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# Dynamical Load Balancing and Priority based Round Robin Algorithm for selecting Data Center in Cloud

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***Abstract***: The datacenters are need to transmit more dataflows towords huge servers are interconnected. The task of transmiting the data is give some difficult because it lead to no of issues are there is to manage work load efficiently and adaption of changing network states and arrival of new requests during transmission. For overcome this problem a dynamically load balancing technique may be implemented in software define networks to degedize the total overall response time and increasing network throughput. This approach work more efficiently when there is only one data center in the same network environment. When there is two or more datacenters in the same network region the conflict may occur which datacenter may be transmit the data flows through the servers, to avoid this type of situation we propose a priority based with round robin algorithm for selecting datacenter from the same network environment. for this first list out the datacenters from network environment and make index of the datacenters based on their priorities usually speed. And by using round robin techique for selecting the datacenter may be performed. For this we propose two algorithms for indexing the datacenters based on priorities and round robin approach for selecting datacenter. basically the dynamical load balancing technique gives high throughput on less response time. By combining the prioritised round robin algorithm with this for selecting datacenters is gives better efficient result than traditional model.

***Keywords***: Cloud computing,Software defined network, Load balance, Data Center, Round-Robin.

## 1. INTRODUCTION

In cloud environment there is need of transmitting data from one data center to another data center. The data may be passed through the switches and controlled by routers. . In the network of Data Center in cloud there is necessity of huge amount of data is transferred through large amount of servers. In traditional network model routing of traffic and protocols are and flow tables are done by routers and switches. It is very expensive for scientists to test and implement new rules and also need large scale hardware. "Software Defined Networks "[2] are overcome this problem in this software is embedded into the hardware. The open flow networks are best suited for SDN networks. It improves the capacity of transmission because presence of Programmable load balancer technique.

In cloud environment to aquire maximum throughput at minimul response time by using load balancing technique. the concept of distributing workload and computational resources is load balancing. Load balancing not only refers website traffic ,it also concern about load in CPU, network and capacity of memory in the servers. It make each system in network with same work load that is neither overload nor under utilize, Static load balancing is used in traditional network load balancing technique in which initially routing of data flow can be done before transmission of data through Data Centers. Now a day network states are dynamically changed when arrival of new data flows. Dynamical load balancing techniques are best suited for this situation, dynamical load balancing acquire the changing network situation and the routing of data flows maybe initialized before and during the transmission of data flow. Dynamically balancing the traffic in cloud network environment lead to increase in overall throughput in minimum response time .

the load balancing technique is applied when there is imbalance degree occurs in data center. In cloud network region there is two data centers the performance is decreases to avoid this situation the selection of data center is done by using priority based round robin algorithm.

The remaining section of the paper describe as follows section II preliminaries of the project, in section III

proposed work and architecture will be described in section VI result and in section V in this we conclude it.

## 2. PRELIMINARIES

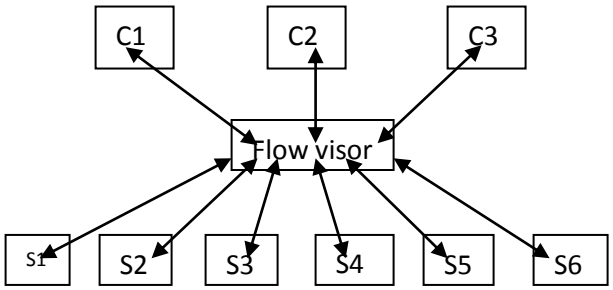
In this , we describe open flow network and load balancer used in this and motivational scenario of the project.

### 2.2 Open Flow Network

In traditional (TCP/IP) network model the process of rule selction and routing of packets by using routing table can be done by routers. For transmission of huge amount of data need more expencive and powerful router and it routing the data flows initially that is statically and cannot work as dynamical conditions. These are the main disadvantages in traditional network model.

In open flow network there data forwarding components are under the control of switches and routing components under the control of controller.

The following diagram shows that the C1,C2,C3 are controller controllers ans S1 to S6 are the open flow sitches. The data flow forwarding rules are managed by controllers and the flow visors make the virtualize the locations of switches and the switches are forward the data under rules in controller and the flow visor communicate between controller and swithes. The open flow framework provide open programmable API provides set up of customized rules.




