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   HYPOTHESES

   RESEARCH METHODOLOGY

   RESULTS & DISCUSSION

   FINDINGS

   RECOMMENDATIONS/SUGGESTIONS

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JOURNAL AND OTHER ARTICLES

- Schemenner, R.W., Huber, J.C. and Cook, R.L. (1987), "Geographic Differences and the Location of New Manufacturing Facilities," Journal of Urban Economics, Vol. 21, No. 1, pp. 83-104.

CONFERENCE PAPERS

- Garg, Sambhav (2011): "Business Ethics" Paper presented at the Annual International Conference for the All India Management Association, New Delhi, India, 19–22 June.

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EXPERIMENTATION IN OSPF MULTIPATH ENVIRONMENT WITH OPTIMAL INTERFACE TIMERS

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ABSTRACT

Routing protocols are key elements of modern communication networks. Currently deployed dynamic routing protocols that are used to propagate network topology information to the neighboring routers are Routing Information Protocol (RIP), Enhanced Interior Gateway Routing Protocol (EIGRP), and the Open Shortest Path First (OSPF) protocol. The choice of the right routing protocol depends on a number of parameters. In this research, we used OSPF simulation via OPNET Modeler to design a model, which will experiment with reducing interface hello / dead intervals to see the impact on qulaity of VoIP calls going via loadbalanced, multi-path OSPF environment. In the end of the research it is found that there are considerable effects of reducing OSPF hello timers for achieving faster convergence in case of link failure.

KEYWORDS

VoIP, OSPF, Timer tuning, hello-interval, dead-interval.

INTRODUCTION

There are many different IGP protocols to choose from but OSPF is chosen due to its scalability and robustness. VoIP is sensitive to delays and variations in the delay, thus the packetdrops directly impact the voice calls.[1] During link failure the layer ½ recovery mechanisms may take longer or are stuck sometimes and thus can't be relied on solely. Thus the layer 3 protocol link failure recovery must also be used for the fast reconvergance and change of routing table in network domains. The data available on the OSPF and VoIP is already enough and a lot of research has been done on these topics.

In this research furthering the work by tuning OSPF timers to reduce the link failure recovery time so that the impact on VoIP sensitive traffic could be reduced. Also it is aimed to use OPSF as the protocol of choice as it is open source, robust and scalable, in previous researches scholars have already done much work in the nature of the IGP protocols and their effect on the VoIP. [4] But, so far there has been no research on correcting or recovering the link failure with help of varying the protocol timers. With protocol timers reduced to less and less values there is tradeoff of hardware and bandwidth resources but the tradeoff could be maintained for the benefit of the recovering from link failure on the neighbor router and this re-routing all the packets from the functional link.

We are investigating the different scenarios based on the different dead-interval and hello timer values, by default OSPF have 10 seconds hello interval and 40 seconds as dead interval. However, for the Voice traffic which is sensitive to delays and packet drops the multipath/load balanced environment is still not sufficient enoughif a router comes to know about the neighbor link down in 40 seconds, our model tries to find the optimal value for which the dead interval could be reduced to the level where the BW & CPU utilization along with the link failure detection could be balanced.

RESEARCH MOTIVATION

The motivation to reduce the impact on VoIP is coming from the fact that OSPF in itself is quite flexible protocol and has many features which can be configured to optimize the performance of the protocol depending on the network conditions. [2] VoIP is already known to be prone to the variations and packet drops and BW availability issues, we are here researching into reducing the dead interval between two routers on the same subnet so that the rerouting oftraffic on the other available links could be done within 5 seconds or less. In real world scenario it is possible to reduce the hello interval to milliseconds and thus also reducing the dead interval indirectly.[5] Here, we are working with OPNET to reduce the hello interval so that the dead intervalstays at least 3 times of the hello interval. OPNET has one limitation, it cannot simulate the hello / dead intervals in sub-seconds thus we can only go as low as 1 second. The main aim is to cut the packet loss to as much low possible value.[6]

