

Multipath and Dynamic Queuing base load balancing in Data Centre Network

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ABSTRACT

Data Centre Networks (DCN) are driven by large-scale computing services such as web searching, online social networking, online office and IT infrastructure outsourcing, and scientific computations. One of the challenges of networking is to control the flow of data to optimize the use of resources and balanced load on every node. This purpose can be served using an effective scheduling algorithm. This paper presents a hybrid scheduling algorithm for effective load balancing in the multipath wired communication network. The proposed varying queue scheduling method improves the quality of service (QOS). Proposed method maintains queue size on every node due to this packet dropping reduced and automatically various QOS like Throughput, path oscillation, packet sending, receiving data, acknowledgment of receiving etc. improves. Simulation result shows that proposed method performs better as compare to existing methods.

Keywords- DCN, Varying queue, QOS, scheduling.

I. INTRODUCTION

Data centre networks naturally have several path between every host pair to get high bisection bandwidth for random communication patterns. completely utilize the bisection bandwidth may need flows between the similar source and destination pair to take different paths to avoid hot spots [3]. Data Centre Networks gradually more hold larger and longer traffic flows. As a result of this amplified flow granularity, motionless routing cannot well load-balance travel, resulting in an increased network disagreement and a condensed throughput.

II. RELATED WORK

The Data Centre Network is the hottest area of the internet world. This research is not bound only media, industries or hospital. The speedily growing internet based application, including research, new technologies (Google related) , hosting of video content and broadcasting and distribution (YouTube ,online tutorial) social networking media and large scale computation (like twitter, What sup). Various method has been proposed in this field, but still there is a roof of efficient scheduling method which will have a balanced b/w Performance, Cost and Substance .Lot of researcher is working in this direction. Some of them are listed below:-

Kiran Chhabra et al [1] explore RED for overcrowding prevention and proposed a new approach. Authors engaged these two struggles and proposed a way in which packet dipping is not only based on average queue size but also on the rate of change of input. The work which is approved out is to find out major changes in input rate and use this hiking rate as suggestion of impending congestion for sources to respond quickly. They analyze the performance of their proposed algorithm using network simulator NS-2. Following are their contribution in the present work:-

- Packet defeat ratio decrease in case of ISRED contrast to RED.
- selfishness of RED towards input load variation is reduced a lot.
- By production ISRED further responsive to input load variation, abundant of buffers is avoided which eliminate the possibility of punishing new innocent packet from dropping on overflow of queue (buffer).
- Congestion hint is done effectively which is indicated by decrease in arrival of packets.
- There is message connecting attempt current size and average queue size.

Srikanth Kandula et al [2] describe that in data centre travel around the natural world of travel, considered to hold up the drawing out of vast or significant data sets. They gadget the servers to gather socket-level kindling, with tiny presentation force. In a 1500 server functioning cluster, they gather approximately a Petabyte (10^5) of measurements over two months, from which they obtain and report complete views of traffic and overcrowding conditions and patterns.

Xin Wu Xiaowei Yang [3] shown that Data centre networks classically have a lot of paths linking every host couple to get far above the ground bisection bandwidth for random message pattern. Completely utilize the bisection bandwidth may have require of flow between the similar resource and goal couple to get different paths to avoid hot spots. However, the active routing protocols have little support for load-sensitive adaptive routing. They proposed DARD, Distributed Adaptive



Routing architecture for Data centre networks. DARD allow each end host to regulate traffic from loaded paths to under loaded ones without central organization.

They used open flow performance and simulations to show that DARD can successfully use the network's bisection bandwidth. It outperforms previous solutions based on arbitrary flow-level scheduling by 10%, and performs similarly to previous work that assigns flows to paths using a centralized scheduler but without its scaling limitation. They used ready for action game theory to show that DARD's flow scheduling algorithm is stable. It makes progress in every step and converge to Nash equilibrium in finite steps.

Wenzhi Cui et al [4] leverages multiple parallel paths concerning end host pairs to offer high bisection bandwidth for collect computing applications. However, position of the art distributed multi-Pathing protocols such as Equal Cost Multipath (ECMP) use static flow-to-link assignment, which is load unaware. They may cause bandwidth failure due to *flow collisions* on a same link [6]. Recently proposed centralized scheduling algorithm or host-based multi-pathing may suffer from scalability problems. Authors presented Distributed Flow Scheduling (DiFS) for data centre networks, which is a switch-only distributed explanation DiFS allows switches assist to avoid over-utilized links and find available paths without centralized control. DiFS is scalable and can react speedily to forceful traffic, because it is independently executed on switches and requires no synchronization. Experiment results show that the aggregate bisection bandwidth of DiFS using various traffic patterns is much better than that of ECMP, and is related to or top than that of a recent proposed centralized scheduling algorithm.