**1.Open Flow Network**

### 2.2 LOAD BALANCING:

Load balancing in the senceequally distributing the work to all resources in some measures. The high aspect of load balancing is for increasing throughput in minimum response time, efficient resource utilization and overload and under utilization of single resource. It equally split the load through multiple interconnected links. It spread the band width for data flows to increase bandwidth. In the cloud network there are large number of data will be trasfered through the network the routing of the every data flow we using particular load balancing technique for better performance. The load balancing techniques are static and dynamic. In static load balancing technique it schedule the work flows at initial stages this proposal lead to poor transmission capacity because initial routing does'nt aquire the real time situation. In dynamical load balanacing technique the routing of data flows is re scheduled for every ending of time slot.

### 2.3 Motivational Scenario

The dynamical load balancing is used for transmission of data flows dynamically for maximize network throughput in minimum response time. This approach is more efficient than other load balancing techniques but it select the the data center for data flow transmission in the nearest region . but there is two data centers in same network region the selection process is random. This situation lead to unsatisfactory results. to improve the network throughput and better resource utilization we using algorithm for selecting data center in same cloud network.

## 3.PROPOSED SYSTEM

In this section we propose a Dynamical load balancer for transmission of dtat flows in data center combine with priority based round robin algorithm for selecting data center in cloud.

### 3.1 Dynamic load balancing

In cloud network,for initial set up of data flows is based on three characteristics are high frequency, huge volume and hard transmission deadline.once switch receives transmission data requests from multiple hosts , scheduling of data flows may be based on their priorities.the data flows can be scheduled in lowest weight first serve. The heighest priority data flow can be transitted and the next data flow will be transmitted if there is two data flowshaving same priorities it select randomly.

After finishing of the initial time slot the data flows priorities can be calculated again and scheduling the high rioritized data flows . This approach best suited for real time cloud environment. Because it aquire the change in network state and arrival of new data flows during transmission.

#### 3.1.1Path Selection

For scheduling data flows to a paths are based on two tables are Switch Path Table
and Resource available table.

Switch path table can store the information of changing network outline and resource available table can store the available resources in data center. The two tables are changed for shows the dyanamic need of the data transmission.

The Switch to Switch path table stores the possible paths from source to other hosts. The data center switches are limted so the S to S path table is limited.

**S2S PATH TABLE**

| Source | Destination switches | | |
|---|---|---|---|
| S1 | S2 | S3 | S4 |
| S1 | {1,4,2} | {1,4,3} | {1,5,4} |
| S1 | {1,5,2} | {1,5,3} | {1,6,4} |
| S1 | {1,6,2} | {1,6,3} | {1,3,4} |
| S1 | {1,5,6,9,2} | {1,5,9,3} | {1,5,9,4} |
| S2 | … | … | … |
| S3 | … | … | … |
| S4 | … | … | … |

The above table shows tha the source switch is S1 and the table shows the available paths for other end switches. Here {1,4,2}referes path between switches 1 and 2 is shown as S1 →S4 S2→ The S2S path table changes frequently for a particular time slot based on dynamic nature.
The another path table is Available resource table it shows the availability of resources for ex: bandwidth.

ART table

| links | Remainder T1 | Bandwidth T2 | T3 |
|---|---|---|---|
| <s1,s2> | 500 | 250 | 100 |
| <s1,s3> | 500 | 95 | 95 |
| <s1,s5> | 500 | 120 | 56 |
| <s1,s6> | 500 | 450 | 200 |
| <s2,s5> | 500 | 0 | 0 |
| <s2,s6> | 500 | 200 | 119 |
| <s2,s7> | 500 | 250 | 75 |
| <s2,s8> | 500 | 187 | 58 |
| <s3,s2> | 500 | 135 | 122 |
| <s3,s4> | 500 | 225 | 225 |
| <s3,s5> | 500 | 72 | 72 |
| <s3,s6> | 500 | 120 | 120 |
| <4s,s5> | 500 | 165 | 165 |

The above table shows that the available bandwidth for sending request it there is any problem in link it shows zero"0" that means noneed to send request in that link until it get ready. It shows three time slots T1,T2,T3
At every time slot it calculate the band width of the links.
Based on the two tables the path may be selected for transmitting the data flows.

