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EFFICIENCY NETWORK ANALYSIS FOR IP INVESTIGATE AND IMPROVE NETWORK PERFORMANCE

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Abstract:
The Experiment was done to find out network failures and application performance relationship over distributed Wide Area Net (WAN). In order to access related application over the cloud there must be an internet connectivity which will help the respective workstations to access the remote server for applications being deployed over the network. Bandwidth improvement helps in reducing utilization over the network and it also helps in improving Application Efficiency of these Applications in terms of Response Time. Routers were configured under Enhance Interior Gateway Routing Protocol (EIGRP) to reduce utilization and to ensure load sharing over the network. Three scenarios were modeled and their performance efficiency was evaluated. A modeled computer Network with and without a fail Router under different scenarios and such Network was simulated with emphasis on the Application Performance. The Experiment was done for fifty workstations under three scenarios and these three scenarios were accessed and evaluated on experimental basis using Riverbed modeler to show the Effect of Application Network performance. The performance results show that increasing the bandwidth reduces utilization and also with the failure of one communication bandwidth, users can still access Network Application with a minimal cost.

Index Terms: Wide Area Network, Enhance Interior Gateway Routing Protocol (EIGRP), Routers, Riverbed Modeler, Utilization .

1. INTRODUCTION

Network performance has been one of the key indicators that determined the quality of Service a vendor or an agency is rendering to its customers or the way and manner the network delivers based on the arrival of packet and other related components. Users of the said network complains more frequently about the efficiency of the network when it is not delivering the expected preambles to the masses, the masses would want to know why the said network is underperforming and hence this has called for the study to see how the network could be optimized to boost its performance in ensuring that quality of service is at its best. With high amount of data that are being injected into the network for service delivery has been the cause of a dwindling network hence the use of Riverbed modeler simulator to model and study the performance of a model network by measuring the key performance indicators based on traffic variation with respect to user behavior. To measure network performance quantitatively, several related aspect of the network are considered before drawing on any conclusions and such area would have to be studied for a period of time. Network application such as File transfer protocol(FTP), Hypertext transfer protocol(HTTP),Telnet, voice runs through the network and exponentially increase the packet injected into the network and these could result in high probability blocking congestion, etc. In field of computer science network performance comprises of the aspect of response time, loss, signal-to-noise Ratio. [11] In a high optimized network, the traffic pattern must be modeled in a way that will result in resource reservation and control certain parametric indicators to provide different priority to different application users.

2. RELATED WORK

Data Network is a telecommunication system which allows computers and other wireless systems to exchange data during transmission and most of the connections are established either by cable media or wireless media by the Respective Nodes within the circuit. The performance of such network must consistently be monitored in ensuring a very good indicator in satisfying the customer within the block. In pursuing the task of good performance, certain part of the network must be fine- tuned to meet the desire standard of the needed quality of service. The critical component in managing information effectively is by network optimization. Information technology is growing at an alarming rate with more and more application consuming a greater amount of bandwidth as well as producing larger volumes of Data from application of which majority of these data has to flow through corporate networks. These ad hoc growths add to the stress of already over stress network within the corporate platform. The situation is unlikely to be solved or improved as the rate of usage of computers is on the increase and there is no ending to that. The only workable solution is to improve the information technology platform and the management of data flow within the said company. Optimizing computer network starts at the intended work station and finds its way to the server farm until it is linked to the IP cloud or through the local area Network (LAN).[9] In order to increase the efficiency of the Network, certain applications need to re-engineered and also organizational process needs to be scrutinized internally in ensuring that people managing and using the network resource within the organization are doing so more efficiently. Comparatively the need for computer Network Connectivity over long distance from one another to the other was very eminent hence wide area network. It provides answers of tasks which are at the far end of the globe. Those remote networks allow users at the far end to access network resources. The ability for any computer network to exchange data in an automation mode is one of the essential mechanisms needed in a computer network. Wide Area Network is the first to appear, thus the joining of geographically distributed network at different location of the world. Based on the concept of WAN, many fundamental thoughts of ideology were introduced and expanded, hence the following Multilayer architecture mode of communication Packet switching Routing in heterogonous network. [8] With the continued decline in the cost of computing, there has been a dramatic increase in the number of independent computer system used for scientific analysis and these machines do not work in isolation and with their proliferation comes a need for suitable communication network, particularly computers that can interconnect in a distributed computing system.

