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Determination of Delay Performance of Route Reservation in Inter Networks

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Abstract
This paper gives an insight on the delay performance of route reservation-based (RB) communication over non-reservation-based (NRB) communication in Inter networks. Along with the delay performance, the necessities in terms of route discovery, media access control (MAC) protocol, and pipelining are deliberated in the paper which makes the RB switching superior to NRB switching. A novel analytical framework is developed and the network performance under both reservation based and non-reservation based schemes are computed. In the proposed Reservation Based scheme, a source first reserves a multi-hop route to its destination .It reserves intermediate nodes before the actual transmission begins. The reserved intermediate nodes are required to relay only the message generated by the specific source. This gives the source an exclusive access to the path to the destination. All these cumulative factors betters the delay performance of route reservation based communications. This advantage, however, comes at the expense of lower throughput and good put compared to NRB schemes.

Keywords
Route Reservation, Delay Performance

I. Introduction

In the field of telecommunication networks, the term quality of service (QOS) refers to resource reservation control mechanisms rather than the achieved service quality [1].

Quality of service is the ability to provide different priority to different applications, users, or data flows, or to guarantee a certain level of performance to a data flow. For example, a required bit rate, delay, jitter, packet dropping probability and/or bit error rate may be guaranteed [2]. Quality of service guarantees are important if the network capacity is insufficient, especially for real-time streaming multimedia applications such as voice over IP, online games and IP-TV, since these often require fixed bit rate and are delay sensitive, and in networks where the capacity is a limited resource, for example in cellular data communication [3]. In the absence of network congestion, QOS mechanisms are not required.

A network or protocol that supports QOS may agree on a traffic contract with the application software and reserve capacity in the network nodes, for example during a session establishment phase [4]. During the session it may monitor the achieved level of performance, for example the data rate and delay, and dynamically control scheduling priorities in the network nodes [5]. It may release the reserved capacity during a tear down phase.

A best-effort network or service does not support quality of service. An alternative to complex QOS control mechanisms is to provide high quality communication over a best-effort network by over-provisioning the capacity so that it is sufficient for the expected peak traffic load [6].

In the field of telephony, quality of service was defined in the ITU standard X.902 as "A set of quality requirements on the collective behavior of one or more objects" [7]. Quality of Service comprises requirements on all the aspects of a connection, such as service response time, loss, signal-to-noise ratio, cross-talk, echo, interrupts, frequency response, loudness levels, and so on. A subset of telephony QOS is Grade of Service (GOS) requirements, which comprises aspects of a connection relating to capacity and coverage of a network, for example guaranteed maximum blocking probability and outage probability.

QOS is sometimes used as a quality measure, with many alternative definitions, rather than referring to the ability to reserve resources [8]. Quality of service sometimes refers to the level of quality of service, i.e. the guaranteed service quality. High QOS is often confused with a high level of performance or achieved service quality, for example high bit rate, low latency and low bit error probability [9].

II. Theory

Prior to the existence of the reservation based system users had to follow NRB scheme only which had several problems. Some of the problems related to the NRB scheme are as follows:

Sharing of bandwidth: In NRB scheme several nodes had to share one source node due to which a low transfer rate existed. Suppose if the source transfers a rate of 1mbps to the network which have 5 nodes, then this 1mbps data rate will be distributed among the nodes present in the system [10]. It is possible that one node receive 200kbps, other receive 400kbps and so on.

Slow transfer rate: Since sharing between nodes do not exists so no systems achieved maximum transfer rate. So we can say that there was a slow transfer rate. Difficulty of transferring large sized data-Due to slow transfer rate large sized data was not possible to send as it took a lot of time.

Transferring of multimedia files: Due to slow transfer rate multimedia files like video and audio files were difficult to view [11]. For example- Watching online movies on internet was not possible.

All the above mentioned problems are solved by replacing the non-reservation based system with the reservation based system. The high rate of transfer of data in RB system will allow large files to be transferred in a short span of time.

Thus, we can also view multimedia objects like audio and video files over internet. Hence, a quality of service can be achieved.

III. Design

The project that we have undertaken is a comparison between the NRB systems and RB systems. Here, transfer of messages is done from one system to other system so we needed an environment which is portable and platform independent. Also, it should be able to do work on internet.

