University of Sindh Journal of Information and Communication Technology (USJICT)
Volume 2, Issue 2, April 2018
ISSN-E: 2523-1235, ISSN-P: 2521-5582
Website: http://sujo.usindh.edu.pk/index.php/USJICT/

Model Valuation of MPLS utilization Physical and virtual Network on GNS3

Abdul Ahad Abro, Abdul Basit Abro, Mehwish Abro, Asad Aslam Siddique

Computer Engineering, Ege University, Electrical Department, Indus University, Electronics Department, Isra University, Network & Telecom Department, Muhammad Ali Jinnah University.

91150000622@ogrenci.ege.edu.tr, abrobasit@hotmail.com, mehwish.abro@isra.edu.pk, asad_a.siddiqui@hotmail.com

Abstract: The various Protocol Label Switching (MPLS) is an evolving technology which have value, efficiency and management quality. On the differing, traditional system inside part way steering contracts devastation the feasible acknowledgment of current activity manipulative approaches in inheritance IP systems. Virtualization of the system could simply be promising the system presentation and virtual system are logically linked with one physical mechanism so that data could straightforwardly be send and get info from one virtual device to the next system. The determination of this Paper is to examine the circulation of MPLS by means of physical and virtual systems. This Paper will demonstrate that MPLS could also be run on physical and virtual system. MPLS is consecutively nowadays to deliver LAN speed into the WAN.

Keywords: MPLS, Physical and virtual Network GNS3, Modelling.

I. INTRODUCTION

The inspiration behind this paper is to separating the MPLS system. MPLS system is alienated into two portions; Core network is utilized to link one side of the client end to alternative side. Cloud in the figure displays that the core system is be contingent on the virtual routers that linked in a mesh. [7] Using MPLS, we could upsurge the competence of the packet transitory over them [7]. Figure1 shows that MPLS can labor on both virtual & emulated network, while both strategies can work in a similar network by linking virtually with one another. Access network is a network when transportation examining starts from one side of the client End too other side. We will examines traffic routine on both virtual & physical system to confirm, which one would be finest to test.

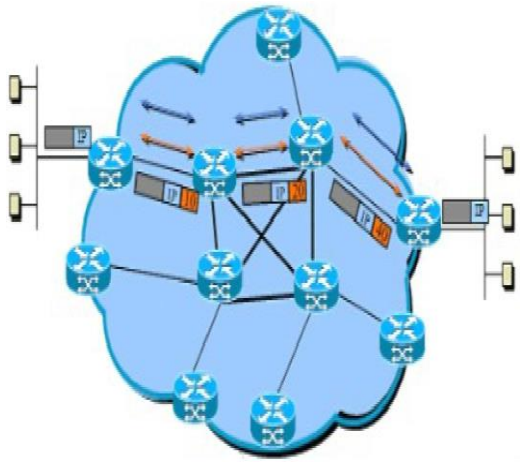


Figure 1: Working of MPLS

Traffic engineering, at its vital part, is the art of touching traffic about so traffic from a jam-packed connection is stimulated onto the unused capability on a dissimilar link. Traffic engineering is by no resources an MPLS-exact thing; it's a widespread observation. [2] Traffic engineering can be place into repetition by approximately as simple as modification IP metrics on interfaces, or something as diverse as running an ATM PVC full-mesh and re- optimizing PVC paths based on circulation needs across [2]. MPLS with TE is an exertion to obtain the finest connection-oriented traffic engineering methods (such as ATM PVC placement) and hitch them with IP routing. The theory effective is traffic engineering with MPLS can be as actual as with ATM, but deprived of many shortcomings of IP over ATM

II. VIRTUAL NETWORKING

Virtual networking is distinct as the network background in the virtual box. Virtual box cares eight virtual Ethernet cards for each virtual machine and it can be arrangement separately or as well as the hardware that will be virtualized. Virtual cards function according to the corporeal hardware on the host in the virtualization mode. Figure 1 shows the current working scenario of MPLS.