3. METHODOLOGY

Primary and Secondary data were sampled using unstructured interviews with Network Application users and Technical Expert in Networking Domain such as System Administrator, Switch Engineers and Telecoms Managers to determine, analyze and improve on the ideas of network failures and application performance in application protocol layered. The behaviour and performance analysis of computer and Telecommunication Network can best be investigated by the used of Simulation and analytical study or Both.Preferences are given to simulation when studying the behaviour of a specific network covering a specific area of topology.In this research, the study of network performance and its failures is base solely on computer simulation and Event Driven Simulator by the use of Riverbed modeler.The Focus was load balancing and Link Utilization to see the Generalised impact on the Network with respect to how the

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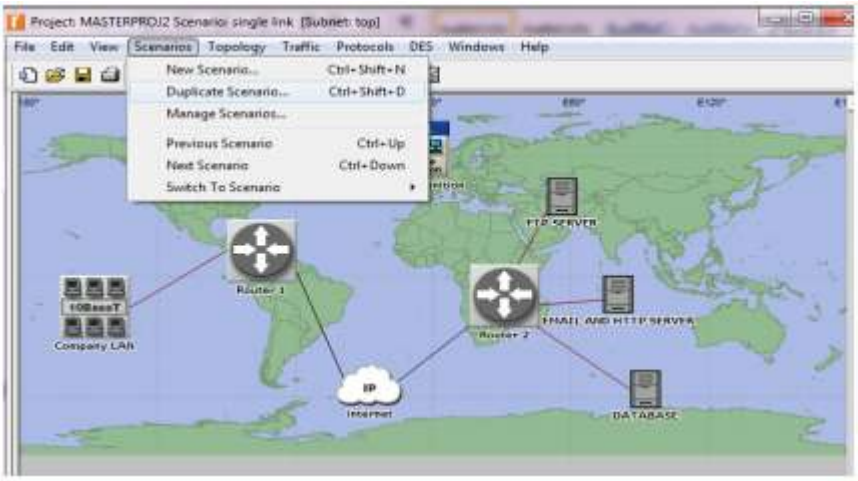

Fig.1. Network model with TI Link connectivity

Applications deployed will performed. Riverbed Modeler is one of the leading simulator being used in the Academia as well as industrial Research to design and to study the performance of communication network, Dvices, Application Protocol etc.It helps in accelerating research and development in industrial and Academic Setup. Riverbed Modeler Support most of the Network Designed and allows you to answer question that cannot be answer through visual inspection.The Benefit that goes with the used of Riverbed Modeler are as follows Reduce Time-to-Market i.e it helps you to confirmed the Design ahead of Time by Designing and Validating the Network Architecture. Product Quality Improvement:It helps to test the performance index of any product or component for the customer to know the reality of it before production. Boosting Network Research and Development (R&D): The workflow involve in building a comprehensive network for its performance to be access must go through a scenarios in order to ensure that an accurate Report is assured.

4. RESULT DISCUSSION

The server model on the Ethernet represent server mode with respective Server Application working over UDP/IP and TCP/IP. It support 10Mbps, 100Mbps and 1Gbps.The Link Data rate determines the operating speed. The Ethernet card can be made to operate in either full or half duplex. A constant amount of time is required to route each packet as determined by the forwarding rate of the internet protocol (IP).It

