Internet transport protocol. TCP is fast, efficient and responsive to network congestion conditions but one objection to using TCP congestion control is that TCP’s AIMD congestion back-off algorithm [9] is too abrupt in decreasing the window size, thus it hurts the data rate.

COMPARISON OF CONGESTION CONTROL

A network state were a node or link carries so much data that delay network service quality, resulting in queuing delay, frame or data packets lows and blocking of new data collections. Congestion occurs when bandwidth is insufficient and network data traffic exceeds capacity. Here, first paper, Accumulation Based Congestion Control about comparison between Vegas and Monaco shows that Monaco receiver-based, out-of-band accumulation measurement solves Vegas well-known estimation problem. Second paper, Internet Congestion Control establish a novel estimation algorithm that is based on online parameter identification techniques and is shown through analysis and simulations to converge to the effective number of users utilizing each link. Third paper, Data cast introduces an efficient algorithm to calculate multiple edge-disjoint Steiner trees, and then distributes data among them. Data cast congestion control works well with small cache sizes and causes few duplicate data transmissions. The fourth paper, Multi-path TCP proposes a fluid model that identifies the uniqueness and stability of system equilibrium. Fifth paper, s a congestion control algorithm that used within a connectionless network environment which controls a source’s transmission rate, that determined by feedback from the point of congestion. From the above all mechanisms we understood that TCP based methods are much better than others. It provides more scalability, better throughput and loss of packet is less. In recent time we use TCP based method for congestion control. This method is useful in high speed internet.

**CONCLUSION**

In every node of a packet switch network, queues are maintained to receive and transmit packets. Due to busty nature of the network traffic there may be situations where there is overflow of the queues as a result there will be retransmission of several packets which further increase the net work traffic. This finally leads to congestion. From the above papers we can understand different types of congestion control mechanisms and their merits and demerits. So, we concluded that TCP based methods are much better than others. Because it provides more scalability, better throughput and loss of packet is less.

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