Virtual box delivers four network interface card and can be arranged through Graphical user boundary. There are various systems setting in the system Modes which delivers by Virtual box. Network Report translation is a method to interconnect

external network from virtual machine.it doesn't obligatory any configuration in the network on guest and host OS.

In bridged Networking, Virtual box does use the tool motorists of device to filter the info or data on host system from physical network adapter. It's also mentioned to as net filter implement drivers.
For interior networking, no predefine formation because it's created routinely in the network. There is no alteration in internal interacting and bridging networking only is sanctuary assistance for using interior networking. Internal networking and bridging networking, all VM can conversation information and statement with the external

Network. Host-only networking is the other networking mode which added in the Virtual Box. [9] It is often thought of as a central piece between the bridged and internal networking modes. [9] In linked networking, the virtual tackles will consider to one additional and also the host as if they are connected with the physical LAN switch. [5] Correspondingly, like interior networking but, Virtual machine must link to the physical interface to communicate with the outside network [5].

Generic networking is UDP channel networking mode documents interconnecting virtual machines consecutively on different hosts. This system can be done by condensing the frame into UDP/IP datagrams or packet which send and receive by the guest system card and send them on any available system.

Virtual Distributed Ethernet (VDE3) provisions numerous flavors in virtual system infrastructure network, providing across multiple hosts in a secure manner. Its achieve layer2 and layer3 switching, including STP, VLAN, VLAN tagging and WAN switching.

III. Related Work

Utilizing MPLS swapping process the correspondence might be enhanced by labeling of marks between OSI layers of Data-link and system that are supportive a few characteristics in Traffic Engineering. This Paper and virtual network because of increasing request of virtualization to reduce power and rate and ensure the dependability. The Traffic analysis and path protection could be shown in simulated environment while sending traffic from client end.

IV. Simulation

Testing and performance of Physical and virtual system by using GNS3. Mikrotik. Open software solutions and cisco platform execution the same scenario on GNS3. Mikrotik. Virtual Operating system are the leverage standard x.86 hardware can be viable alternatives to expensive proprietary solutions. Mikrotik open solution demonstrates that standard hardware at attractive price points can be one of the good platforms than a purpose-built box from a leading vendor, but it also provides enough processing headroom for expansion. [3] The structural economics of the open model provides users with a cost-effective way to scale performance. Another important benefit of Mikrotik open solution is that it decouples software from the underlying hardware and allows users to achieve software feature and service extensibility by leveraging thousands of Linux-compatible application packages that can integrate with the Mikrotik software [3].

I have used an x.86 machine (desktop/laptop) QUAD core to run Mikrotik virtual OS router by consuming GNS3 virtual box and all VM are linked with one another. On the other hand, I have used a Cisco router (GNS3) which is right connected to the other cisco router's Ethernet border to exchange the routing data. Figure 2, which showing the test topology used for testing of cisco and its performance. The subsequent are the hardware and software configurations on both the Mikrotik and Cisco routers:

A. Scenario 1 Physical Platform

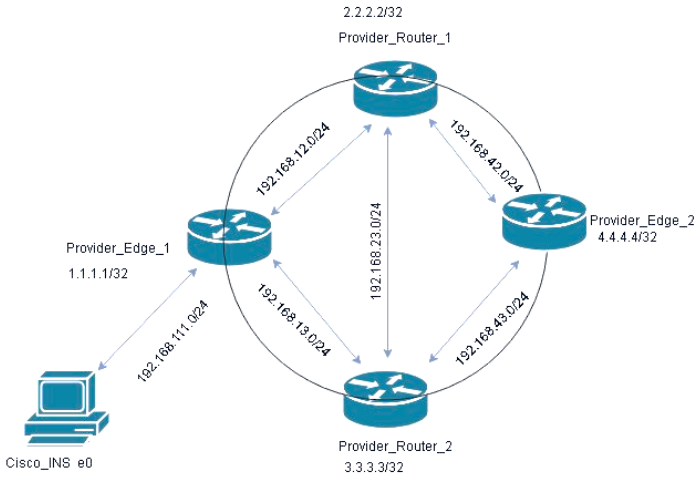


Figure 2: showing the test topology used for the testing of Cisco and its performance graph