THE SETUP

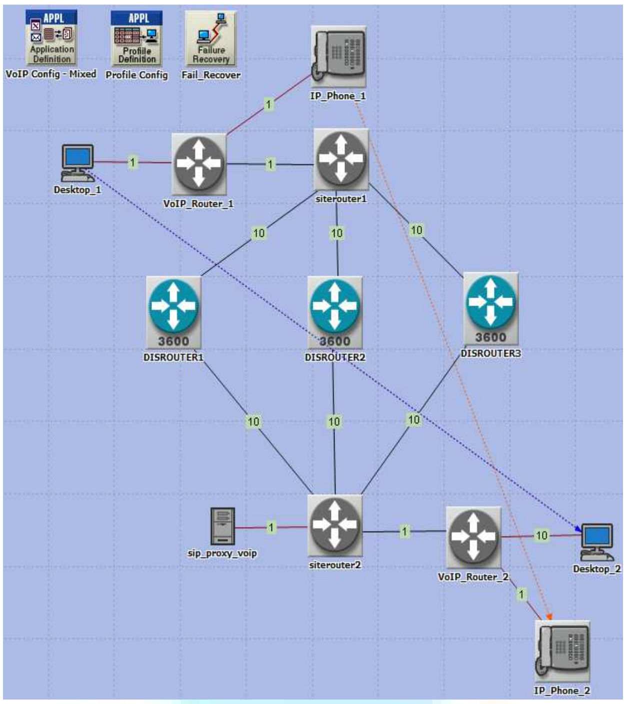
The test network in the project is made with generating a demand link for VoIP traffic through OSPF multipath network. There are two desktops with Voice over IP and File transfer applications configured, also network consists of two IP telephones to have consistemt stream of VoIP traffic across the network.

Desktop 1 and 2 also generate application traffic (ftp, http) to allow for comgestion and contention in network so that the link utilization could be regular throughout the simulation. Siterouter 1 and 2 are sitting at the edge of two far sites and are handling data / voice routing for the two customer sites. Siterouters connect to VoIP routers which are connected to provide call processing and Quality of Service features to the VoIP traffic, in our case we are using simple proxy server for managing Session Initiation Protocol calls across the network. Sip_proxy_server is connected to siterouter 2 and is managing the calls generating from desktop and IP telephones as well.

The green numbers on the link in diagram below represents the assigned cost metric to the link and the core of the network consists of the equal cost paths so the the traffic could be load balanced at the middle of the core. Other elements in the network will be explained in detail in next section, Application Configuration, Profile Configuration and link failure / recovery are 3 elements which define, apply and run the traffic in network and manage when the link outage would occur during the simulation.

The SIP Proxy Server accepts registration requests from SIP endpoints such as IP telephones, residential voice gateways, and PC applications, creating a dynamic record of the endpoint's current contact address. Static registrations can also be configured directly on the Cisco SIP Proxy Server. When the Cisco SIP Proxy Server receives a SIP "Invite" (call setup) request, it searches its registry to locate the desired endpoint. If no match is found in its registry, the Cisco SIP Proxy Server can use external Telephone Number Mapping (ENUM) or location request (LRQ) queries, or locally configured static routes to determine where to forward the request[3].

FIGURE 1: OSPF LINK COST

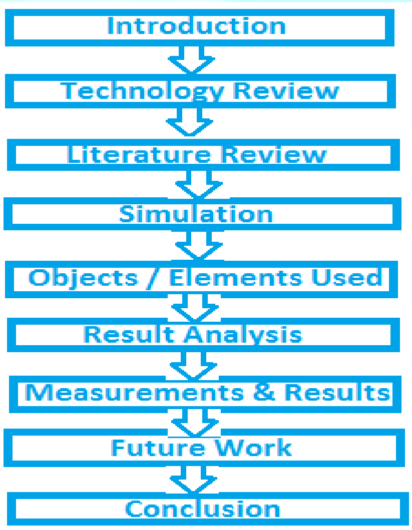


METHODOLOGY OF RESEARCH

In this research the method adapted is of reviewing the underlying technologies, thoruoughly investing the details of VoIP, Routing Protocols, OSPF parameters, Link Failure and Recovery methods, multi-path and load-balanced networks followed by the literature review in form of previous work done in the similar field. At least 8 different previous works have been studied to find out what has been done so far and what more could be added to the existing knowledge of VoIP services over OSPF multi-path network.