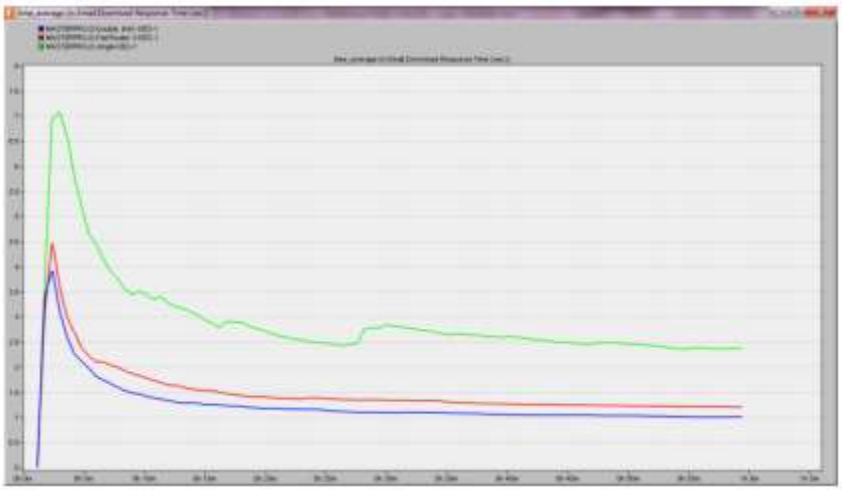

Fig.2. Email Download Response Time

could support various forms of services such as Emails, File Transfer Protocol, Hypertext Transfer Protocol(HTTP). A Router is an Information Technology Device that connect and forward data packet between computer networks. They usually connect two or more Data lines from different sources. The Router accepts incoming Data and set to reads it Destination for onward Transmission. The Router Employ over here is ethernet4_slip8_gtwy node which is an IP base supporting for Ethernet Hub and Eighty Serial Line interface.

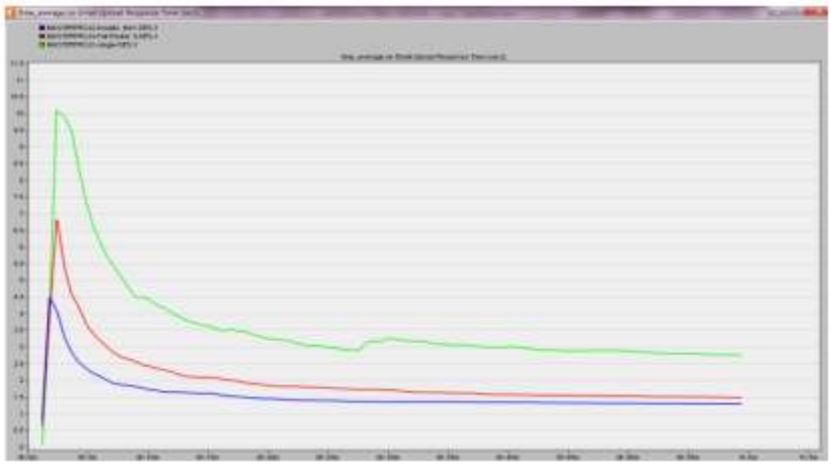

Fig.3. Ftp Upload Response Time

Network configuration is the process involve in the altering of some key parametric figures of the component and the element being used on the network to meet certain criteria and objectives. In this our Network, the only thing to change and to specify is the Application that will support different Profile configuration for each scenario in each context. In the event of the simulation a packet size of 1MB(Low),5MB(Medium) and 10MB(High) were imposed onto the network with a varying link speed(Switching speed) of 500Mbps,1Gbps as well as 1.5Gbps were set between the Routers and the cloud to see the performance effect on the network per the selected matrices. The simulation experiment was run for ten consecutives times with one hour simulation period and the results taken for the first Ten minutes and the last Fiftieth minutes. The procedure employed in achieving the results is that, a load factor is configured and is held constant for the network whiles varying the link speed to see its behaviors graphically for all the scenarios in contention. The Graph is of axis of simulation time as against Bit response. At an interval of 10th and 50th minutes of simulation time, the corresponding bit response is taken for each scenario hence the various figures in the application tables for all the deployed application within the network. These procedures are repeated for all packet size of different application within context to get the needed results.

CONCLUSION

In this global era, understanding the performance of network is characteristically critical to emerging world that are so incline to technological platform. Client population and global network characteristics must match in demand levels at any point in time. User experience must not be affected whenever there is a failure within the network. Service level agreement must be a key factor in ensuring network availability of 99.90% at all times even if additional funds will be required to improve the performance efficiency. Network failures could cause network degradation which will affect the user so badly hence trying to provide different routing route for transmission should anything happens at the other side of the ring topology. Alternatives must always be provided in making sure that total failure does not occur. We modeled a computer Network with and without a fail Router under

different scenarios and such Network was simulated with a deep closeness on the Application Performance.

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