B. Scenario 2: (Mikrotik Linux virtual platform)

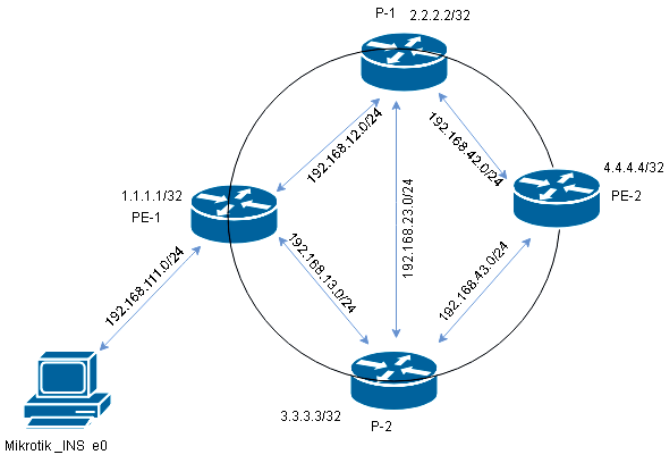


Figure 3: showing the test topology used for the testing of Mikrotik virtual OS and its performance

V. PERFORMANCE EVALUATION

Performance graphs apprehended on the checking server as a consequence of distribution packets from the foundation to the respective destinations. The topology used for the testing which is in figure 3, about Mikrotik virtual OS and its performance.

VI. THROUGHPUT

In physical network, data directed about 1Mbps and its start from basis that is traffic in which is fast Ethernet 0/1, peak traffic in is 752kbps but its usual is about 522kbps while traffic out which is fast Ethernet 0/0, figure 4, the peak throughput is 764kbps but its average is about 530kbps.

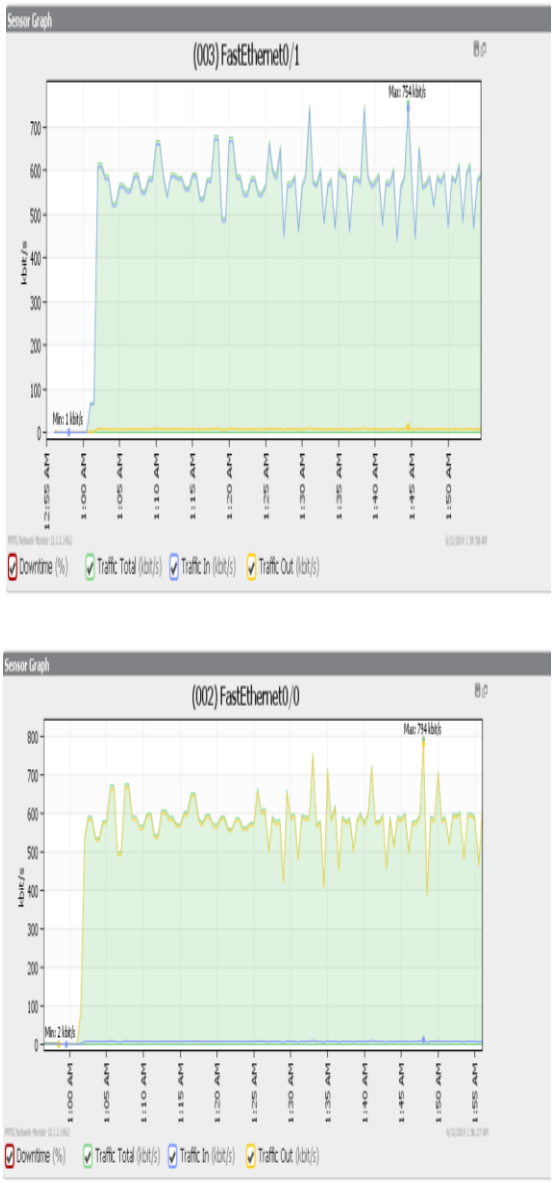
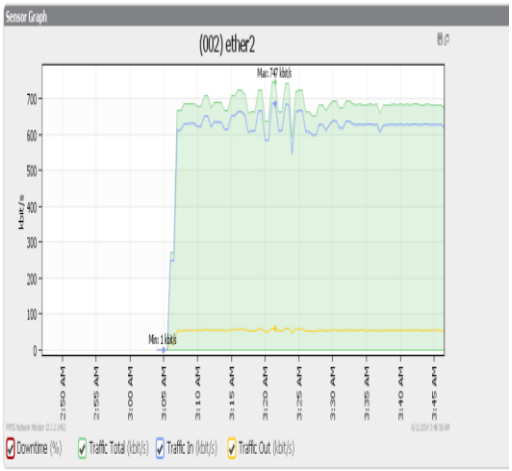