Literature review is then followed by the simulation section in which test network has been simulated by changing multiple variables in four different cases, each case is unique in the terms of OSPF hello and dead intervals. VoIP parameters such as Packet Delay variation, Jitter and MOS values have been measured in each section.**[8]** VoIP demand paths have been assigned ot the end devices to simulate voice traffic whereas the background traffic in form of (ftp, http applications) is simulated to have compartive bandwidth as in real-time scenarios. Although VoIP could utilize securoty measures which could affect the quality of VoIP but this research is excluding security measures to focus on routing optimization alone.[7]

FIGURE 2: METHOD AND SEQUENCE USED



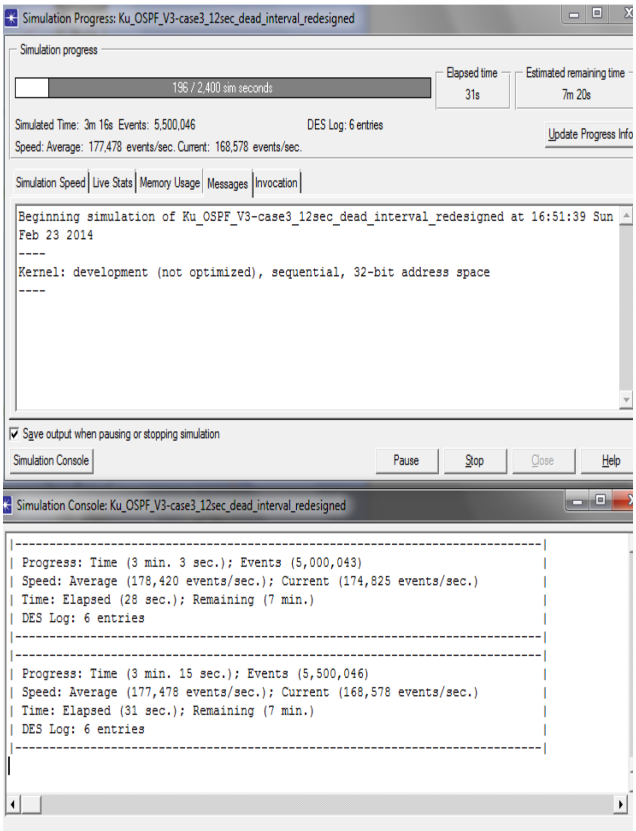
In simple break down analysis of the network topology designed for testing the VoIP connection was done in the research process and inclusion of results section in thesis work, and then moving further, a brief introduction of Elements/Objects used from OPNET pallete will be given with configuration details. Also the demand paths and load-balance design will be described along with the OSPF timer settings.

SIMULATION DETAILS

From figure 1, Siterouter1 & 2 connect to Distribution Routers which are managed by Internet Service Provider and is connected in load-balanced fashion, all the links going from sitrouter 1 & 2 towards 3 distribution routers are of equal OSPF metric 10 and the routers are configured for loadbalancing the incoming traffic. Distribution router 1,2 and 3 are of higher capacity (Cisco 3600) than site routers.

Scenario configuration is followed by simulation of the whole scenario with all the traffic steams, application and profile settings, link failures and laodbalancing. Diagram below shows how the simulation run time looks like and is providing woth information about name of the scenario plus detail of each task been processed, this run time information is important some times to troubleshoot the simulation.

