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Packet Reordering Algorithm for Communication Systems

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Abstract - Satellite links are going to play a vital role in the deployment of ubiquous broad band systems. Non- Geostationary (NGEO) satellite communication systems are more advantageous than terrestrial satellites. This paper presents an exchange of information on cooperation status among neiboring satellites. The new explicit load balancing scheme is used to avoid congestion and packet drops at the satellite. A TTL based algorithm is used for packet reordering.

Keywords - Latency, Packet reordering, New Explicit load Balancing, Packet Drops, Inter Satellite Links, Congestion Status.

1. Introduction

The next generation internet will have a large number of very high bandwidth links. Satellites and wireless links with high latency plays an important role for ubiquous communication in the next generation communication system.

Non – Geostationary satellite communication systems are far better than terrestrial and geostationary counterparts. The ongoing research is going to find out efficient algorithm for congestion control in satellite communications. Future NGEO satellite uses will be focused more on the globe. This is because of geographical or climate constraints. The density variance identified here, along with the highly dynamic feature of NGEO constellations, will yield a scenario where some satellite links are congested while others are decentralized.

2. Meterials and Methods

The feature internet will have a large number of very high bandwidth links. For interactive internet applications LEO satellites will be used due to shorter round trip delays. Many LEO satellites constellations include direct inter-satellite links in order to provide communication paths arrange satellites.

In the present scenario, a number of LEO, MEO and GEO[1] satellite constellations have been proposed to provide brad band services. With the help of on board processing technologies, satellites are now able to provide full two-way services[2].

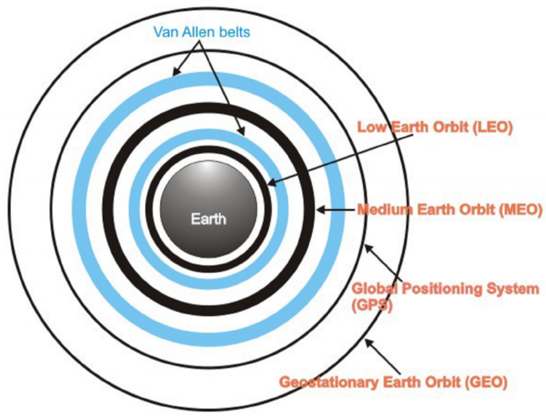


Fig.1. Different satellite Constellations.

The Ka band supports broad band multimedia communications [3][4]. V-band with 51.4 G.Hz and millimeter wave with 76 G.Hz frequencies will enable scalable mobility and ubiquous connectivity across the globe, the work proposed by Esaci and Bender[5] considers ISL's as a variable length and each satellite decides on the neibouring satellite to find the shortest path. Present researchers goal is on the constellations made of multi Non-Geostationary satellites like LEO and GEO[6]. NGEO constellations leads to complex dynamic routing[7]. In [8], a routing strategy proposed to maximize throughput in LEO satellite networks. Recent works propose routing protocols with shortest delays. Network traffic information is controlled either locally or globally from the whole network[9]. In [10], a priority based adaptive minimum-hop routing algorithm is proposed. In [11], a probabilistic routing protocol (PPP) is proposed.

3. Proposed Work

The proposed work proposes that neibouring satellites can exchange information on their present congestion status. This work uses Explicit Load Balancing Technique (ELB). In which a satellite continuously monitors its queue size to determine its state. The change in the state of the satellite is informed to its neighboring satellites, with the help of self state advertisement packet. To avoid congestion, a satellite with heavy traffic requests its neighboring satellites to forward a portion of date via alternative packets set do not involve the satellite. The ELB mechanism uses three parameters to indicate their congestion status and to reduce their data transmission rates. These parameters are queue ratio thresholds [2] and a traffic reduction ratio[1]. This paper finds the effect of receiving on TCP while ELB is in use.

4. Packet Reordering Mechanism

In satellite networks, the packet loss is usually due to corruption, these corrupted packets can be dropped either the routers or in the receiver when the header checksum fails. The most useful packet reordering method is the TCP for persistent reordering [12]. The main idea of this method the detection packet loses through the use of timings instead of duplicate acknowledgements. This method purely follows different rules then the basic TCP.(if does not use any modifications at receiving side). N the proposed method, the receivers refer to the TTL packet headers. After receiving a packet in order, a TCP receiver immediately sends back a normal ACK to the sender similar to the general hoe TCP behavior.
If the TTL > TTL intact then the receiver interprets the incident as due to changes in the communication path. Acknowledgement packets are hold for a specified time span and hence the throughput degradations because of unnecessary transmission of duplicate ACKs will be prevented.