Figure 4: Throughput of physical network

In virtual network, statistics sent about 1Mbps and its start from source that is traffic in which is ether 2, peak traffic in is 748kbps but its average is about 642kbps while traffic out which is Ethernet 2, in figure 5, the peak output is 1021kbps but its average is about 575kbps.



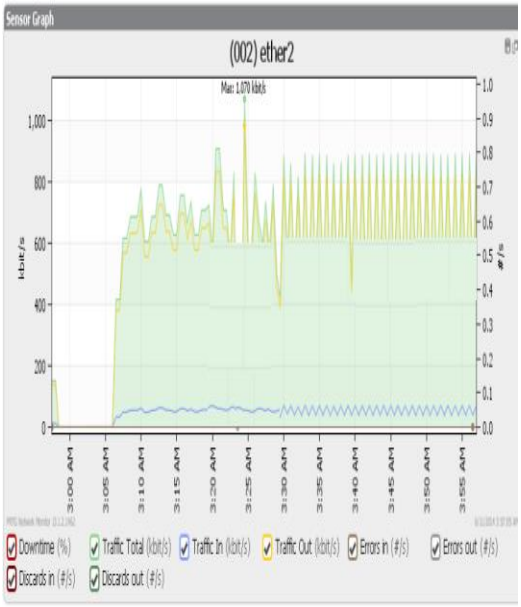


Figure 5: Throughput of virtual network

VII. DELAY

In physical system, information sent about 1Mbps and we initiate so much delay in that system because it's reached at maximum level that is 121msec and its minimum delay level is 30msec. The figure 6, shows the delay variations.

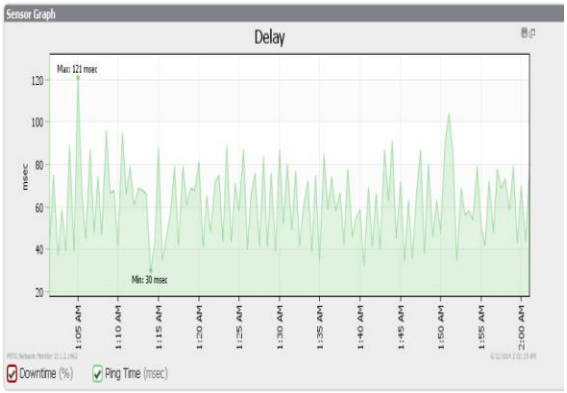


Figure 6: delay of physical network

In virtual network, data directed about 1Mbps besides we found so much delay in that system because it's reached at maximum level that is 8msec and its minimum delay level is 3msec.

