DATA GIVE-AND-TAKE IN WIRELESS NETWORKS WITH NETWORK CODING MECHANISM

Manjiri Patil*

Prof. Srinu Dharawath*

ABSTRACT:

In this paper we have analysed the different types of Information exchange in wireless network that includes Unicast, Broadcast & Multicast &elaborate about the role of Network coding in such information exchanges. Recently it has been shown that network coding improves network reliability by reducing the number of packet retransmission. Network coding is a developing method which is currently pragmatic to wireless networks to improve network throughput and other performance. Contemplate cooperative wireless network in which there are several sources & several relays. The unreliable wireless channels, the quality of network links between nodes can vary; which result in the failure of intermediate nodes which results in to the linear combination of incoming massage in network coding scheme. At base station we have proposed the recovery performance of sources massages.

Keywords: Multicasting, Network coding, Network throughput

* M.E. Computer Engineering G. S. Moze college of Engineering, Balewadi Pune, India

1. Introduction

Information exchange can be done in three different ways these different scenario are Unicast, Multicast & Broadcast. Unicast is the term used to describe communication where a piece of information is sent from one point to another point. In this case there is just one sender, and one receiver. Broadcast is the term used to describe communication where a piece of information is sent from one point to all other points. In network case there is just one sender, but the information is sent to all connected receivers. In applications like distributing weather reports, stock market updates or live radio programmes, broadcast is the best way to spread information. Broadcast is mostly used in local sub-networks. Multicast is the term used to describe communication where a piece of information is sent from one or more points to a set of other points. In this case there is may be one or more senders, and the information is distributed to a set of receivers. Below diagram shows overview.Multicast is a network addressing method for the delivery of information to a group of destinations simultaneously using the most efficient strategy to deliver the messages over each link of the network only once, creating copies only when the links to the multiple destinations split (typically network switches and routers). Multicast is often used for streaming media and Internet television applications.

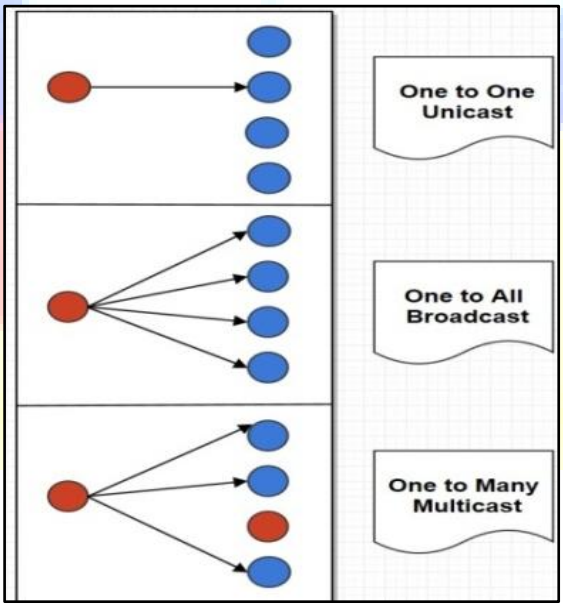

Fig1.Overview of Unicast, Broadcast Multicast

Network Coding is a field that was first introduced in 2000 [5] as a method to utilize the maximum capacity of a network and maximize the flow of information in that network. It suggested coding at packet level in wired P2P networks. The idea sprouts from research done in

[4] on satellite communications using a source coding system which consists of multiple sources, encoders, and decoders.

Network coding is a networking technique in which transmitted data is encoded and decoded to increase network throughput, reduce delays and make the network more robust. Network coding is perceived to be useful in wireless mesh networks, messaging networks, storage networks, multicast streaming networks, file-sharing peer-to-peer networks and other networks where the same data needs to be transmitted to a number of destination nodes. The regular topology change that occurs in peer-to-peer networks poses a challenge to the network coding technique because it complicates network synchronization. In addition, the peers may need a large amount of processing time while trying to decode data. Network coding promises significant benefits in network performance, especially in lossy networks and in multicast and multipath scenarios.

2. Details Experimental

2.1.Multicast Topology

As shown in Fig2 When a sender has the first multicast packet to send, it launches an initiating process which includes assigning FEC to packets flow, computing sending interval according to various application mode, and generating a new FEC table item, etc. Then, it generates and sends a Label-Request message through flooding. During the setup process, not only a multicasting tree but also a mesh is generated. These two kinds of forwarding topology can work alternatively to match the varying network environment. This is made possible by down-stream nodes sending Label-Mapping message to up-stream nodes with two different modes: unicasting via inverse path and flooding. Nodes which have received the Label-Mapping message can potentially become forwarding nodes of the multicasting mesh. Thus, the multicast topology is determined by destination nodes according to their judgments to the network conditions, and source nodes have no need to maintain the multicast topology.