Packet Reordering Algorithm

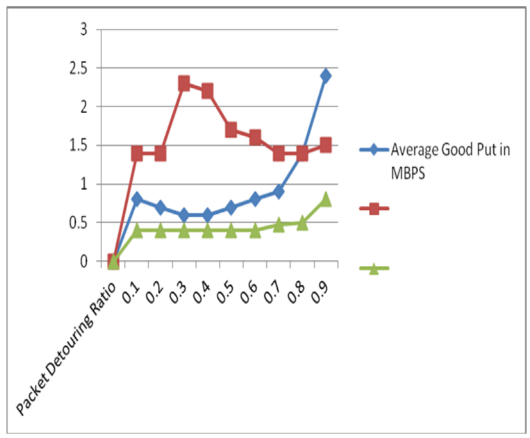
1. Begin
2. Start after receiving a packet
3. If packet arrival is intact them
4. Store TTL = TTL_{intact}
5. Reset(Timer)
6. Send back ACK
7. Else
8. Verify next TTL
9. If TTL>TTL_{intact} then
10. Set(Timer)
11. If timer expires then
12. Send duplicate ACK
13. Else
14. Send General ACK
15. End if
16. Else
17. Send duplicate ACK
18. End if
19. Endif
20. End

5. Result Analysis

The performance of the ELB scheme is tested using network simulator. In this proposed mechanism, the time out interval to send back “Duplicate ACK” is set to (2L+8ms) (in casa of out of order reception packets).
General TCP-PR & TCP schemes are used for comparison from the simulations results, it is confirmed that the proposed TCP for packet reordering out performs most packet reordering solutions proposed in recent works.

Table (1) Performance evaluations when inter satellite link delay is 22 ms

	Average Good Put in MBPS		
Packet Detouring Ratio	Standard TCP	TCP-PR	Proposed Packet Reordering
0.1	0.8	1.4	0.326
0.2	0.7	1.4	0.326
0.3	0.6	2.3	0.326
0.4	0.6	2.2	0.326
0.5	0.7	1.7	0.326
0.6	0.8	1.6	0.326
0.7	0.9	1.4	0.468
0.8	1.4	1.4	0.497
0.9	2.4	1.5	0.798



Graph 1. Graph showing results specified in table 1.

The proposed reordering mechanism gives much lower good put in case of low values of packet detouring ratio.

6. Conclusion

In this paper, we proposed a packet reordering mechanism the TTL based packet reordering results are compared with standard TCP and TCP-PR. Proposed packet reordering algorithm shows much lower good put in case of low values of packet detouring ratio. When the packet detouring ratio is 0.7 & 0.8, the proposed technique out performs the TCP-PR. When the inter satellite link delay values are high, then the proposed technique obtained good performance. Simulation results shows better performance of ELB scheme in avoiding congestion, increasing throughput and reducing queue lengths.

7. References

[1] J.Farseroter and R.Prasad,” A Survey of future broad band multimedia satellite systems, issues and Trends”, IEEE common Magzine, Vol 38, No. 6, June 2000, PP. 128-133.

[2] J. Neale, R. Green, and J. Landovskis, "Interactive channel for multimedia satellite etworks," *IEEE Commun. Mag.*, vol. 39, no. 3, pp. 192–198, 2001. 292 IEEE/ACM TRANSACTIONS ON NETWORKING, VOL. 17, NO. 1, FEBRUARY 2009

[3] M. Wittig, "Large capacity multimedia systems," *IEEE Commun.Mag.*, vol. 35, no. 8, pp. 44–49, Aug. 1997.

[4] T. Taleb, A. Jamalipour, N. Kato, and Y. Nemoto, "A theater in the sky: A ubiquitous broadband multimedia-on-demand service over a novel constellation composed of quasi-geostationary satellites," *Wiley Int. J.Satellite Commun. Netw.*, vol. 24, no. 3, pp. 215–227, May/June 2006.

[5] Ekici, E., I. F. Akyildiz, and M. D. Bender, "A Distributed Routing Algorithm for Datagram Traffic in LEO satellite networks", *IEEE/ACM Transactions on Networking*, vol. 9, no. 2, pp. 137-147, April 2001.

[6] T. Taleb, N. Kato, and Y. Nemoto, "REFWA: An efficient and fair congestion control scheme for leo satellite networks," *IEEE/ACM Trans.Networking*, vol. 14, no. 5, pp. 1031–1044, Oct. 2006.

[7] L. Wood, A. Clerget, I. Andrikopoulos, G. Pavlou, and W. Dabbous, "IP routing issues in satellite constellation networks," *Int. J. Satellite Commun.*, vol. 19, no. 1, pp. 69–92, Jan./Feb. 2001

[8] J. Sun and E. Modiano, "Routing strategies for maximizing throughput in LEO satellite networks," *IEEE J. Sel. Areas Commun.*, vol. 22, pp. 273–286, 2004.

[9] L. Franck and G. Maral, "Static and adaptive routing in ISL networks from a constellation perspective," *Int. J. Satellite Commun.*, vol. 6, no. 20, pp. 455–475, 2002.

[10] O.Korçak and F. Alagöz, "Priority-based adaptive shortest path routing for IP over satellite networks," in *Proc. AIAA 23rd Communications Satellite Systems Conf.*, Rome, Italy, Sep. 2005.

[11] H. Uzunalioglu, "Probabilistic routing protocol for low earth orbit satellite networks," in *Proc. IEEE Int. Conf. Communications(ICC'98)*, Atlanta, GA, June 1998.

[12] S. Bohacek, J. P. Hespanha, J. Lee, C. Lim, and K. Obraczka, "A new TCP for persistent packet reordering," *IEEE/ACM Trans. Networking*, vol. 14, no. 2, pp. 369–382, Apr. 2006.

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