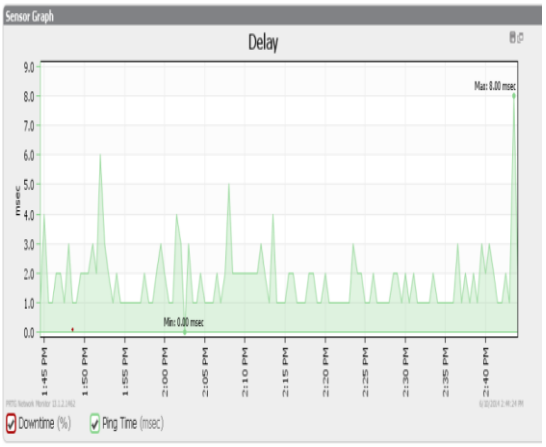


Figure 7: Delay of virtual network

VIII. CPU UTILIZATION

In Physical network, CPU use was directly shot up to 12% then it had been stable at 16%. It straight put impact on the hardware performance. The CPU utilization in figure 8, shows the changes in utilization of various aspects.

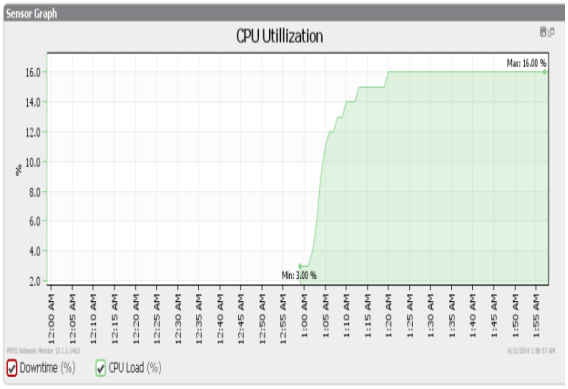


Figure 8: CPU utilization of physical network

In virtual system, CPU deployment was cumulative slowly from 2% then it had been stable at 5%. Figure 9, virtual network which directly put impact on the hardware performance.

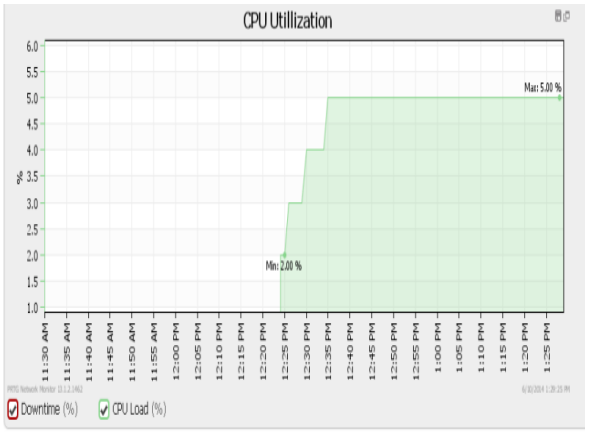


Figure 9: CPU utilization of virtual network

IX. CONVERGENCE TIME

In physical network, junction time taken place within a second but only initiate the difference in seconds that's 31second. The figure 10, represents the various convergence of physical network in two dimensional graph.

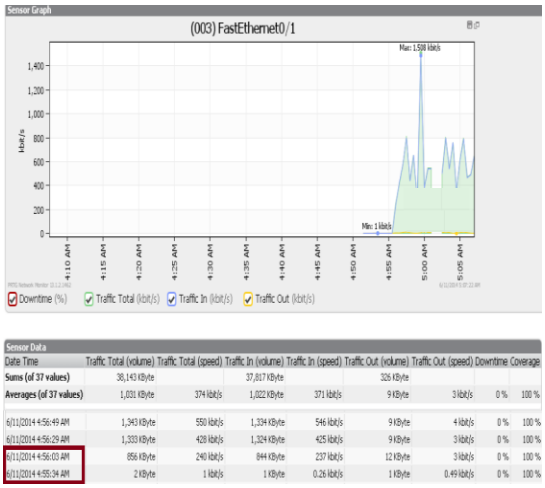


Figure10: Convergence time of physical network

In virtual network, convergence time taken place within a second but only originate the alteration in seconds that's 26second.