Fung Po Tso et al [5] shown that in Data Centre (DC) networks display much more centralized characteristics than the inheritance Internet, yet they are operated by comparable distributed routing and control algorithms that fail to exploit topological redundancy to deliver better and more sustainable presentation. Multipath protocols, for model, use node-local and heuristic information to only utilize path diversity between shortest paths. In this paper, we use a dimension based approach to schedule flows over both shortest and non shortest paths based on temporal network-wide consumption. We present the Baatdaat1 flow scheduling algorithm which uses spare DC network capacity to mitigate the performance degradation of heavily utilized links. Results show that Baat-daat achieves close to optimal Traffic Engineering by reducing network-wide maximum link utilization by up to 18% over Equal-Cost Multi- Path (ECMP)

routing, while at the similar time reaching better run completion time by 41% - 95%.

III. PROPOSED ALGORITHM

Parameter: S: Sender node
 R: Receiver node
 Q: Buffer Size
 Rt: Routers
 Proto: Multipath

S Sends route discovery packet for search R node
 Select multipath for data transmission
 Send data packet to R
 If (intermediate router Q == full)
 {
 Increase Q Size
 }
 If (intermediate router Q under load)
 {
 Decrease Q Size
 }
 Check load of each router
 If (rt1 load > rt2 load && next-hop info in both table)
 {
 Transfer rt1 load into
 rt2
 }
 Else { rt1 forward data to next hop }
 Generate output file
 Calculate network performance and buffer utilization
 Compare performance of existing RED, Drop Tail and Proposed Drop Tail Q mechanism

IV. SIMULATION OF PROPOSED VARYING QUEUE(VQ)

The Varying Queue represent the path oscillation in active moment variation flow of node will be in selected form from source to destination. To realize richer policy through independent route selection, yet avoid or minimize the impact of route oscillations, two other approaches are possible:

1. Require domains to coordinate among themselves for specifying policy. This coordination can allow interesting yet safe preference functions to be realized.
2. Allow domains to independently specify their policies, and deploy mechanisms to detect and suppress oscillations.

Given global knowledge of the policies for all domains, it may be possible to analyze those policies for the likelihood of route oscillations. One or more domains could then modify their policies based on the results of this analysis.

One way of doing such an analysis may be to extend the return graph representation to more general topologies. An alternative approach might

be to simulate the effect of these policies off-line. Such a simulation would capture those oscillations that occur independent of initial conditions. More extensive simulations might be necessary to capture those oscillations that depend on initial conditions. For analysis to be possible, each domain's plan must be available to all other domains at all times. One mechanism for making policies available is a route registry.

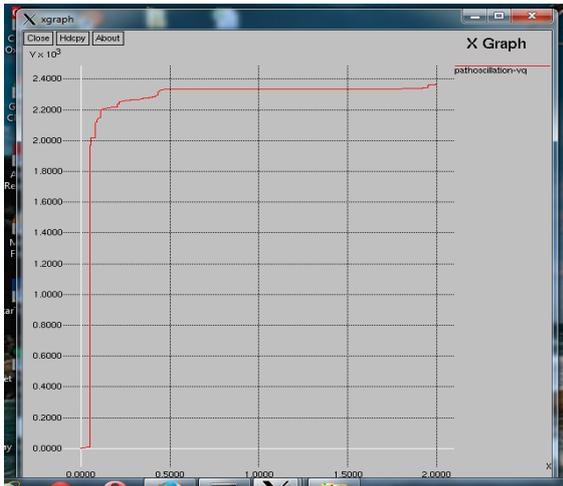


Fig.1: Path oscillation for varying queue

TCP acknowledged represent the flow of data from source to destination and see how much node send the acknowledge to the receiving end.

Number of Packet send= Number of packet acknowledge from receiver end



Fig.2: TCP ACK Knowledge through Varying QUEUE

The Packet transmission shows how much packet transmit from sender to receiver it shows the large difference between RED and Varying queue in the graph.



