

A Preamble approach of network congestions over a TCP/IP networks

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Abstract: We are living in technical era, which upgrade it rapidly day by day. Now we are totally depended on technology. In earlier edge we use to send any information or messages through Post while today us sending messages and mails through internet. Billion of user uses same network at same time so the network become so much populated. There is a suit of protocols which specifies how data is exchanged over the internet by providing end-to-end communications that identify how it should be broken into packets, addressed, transmitted, routed and received at the destination called TCP/IP. In this paper we have discuss all about the TCP/IP network problems due to bulk of users, one of which them is congestion on network. Due to huge number of users, it is possible to become congestion on network. It affects a network by queuing delay, packet loss or the blocking of new connections.

Keyword: Network, TCP, IP, Congestion, Data Packets, Routing, Queuing, connection.

Introduction to TCP/IP

“TCP/IP is the back bone of network which provide the facility to share data, information and resources “

Basically TCP/IP specifies how data is exchanged over the internet by providing end-to-end communications that identify how it should be broken into packets, addressed, transmitted, routed and received at the destination. TCP/IP requires little central management, and it is designed to make networks reliable, with the ability to recover automatically from the failure of any device on the network.

The two main protocols in the internet protocol suite serve specific functions. TCP defines how applications can create channels of communication across a network. It also manages how a message is assembled into smaller packets before they are then transmitted over the internet and reassembled in the right order at the destination address.

IP defines how to address and route each packet to make sure it reaches the right destination.

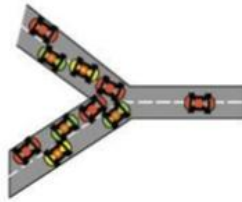
Each gateway computer on the network checks this IP address to determine where to forward the message.

TCP/IP uses the client/server model of communication in which a user or machine (a client) is provided a service (like sending a webpage) by another computer (a server) in the network.

Network Congestion over TCP/IP

A Congestion of networks refers state of network where a node or link carries so much data that it may deteriorate network service quality, resulting in queuing delay, frame or data packet loss and the blocking of new connections.

By taking the example of road map we can say that when the traffic jam occurs on road its also shows the condition of congestion.



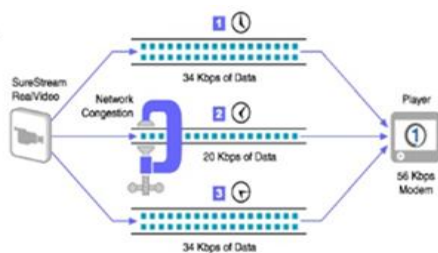
congestion on road due to traffic

“Network congestion is the situation in which an increase in data transmissions results in a proportionately smaller increase, or even a reduction, in throughput.”

Throughput is the amount of data that passes through the network per unit of time, such as the number of packets per second. Packets are the fundamental unit of data transmission on the Internet and all other TCP/IP (transmission control protocol/Internet protocol) networks, including most LANs (local area networks).

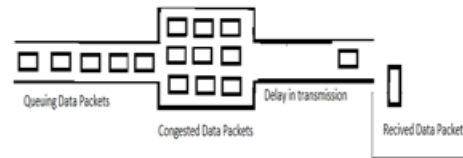
Congestion results from applications sending more data than the network devices (e.g., routers and switches) can accommodate, thus causing the buffers on such devices to fill up and possibly overflow. A buffer is a portion of a device's memory that is set aside as a temporary holding place for data that is being sent to or received from another device. This can result in delayed or lost packets, thus causing applications to retransmit the data, thereby adding more traffic and further increasing the congestion.

A network is considered as congested when too many packets try to access the same router's buffer, resulting in a large amount of packets being dropped.



showing congestion on transmission of data

Network congestion in data networking and queuing theory is the reduced quality of service that occurs when a network node is carrying more data than it can handle. Typical effects include queuing delay, packet loss or the blocking of new connections



Queuing of data packet between sender and receiver

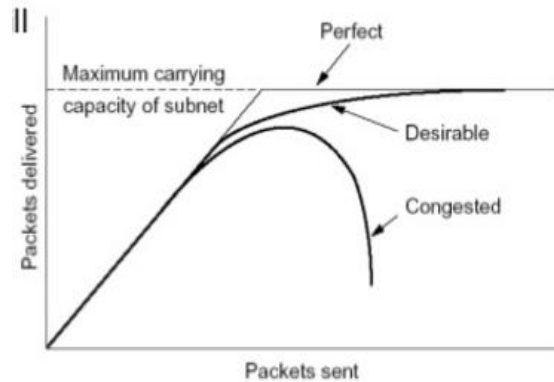
The networks are congested; we usually mean that a combination of too much data and not enough available capacity to support the applications are involved. We'll conjure up metaphors of traffic jams, inner-city lane closures and other practical analogies to simplify the concept to users. The ubiquity of the internet these days deems these no longer necessary. Users understand bottlenecks, buffers and crowding better than ever. Users expect fast connections regardless.

Network congestion is an issue of scale. Too much data forced through a route that can't process that data fast enough inevitably leads to delays and packet loss. To design and monitor networks intelligently, we should understand what causes congestion.

Impact of Congestion

The congestion effects on network reliability and stability. A bulk of data packets transmits over a TCP/IP network through a channel. We can find a big difference between the numbers of delivered and sent packets. Some packets delivered successful as perfect as they were while some are received as desirable in numbers and remain become collapse due to congestion.

The congestion impact may be temporary but if not handled it will be catastrophic. /this situation can be understood by given figure.



A congestive collapse effects network stability, throughput and fair resource allocation to network users

Congestive Collapse

Congestive collapse is the situation in which the congestion becomes so great that throughput drops to a low level and thus little useful communication occurs. It can be a stable state with the same intrinsic load level that would by itself not produce congestion. This is because it is caused by the aggressive retransmission used by various network protocols to compensate for the packet loss that occurs as a result of congestion, a retransmission that continues even after the load is reduced to a level that would not have induced congestion by itself.

Conclusion

At last we can conclude that the TCP/IP is the suit of protocols which specifies how data is exchanged over the internet by providing end-to-end communications that identify how it should be broken into packets, addressed, transmitted, routed and received at the destination. The safe transmission of data packet is the responsibility of a network but due to billion of user, we can easily find the delay transmission of packets. There is only one reason is that congestion over a networks. The congestion means that a combination of too much data and not enough

available capacity to support the applications are involved. This congestion impacts on reliability and stability of networks.

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