The Data Flow Diagram for Route Reservation in Inter Network is as follows

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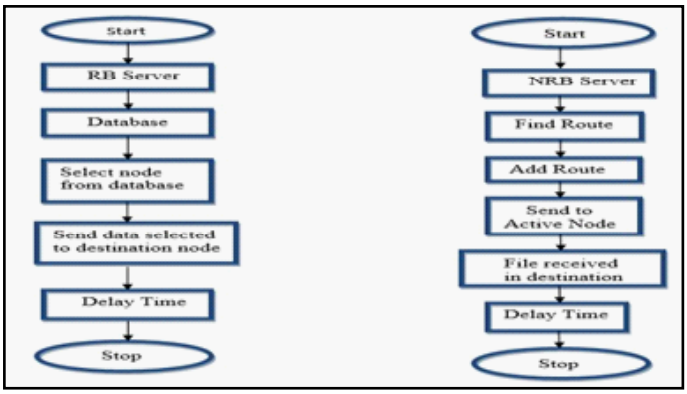

Fig 1: Data Flow Diagram for RB System and NRB system

The flow chart represents the data flow of reservation and non-reservation based system. In the case of non-reservation technique the data reaches the destination by adding a route which sends the data to the active node which is then transferred to the destination. But in the case of proposed reservation based data flow system the database is used to select and select the data to the destination. The same is explained in the data flow diagram.

IV. Results

The result shows the considerable amount of reduction in delay performance when compared with non-reservation based technique. The following results are alienated into different interfaces which are as below. The delay performance was calculated for both reservation and non-reservation technique. To implement this technique Java was used and compilation was performed on JDK which emanates with a complete set of generic routing encapsulation.