Fig.3: TCP Transmission through Varying QUEUE

There is fluctuation between Dropping of packets at the receiving end at which end the critical node block the packet or not.

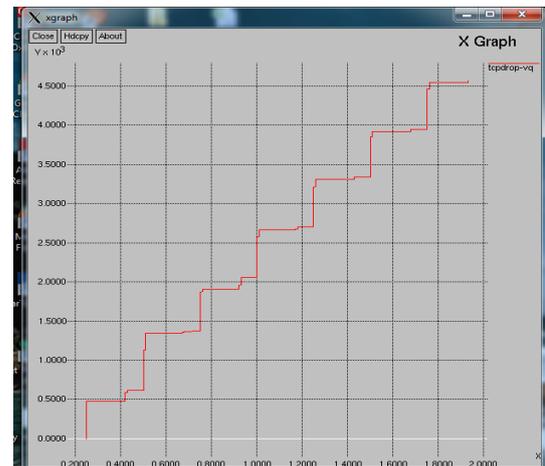


Fig.4: TCP drop by Varying QUEUE

This simulation exercise explores the impact of MAC overhead and multiple hops on achievable data throughput in a wireless network.

We'll separately analyse the impact of MAC overhead using single hop topology and impact of multiple hops on the attainable throughput.



The simulation set-up comprises two nodes S and D in direct range of each other. S acts as a CBR source, with D being the sink.

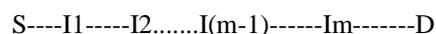




Fig.5: Throughput for the Varying Queue

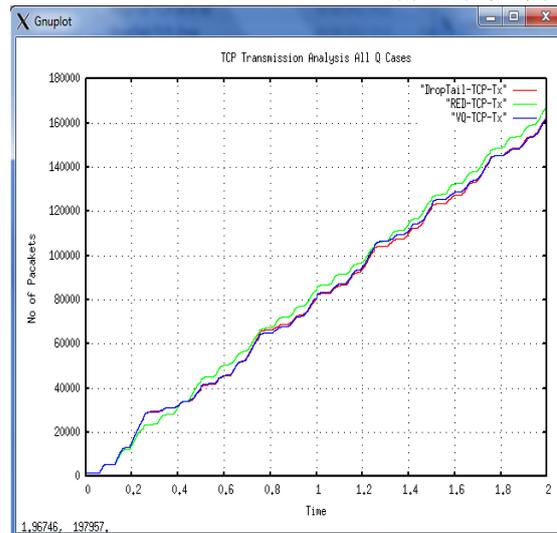


Fig.6 Comparative Result For RED ,DROP Tail and Varying Queue

V. RESULT ANALYSIS

Table1: Performance summary of Proposed VQ method

S.N.	Parameter/ Attribute	Value
1	SEND	180533.00
2	RECV	174383.00
3	ROUTINGPKTS	2368.00
4	PDF	96.59
5	Normal Routing Load	0.01
6	Average e-e delay (ms)	43.96
7	No. of dropped data (packets)	6150

Table2: Comparative Table

Overall Comparison			
Parameter	RED	DROP Tail	Varying Queue
SEND	110154.00	131755.0	150874.00
RECV	98288.00	119378.	145940.00
ROUTINGPKTS	3531.00	3529.00	3531.00
PDF	89.23	90.61	96.73
NRL	0.04	6.03	0.02
Average e-e delay(ms)	58.29	58.29	45.70
No. of drop data (pkts)	11866	12377	4934

This Graph shows the representation as well as the comparison between Drop-Tail, RED, and VQ for the Transmission analysis between No. of packets and Time. All Q case represents Queue case for transmission.

VI. CONCLUSION & FUTURE DIRECTIONS

The proposed varying queue scheduling method improves the quality of service (QOS). Proposed method maintain queue size on every node due to this packet dropping reduced and automatically various QOS like Throughput, path oscillation, packet sending, receiving data, acknowledgment of receiving etc. improves.

1. Packet loss ratio decreases in case of varying queue compare to RED and DROPTAIL method.
2. Congestion indication is done effectively which is indicated by decrease in arrival of packet.

The future work involves progress in the direction of queue overflow. If the number of packets exceed to the maximum queue size then it will drop the incoming packet. An important question in terms of analysis. Calculate network performance and buffer utilization. Specifically, algorithms with easily tunable performance in various dimensions would be extremely useful.

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