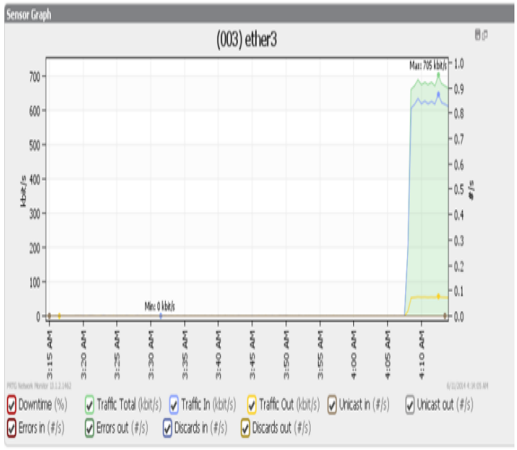


Figure 11: Convergence time of virtual network

X. CONCLUSION

The determination of this paper was to examine the better concert of MPLS either on physical or simulated network. The tested mechanism is that virtual & physical network can effortlessly be integrated and MPLS can be realized on both virtual & physical organizations of the system. The consequence shows of both physical and virtual system, bandwidth and delay could simply be optimized and have the same effect as the real situation. Virtual router helps to reduce physical hardware cost as well as the greatest supply operation and also less control consumed in the system.

XI. FUTURE WORK

Software Defined Networking (SDN) is a growing structure design that is functional, monetarily better, and adaptable, Showing it impeccable for the high-data transmission, and multicolor nature for the current prerequisite of the market application. This structural engineering mixed the system control and distribution capacities allowing the Network control to end up exactly programmable and the below foundation to be detached for provisions and system managements. The Open flow convention protocol is a base module for building SDN architecture.

XII. REFERENCES

[1] Igor Maravi´c and Aleksandra Smiljani´c on an High Performance Switching and Routing – "MPLS implementation on LINUX"Belgrade, Serbia,2012.

[2] Ashiq Khan, Wolfgang Kiess, David Perez-Caparros, Joan Triay DOCOMO Communications Labs Europe- " Quality-of-Service (QoS) for Virtual Networks In OpenFlow MPLS Transport Network" Munich, Germany, 2013.

[3] Wim Verrydt, Ciprian Popoviciu, **"**Performance Evaluation between IPv4 and IPv6 on MPLS Linux Platform", Cisco System 2010.

[4] Mohammad Aazam1, Adeel M. Syed2, Eui-Nam Huh3 "Redefining Flow Label in IPv6 and MPLS Headers for End to End QoS in Virtual Networking for Thin Client" Asia-Pacific Conference on Communications (APCC), Bali - Indonesia , 2013.

[5] Mahesh Kr. Powal, Anjulata Yadav, S.V. Charhate, "Traffic Analysis of MPLS and Non MPLS Networks including MPLS Signalling Protocols and Traffic Distribution in OSPF and MPLS" Indore, India: SGSITS, 23 Park Road, 2008.

[6] Haris Hodzic, Sladjana Zoric, "Traffic Engineering with Constraint Based Routing in MPLS Networks" 71000 Sarajevo, Bosnia and Hercegovina,2008.

[7] Sherry L. McCaughey, "Bandwidth for Next Generation IP MPLS Backbones" AT&T lab, 2012.

[8] Katia Sarsembagieva, Georgios Gardikis, George Xilouris, Anastasios Kourtis, "A Fast Route Planning Algorithm for MPLS-TE, Agia Paraskevi, Greece, International Conference on Telecommunications and Multimedia (TEMU),2012.

[9] Bernhard Thurm, "Service-Oriented MPLS Network Management in a Virtual Networking Environment" Institute of Telematics, University of Karlsruhe D-76128 Karlsruhe, Germany ,2013

[10] Xiaoling Sun " QoS of Next Generation Network Based on MPLS" IEEE International Conference on Information Science and Technology Wuhan, Hubei, China; March 23-25.