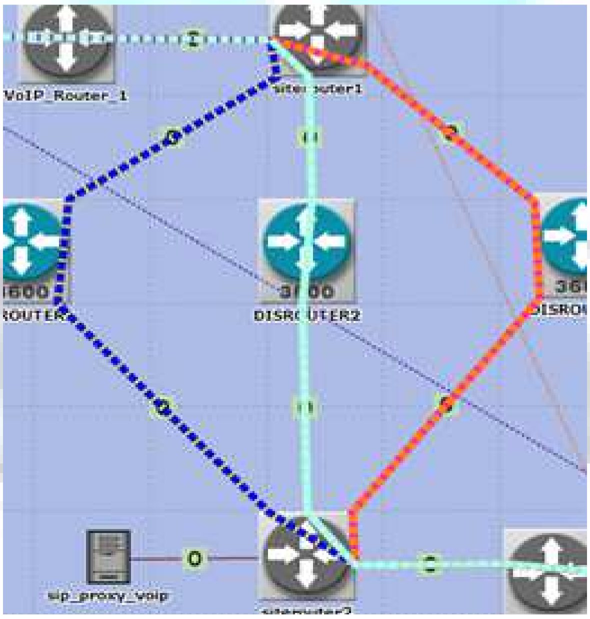
FIGURE 3: SIMULATION RUN



Each simulation takes about half time of the real time, time elapsed during simulation is called simulation time in OPNET. So each simulation time = ½ real time in this case, this time varies depending on the complexity of scenario configuration and network elements used. Other features of OPNET such as Flow Analysis allows us to check the routes from one node to another and helps to verify if the loadbalancing and interface metrics have been configured properly, diagram below shows us how it looks when the equal weight load-balancing is configured properly.

In the next diagram to follow, figure 4, blue, green and red lines shows the various paths OSPF routing is providing to traffic coming from end devices at site 1 to end devices at site 2. During the simulation links between siterouter1 and distributions routers 1,2 and 3 will fail within some intervals and we could see the effect of the link failure in the graphs, links between routers will fail in sequence from site router1 → distribution router 1, site router1 → distribution router 2 and site router 1 → distribution router 3. Link between site router 1 and distribution router 1 will come back up before the link between siter router 1 and distribution router 3 will go down thus providing the consistent links between end devices. Simulation run for different scenarios will be same except the difference in OSPF timers.

FIGURE 4: ROUTE CHECK BETWEEN DESKTOPS



MEASUREMENTS & RESULTS

As discussed earlier in thesis now we are going to discuss the four different scenarios, with the same topology and elements and same IP routing protocol running (OPSF) along with load-balancing only difference each case have is OSPF interface timer. Following table shows the differnece of timers in differenct scenarios along with other parameters:

TABLE 1: SCENARIO COMPARISON

Scenario	Dead Interval	Hello Interval	Link Utilization	CPU
Case 1	40	10	Minimum	Normal
Case 2	20	5	Medium	Medium
Case 3	12	3	Medium	Medium
Case 4	8	2	Maximum	High

ASSUMPTIONS

- Decreasing dead interval should help
- Multipath is good but when fail occurs what is response
- Fine tuning of ospf for faster recovery
- Methods available for fast recoveries

EXPECTED OUTCOMES

- Trying to find optimal value for hello / dead interval
- Support VoIP in multipath OSPF environment (about VoIP little intro again)
- Rapid link failure recovery
- Least delay / jitter / delay variation in VoIP call [8]
- Faster switching over of the traffic from multiple links to the single working link
- Effect of increased hellos and dead-interval increase

Scenario 1: case1_40sec_dead_interval_redesigned

Scenario 1 has 4 end devices (2 desktop PCs, 2 IP Phone), with voice demand paths created between them. There are 2 voice routers, 2 siterouters and 3 distribution routers in middle layer, all the traffic will be load-balanced on all three distribution routers. The OPSF link cost is configured as 10 and all the the links between siterouters and distribution routers are kept same. Links will fail one after other at fixed intervals and before failure of the last link between siterouter1 and distribution router 3, the link between siterouter 1 and distribution router 1 will come up.

This configuration will stay same for all the 4 scenarios and only hello and dead time intervals will be modifed as given in table 1 above. For VoIP application profile is configured and codec G.711 is used for sending/receiving voice. Links will fail at 200, 500, 600 seconds respectively between site router 1 & distribution routers 1,2,3. Profile configuration assigns the voice traffic to IP phones and voice traffic and file transfer + http traffic to desktop PCs.

Also as 600th second link between siterouter 1 and distribution router 1 will come up, so that there can be consistent link between 2 sites. Thus most of the changes in the following graphs are expected to be within first 600 seconds and near to the link failure and recovery points. We will see one by one in each case how the link failure and recovery has influenced parameters related to OSPF and VoIP duign link fails and recoveries. Instead of delving into all the graphs for each scenario, only the comparative analysis of 4 scenarios/cases will be shown in this paper.

