A Survey Paper on Dynamic Load Balancing in Software Defined Networking

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Abstract - Computer networking has scaled great heights in past few years. And traditional networks have failed the expectations of many of the people. People want quality of service and hence various network applications provide quality of service to customers. In this paper we try to balance load using software defined networking with the use of Ryu controller using mininet tool. Now a days a lot of data is send by various people using various networks. There should be no data loss and no there should be no delay in time taken for data transmission. We develop new mechanism for guaranteed latency requirements of those applications who give guaranteed delivery of data.

Keywords: controller, data transmission,, Ryu mininet, software defined networking.

I. INTRODUCTION

Data communication forms essential part of our lives. With the onset of new applications such as mobile, it has gained speed and also has recovery models. These applications have much more requirements and have large bandwidth and latency is also very good. Initially traditional networks have low rate of file data transferor used the technique of remote login. This was impossible when it came the use of data transfer on large area and it used the TCP protocol that is transfer control protocol. Now a days we use many protocols and they have a good security features and good rate of data transfer. The recent applications such as video on demand, cloud computing, big data etc. use various protocols and have more requirements for time and latency. They present better quality of service and take less time. This research algorithm takes into account the advantages and features of SDN, which can sense the state of each of the elements on the network in order to act consequently. In order to describe the algorithm, first it is needed to disclose the different data structures involved on it. Such structures characterize the different elements that have been taken in account in order to achieve an efficient load balancing, at the same time that to reduce as much as possible the computational cost and time. Video streaming requires sufficient bandwidth so that the receiver does not face the problem of buffering. They may have other requirements such as low jitter or low packet loss ratio. But this is not the case of big data transfer files. They don’t have a deadline for data transfer.

Traditional networks don’t provide quality of service for data transfer and communication. If we provide total capacity to fulfill the network applications then also they won’t be able to give the quality of service to the networks and to the receivers. Many scholars are working on this in order to provide quality of service in the traditional networks. But they are not able to achieve it. There are many reasons for this. Most prominent of all of these are proprietary protocols in the networks are fixed by the vendors and they can’t be changed by the receivers. They do this because they don’t want to expose the internal structure to public and they want to keep it close thus it makes the program difficult to manage and also the network is very difficult to manage. The network applications cant change the style to meet the requirements of end users. Here the problem arises Software defined network has proposed the new paradigm for computer networks. The other problem that we deal is that of latency. Data should be sensed and signals should be transmitted within the given frame of time so that the system works effectively. There are some factors that these packets have to be in a queue and at the same time there is a lot of traffic. The higher priority queue and switches are are to be allowed to go first. We can understand it in other words such as if bandwidth can be used by others if it is not used by the reserved traffic. But the priorities of the reserved traffic is high and hence there is no delay in control and sensor traffic in the congested network and routers and thus we are able to keep end-to-end latency in limit. New routing paths can be explored and these applications can use the concept of SDN. There are new transmission data for the transfer of data in big data transfer such as cloud computing etc. We don’t use one TCP protocol for the transfer of data but we use multiple TCP protocols to transfer the data effectively. We have a good knowledge about network topology and We have SDN controller that may be Ryu or Pox. Thus we can develop algorithm and hence can improve the overall throughput of the system and make the system more effective. Here we use few mechanisms to overcome the problems that have arisen due to traditional network system and provide better quality of service to selected networks. The main works of our project is

- Improve the quality of service to improve the demands that are associated with the bandwidth, We use SDN and monitor the status of the network and then set the path for bandwidth demanding traffic flows.
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- Provide quality of service to the devices that are sensitive to latency. Different class of traffic flows are adjusted and accommodated with different levels of traffic requirements.

II. LITERATURE SURVEY

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III. ARCHITECTURE

Multipath TCP and SDN is used in order to maximize throughput.

IV. IMPLEMENTATION

Here we have used a terminal so that we can issue commands to the operating system and in our case it is ubuntu. Terminal is much more powerful than graphical interface.

Photon is an interpreter, object-oriented language suitable for many purposes. It has a clear, intuitive syntax, powerful high-level data structures, and a flexible dynamic type system. Python can be used interactively, in stand-alone scripts, for large programs, or as an extension language for existing applications. The language runs on Linux, Ubuntu, Macintosh, and Windows machines. There are also a number of system-specific extensions. A large library of standard modules written in python also exists. Compared to C, python programs are much shorter, and consequently written much faster.
Mininet tool is installed by running the commands in the terminal such as `sudo apt get install mininet`. The other commands are `-sudo mn—custom/mininet.py`.

![Figure 6. Mininet topology](image)

Providing quality of service was not the aim of traditional networks but as the time passed by they became a crucial demand that can't be ignored. Many people have tried to put their efforts to improve the quality of service and at times they have succeeded in doing so but a lot still needs to be done. These requirements are given in Service Level Agreement that are provided by the clients to their customers.

![Figure 7. Ryu & mininet](image)

The performance of a network is measured by various parameters they are

- The bandwidth should be minimum. There is network congestion and link capacity in traffic streams. If here we give minimum bandwidth then the receiver will receive the required data.

- Latency should be maximum. It is the total time taken for the packet to travel from the source to destination. There can be various delays such as transmission delay, propagation delay, processing delay and delay in queuing. Thus these delay should be minimized.

- Packet loss ratio should be maximum. When there is any type of network congestion then the packets will be delivered with a delay. This type of delay mostly happens when buffering in any networking device reaches its maximum limit. We can rely on TCP for this however the packets that are dropped affect the congestion signal and hence result in delay of other packets.

- Jitter should be maximum. Jitter is the variance in the latency. Sometimes packet with different latency go in same traffic flow. This happens when network conditions change. This is not good and hence can affect the quality of the product.

V. CONCLUSION

We have analysed the traffic and have suggested various methods to overcome those. mininet tool is used with RYU controller. Bandwidth has been minimized and latency has been maximized. Jitter is also maximized. The network has been analysed through wireshark and graph has been plotted.

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