Fig 2: Snapshot showing the RR Main

Fig 3: Snapshot showing NRB Main File

Fig 4: Snapshot for NRB Main with Nodes connected

Fig 5: Snapshot showing NRB Destination

Fig 6: Snapshot showing NRB Main with Transmit Time

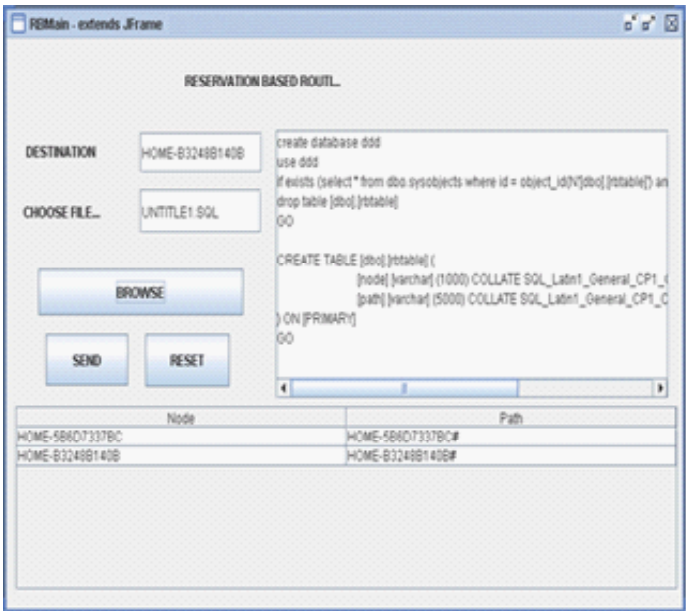

Fig 7: Snapshot of RB Main File

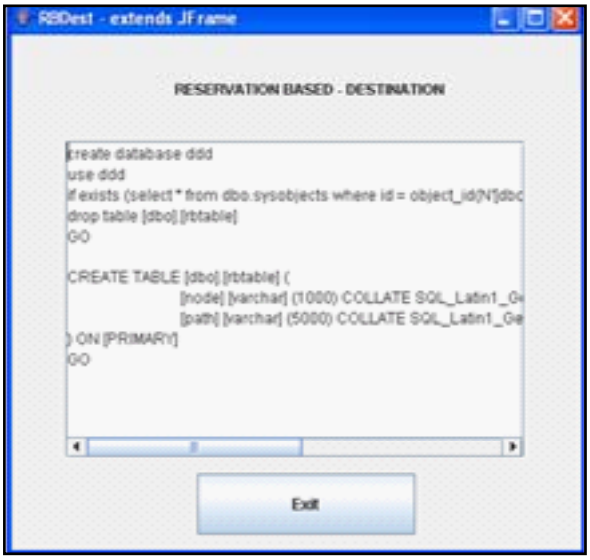

Fig 8: Snapshot of RB Destination

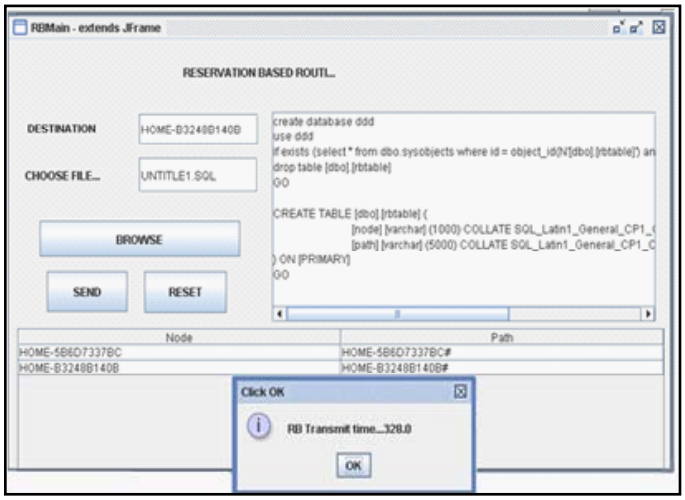

Fig 10: Snapshot showing RR Main with Transmit Time

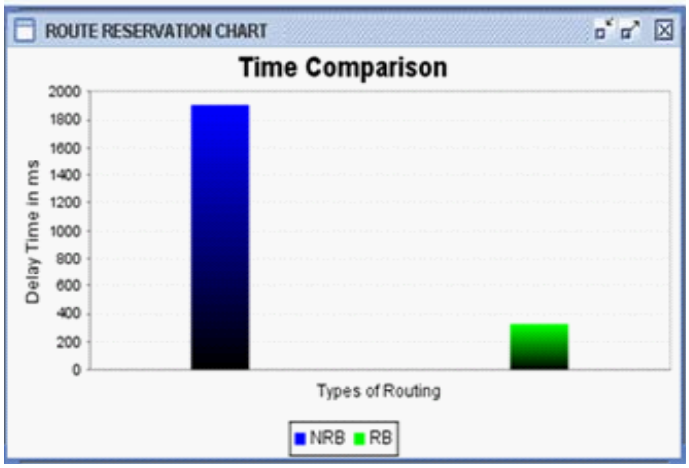

Fig 11: Snapshot showing Comparison Chart depending upon Time Delay

The interfaces and comparison shows that the route reservation has better delay performance when compared to non-route reservation techniques. The delay is reduced to nine times when used with route reservation techniques.

V. Conclusion

The delay performance of both reservation based and non-reservation based delay performance was calculated and it was duly proved that the reservation technique has nine times the better delay performance over the non-reservation technique. Java was used and compilation was performed on JDK which emanates with a complete set of generic routing encapsulation for the implementation.

References

[1]. *Lee Breslau, Deborah Estrin, Kevin Fall, Sally Floyd, John Heidemann, Ahmed Helmy, Polly Huang, Steven McCanne, Kannan Varadhan, Ya Xu, and Haobo Yu. Advances in network simulation. Computer, 33(5):59–67, 2000.*

[2]. *ARAN main page. http://prisms.cs.umass.edu/arand/. Last accessed December 2006.*

[3]. *Pixel Ballistics. uaObjCBridge.http://www.xelballistics.com/Software/LuaObjCBridge/ Contents.html. Last accessed September 2006.*

[4]. *Sang Ho Bae, Sung-Ju Lee, and Mario Gerla. Unicast*

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performance analysis of the ODMRP in a mobile ad hoc network testbed. In Proceedings of the Ninth International Conference on Computer Communications and Networks, pages 148–153, Las Vegas, NV, USA, October 2000. IEEE.

[5]. *Scott O. Bradner. The internet standards process – revision 3. RFC 2026, IETF, October 1996. rfc2026.txt.*

[6]. *Martin A. Brown. Guide to IP layer network administration with linux. http://linux-ip.net/, April 2003.*

[7]. *Bytecode compiler benchmark. http://unigine.com/products/unigine v0.32/compiler benchmark. Last accessed September 2006.*

[8]. *Ian D. Chakeres and Elizabeth M. Belding-Royer. The utility of hello messages for determining link connectivity. In Proceedings of the 5th International Symposium of Wireless Personal Multimedia Communications (WPMC) 2002, volume 2, pages 504–508, Honolulu, Hawaii, October 2002.*

[9]. *Thomas Clausen, Christopher Dearlove, and Justin Dean. Generalized MANET packet/message format. Internet-Draft Version 0, IETF, February 2006. draft-ietf-manet-packetbb-00.txt, (Work in Progress).*

[10]. *[Karn 1990] Phil Karn. MACA—A New ChannelAccessMethod for Packet Radio. In ARRL/CRRL Amateur Radio 9th Computer Networking Conference, pages 134–140. American Radio Relay League, September 1990.*

[11]. *Agent based Bandwidth Reservation Routing Technique in Mobile Ad Hoc Networks, (IJACSA) International Journal of Advanced Computer Science and Applications, Vol. 2, No. 12, 2011*