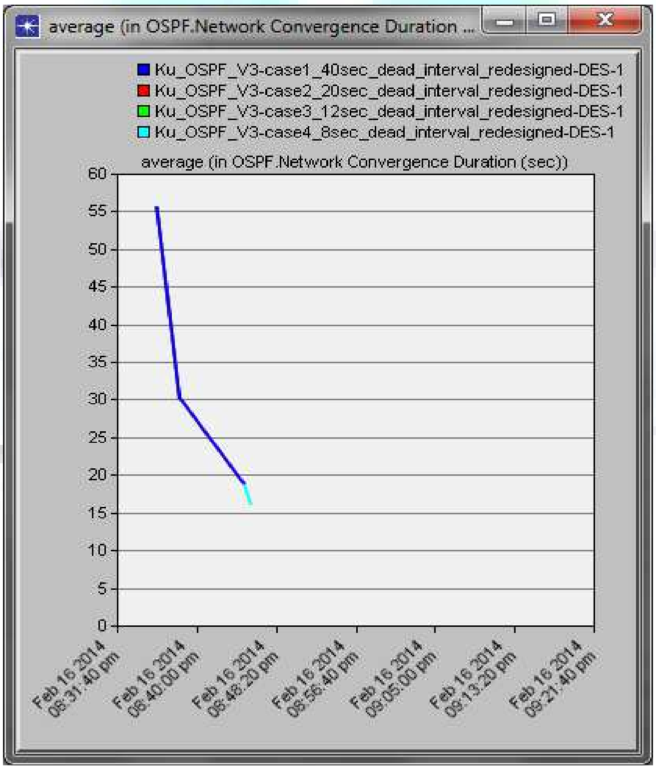
CASE 1 – 4 COMPARATIVE ANALYSIS

From the simulation results in thesis it seems that results are deviating and favoring scenario 2 more, scenario with smallest hello interval (scenario 4) was expected to show better performances on the basis of aster convergence speeds in case of link failures but it seems like the links under high utilization could not support fast hello traffic, in case of ethernet or high capacity links the reduced hello interval could perform much better than on low capacity or congested links.

Following graph shows comparative analysis of scenarios 1, 2, 3, 4 for OSPF Network Convergence time, OSPF hello traffic, Jitter, and Packet delay variations. This comparison will show visually how the different scenarios differ in performances. Scenario names are:

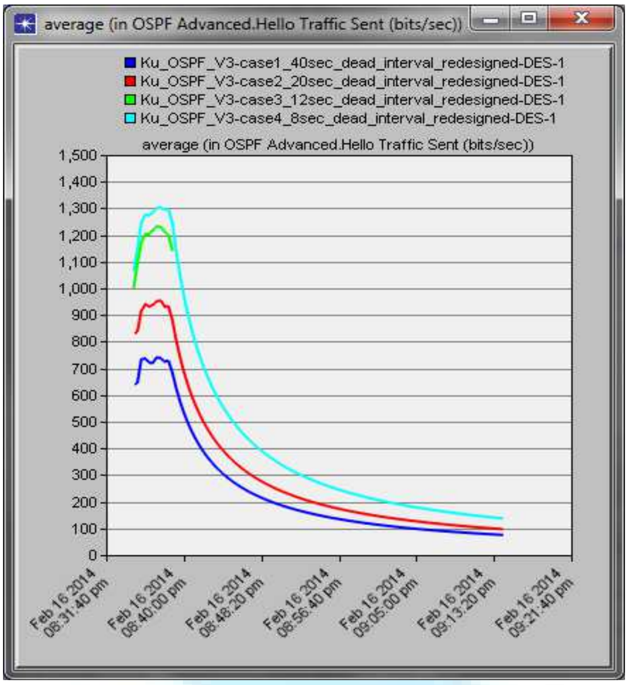
1) *case1_40sec_dead_interval_redesigned*
2) *case2_20sec_dead_interval_redesigned*
3) *case3_12sec_dead_interval_redesigned*
4) *case4_8sec_dead_interval_redesigned*