### 3.2 Priority based Round Robin algorithm

Before we transmtting the data flows first select the data center when there is one data center in the network region it selects the data center and transmit the data flows through the network, when there is more than one data center in the same network region select the data center randomly it gives un satisfactory results. for avoiding this we prepose a prioritized round robin algorithm for selecting data center.

First we make an list of data centers in the network region and indexing the data center based on the priorities and finally apply the round robin algorithm for selecting data center.

Round robin the name indicates each data center share an equal time that is it allows the data center to transmit the data flows for certain time period when it it finishes or not and control goes to next data center it can be done in circular order.

For better understand the example of The process of round robin scheduling of data center in cloud as shown below.

Time quantum=150 sec.

| Data center | Arrial time | Processing time |
|---|---|---|
| DC1 | 0 | 250 |
| DC2 | 100 | 350 |

Here we apply round robin for two data center DC1 and DC2 and fixing ime slot for 150 sec. the two data centers are transmitting their requests based on round robin manner. If the time slot finishes the control may be taken by other data center.

| arival time | Data centers | Round robin |
|---|---|---|
| 0 | DC1 | Dc1 arrives |
| 100 | DC1,DC2 | DC2 arrives |
| 150 | DC2,DC1 | DC1out and DC2 proessed |
| 300 | DC1,DC2 | DC2 out and DC1proessed |
| 400 | DC2 | DC1 finished |
| 600 | …… | DC2finished |

### Round robin algorithm

Before we applying round robin algorithm first we make an index of the data centers bassed on the priorities of the data centers.

### PROPOSED SYTEM ARCHITECTURE

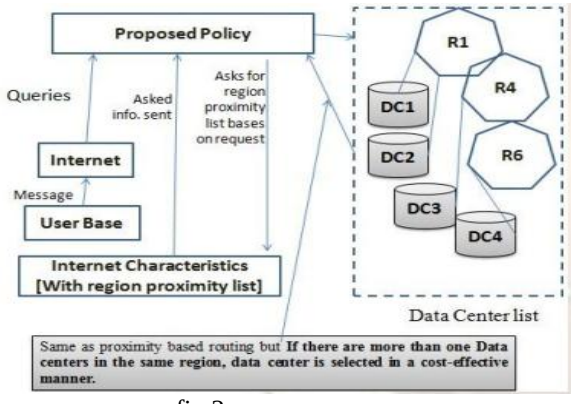
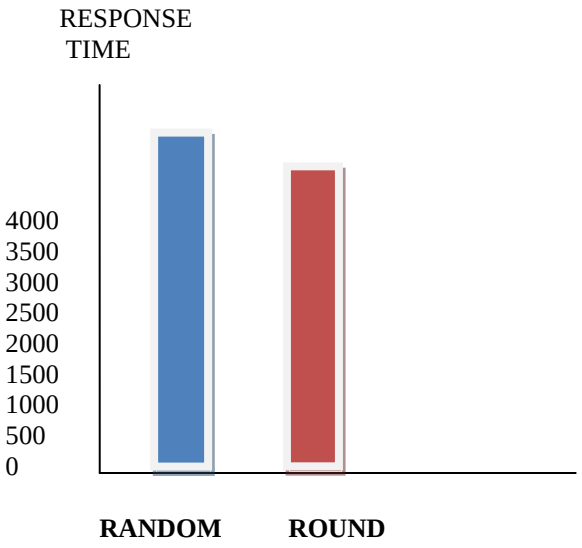



fig 2

## 4.RESULTS

The result shows our proposed priority based round robin algorithm outperformed than traditional random selection of data centers.




The above chart shows that the round robin algorithm for selecting data center is reduces the response time when compared to traditional random selection model.

## 5. CONCLUSION

In this, we conclude that the Dynamically Load Balancer Algorithm is used to balancing the work load in the data center network and also uses prioritized round robin algorithm for selection of data centers for which data center transmit the data flows firstly when two data centers at same network region. The DLBS algorithm calculate imbalance degree of the data centers and manage workload evenly by time slot by time slot to adapt changing nature of the network state. The choosing of the data center from data center index . these two aspects may lead to better performance and for reduction of response time. In future we implement this concept into open flow networks(fully populated network and fat tree network ..)

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