FIGURE 5: NETWORK CONVERGENCE TIME COMPARISON



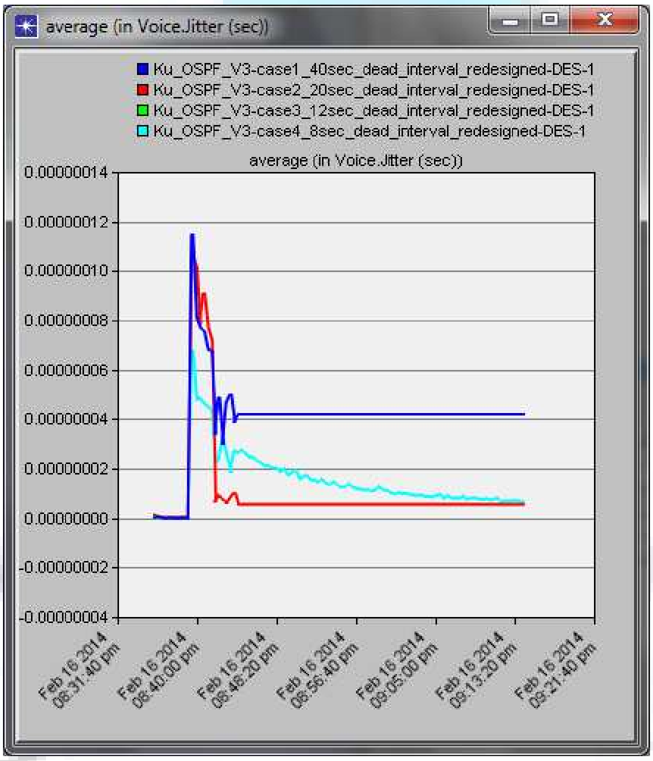
From the above graph in figure 5, it seems that all the scenarios have almost similar fall of convergence times, in fact the best convergence time for first 3 scenarios are reaching 20 secs, only for scenario 4 with reduced hello interval graph is approaching faster convergence time of 15 secs.

FIGURE 6: OSPF HELLO TRAFFIC SENT COMPARISON



As it can be seen from Figure 6, OSPF hello traffic sent increased in initial phases of network simulation, increase in hello packets is directly related to the increased frequency or decreased hello / dead interval.

FIGURE 7: JITTER COMPARISON



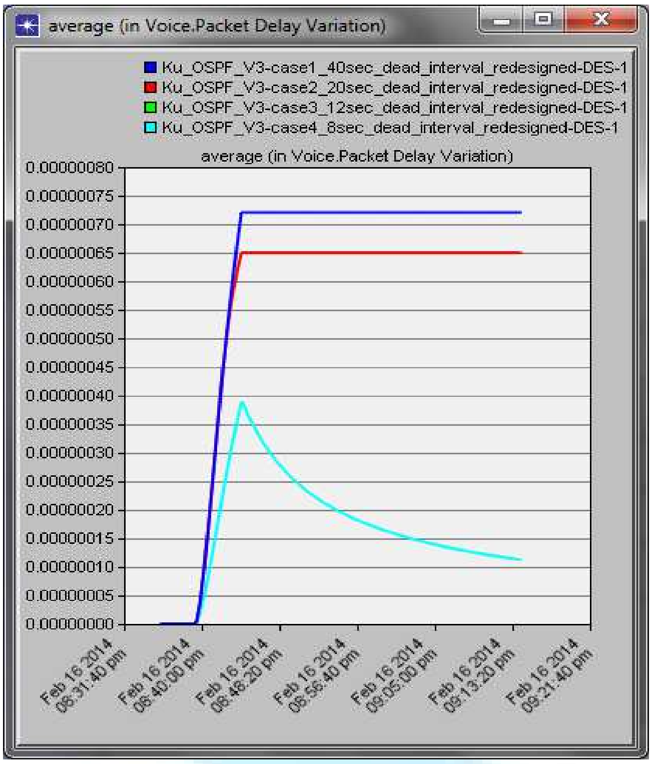
From the Jitter comparison in figure 7, it is clear that the best performance could be seen in case 2 respresented by red lin in above figure. Jitter stayed least for the case 2.

As name suggests packet delay variation is simply measure of deviations from the baseline or some preset / baseline delay on link, when delay increases or decreases from this base delay then delay variation occurs in VoIP calls. From figure 8 it as be seen that the delay variation stayed least in scenario 4.

TABLE 2: SCENARIO COMPARISON

Scenario	Hello / Dead (secs)	Convergence	Hello Traffic (bps)	Jitter	Variation
Case 1	10/40	20 secs (min)	700	Maximum	70+ (max)
Case 2	05/20	20 secs (min)	900	Medium	65 (max)
Case 3	03/12	20 secs (min)	1200	Least	60 (max)
Case 4	02/08	15 secs (min)	1300	Medium	40 (max)

FIGURE 8: PACKET DELAY VARIATION



From the results comparison in table 2 we see that case 4 has the best score, case is second best. Thus it can be proved that when done under controlled and bandwidth calculated envrionment OSPF with reduced hello / dead interval can perfom well for VoIP calls.

CONCLUSION

During preparation, reading literature and planning the research it was always a question if the experiment results would be proving any of the assumptions made, but in the end the comparative study made it clear that there are some considerable improvements in the VoIP parameters.

OPNET is bit tricky in the begining and hard to master and use to its full potential, there are so many options which needs comprehensive study of the tool itself. The results obtained in the anyalysis clearly shows that reduction of interface timers and forcing the topology to converge faster has implications of incresed lin utilization and faster and sharper convergence as well.

There has been considerable improvement sin delay variation and also in Jitter (case 3), if the parameters of VoIP could be affected in this way then it is for sure that further modification in this direction could bring better VoIP experience to end users in future.

FUTURE WORK

We have seen that using PPP DS3 links in OSPF multipath environement we get significant performance improvement for Voice over IP calls, but still it is observed that the link capacity was not enough with DS3 links, as there were high number of packet drops in case 4. The same work could be done in higher link capacity environment such that ethernet and then results could be compared with the results measured in this research.

Also applying congestion control mechanisms along with the reduction of interface timers could show very improved results, this also could be made basis of the next research paper. There are queing mechanisms and also DiffServ and RSVP methods which could be applied for congestion controls or prioritizing the specific traffic such as routing protocol control traffic.

REFERENCES

1. B. Fortz, J. Rexford, and M. Thorup, “Traffic engineering with traditional IP routing protocols,” **IEEE** communicationsMagazine, vol. 40, no. 10, pp. 118–124, Oct. 2002.
2. A. Feldmann, A. Greenberg, C. Lund, N. Reingold, and J. Rexford, “Netscape: traffic engineering for IP networks,” **IEEE** Network Magazine, vol. 14, no. 2, pp. 11–19, Mar. 2000.
3. Cisco. *Cisco sip proxy server data sheet*. (2004) Retrieved from http://www.cisco.com/c/en/us/products/collateral/unified-communications/sip-proxy-server/product_data_sheet 0900aecd800f3968.html
4. B. Fortz and M. Thorup, “Optimizing OSPF/IS–IS weights in a changing world,” **IEEE** Journal on Selected Areas in Communications, vol. 20, no. 4, pp. 756–767, May 2002.
5. Ganguly, S. , NEC Labs., Princeton, NJ Navda, V. ; Kyungtae Kim ; Kashyap, A. ; Niculescu, D. ; Izmailov, R. ; Sangjin Hong ; Das, S.R. (2006). Performance optimizations for deploying voip services in mesh networks . Selected Areas in Communications, **IEEE** Journal on, 24(11), 2147 - 2158. doi: 10.1109/JSAC.2006.881594
6. Performance Evaluation of Packet Loss Replacement using Repetititon Technique in VoIP Streams, International Journal of Computer Information Systems and Industrial Management Applications (IJCISIM), ISSN: 2150-7988 Vol.2 (2010), pp.289-296
7. Sonkar S, Singh R, Chauhan R, Singh A, A Review Paper: Security on Voice over Internet Protocol from Spoofing attacks, International Journal of Advanced Research in Computer and Communication Engineering Vol. 1, Issue 3, May 2012, 2278-1021
8. Cisco Support, *Understanding jitter in packet voice networks (cisco ios platforms)*. (2006, February 02) Retrieved from http://www.cisco.com/c/en /us/support/docs/voice/voice-quality/18902-jitter-packet-voice.html

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