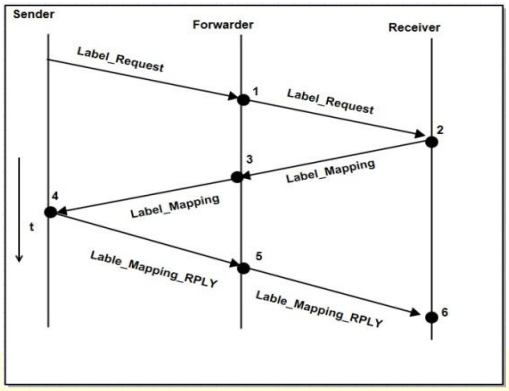

Fig2. Multicast Topology

2.2.Algorithm

Within the scope of the network coding literature, a number of papers have proposed algorithms that employ network coding over a dynamically changing wireless environment & evaluated their performance through simulation results closest to our particular broadcasting problem is [6] which shows that from the viewpoint of packet delivery ratio & overhead, NC compares very favourably to flooding. Minimum cost multicasting using network coding was examined in [1] for mobile networks and in [2] for fixed networks. Our work differs in that, rather than solving the routing problem we focus on assessing the benefits network coding may offer.

3. Results And Discussion

3.1. Performance Evaluation for Multicast member Nodes

The number of duplicate data packet as a function of the number of multicast member nodes with node mobility of 20km/h. As we can see in Fig 3, CRMP generates significantly lower number of data packet transmissions than ODMRP. As the number of multicast member nodes increases, the gap in the number of duplicate data packet of our proposed CRMP and ODMRP is larger. CRMP has moderately lower number of data transmissions because it can reduce the number of forwarding node by using optimal route refresh interval calculated from the information of node mobility in the network.

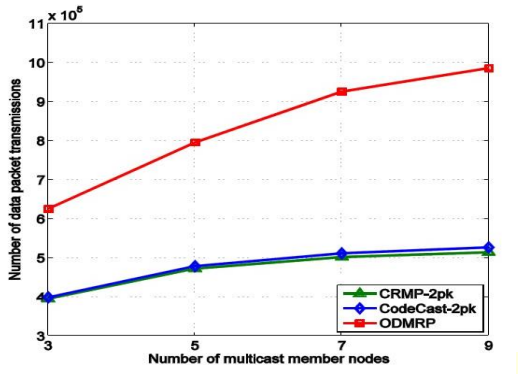

Fig3.The Number of Duplicated Data Packet as a Function of the Number of Multicast Member Nodes

3.2. Network Coding Max. Flow

Network coding is a recently proposed mechanism based on a simple idea first stated by Ahlswede et al. [4]. In fact, it was shown [5] that if we regard multicast throughput as information flow, then max-flow of point-to-multipoint communication is:

$$F_{MCAST} = \min_{t \in M} F(t) \quad \ldots\ldots\ldots I$$

WhereF (t) is a max-flow from source s to t, and M is the set of nodes which are multicastreceivers. Furthermore, multicast max-flow cannot be achieved when using IP ork coding [3].

Conclusions

In this paper, we have studied the Network data transfer mode & basic working. We also showed that Network coding mechanism is effective, method for multicasting for throughput optimization. Also we have proposed a robust Network Coding based Multicast Routing. Further research should focus on whether network coding benefits can be used by practical systems in realistic settings.

Acknowledgments

The Authors would like to thanks HOD &Principal along with staff of computer department for guiding us for research work.

References

[1] D. S. Lun, N. Ratnakar, M. M`edard, R. Koetter, D. R. Karger, T. Ho, E. Ahmed, and F. Zhao, "Network Coding with a Cost Criterion," in IEEE Transactions on Information Theory, vol. 52, pp. 2608-2623, June 2004.

[2] D. Lun, M. Medard, T. Ho, and R. Koetter, "Network coding with a cost criterion," in ISITA, Oct. 2004.

[3] J. Widmer& J. Y. Le Boudec, "Network coding for efficient communication in extreme networks", 2005.

[4] R. Ahlswede, N. Cai, S.-Y. R. Li, and R. W. Yeung, "Network information flow", IEEE Transactions on Information Theory, vol. 46, July 2000, pp. 12041216, 2000.

[5] R. W. Yeung "Distributed Source Coding for Satellite Communications", IEEE Transactions on Information Theory, May 1999, vol. 43, pp. 11111120, 1999.

[6] R. Ahlswede, N. Cai, S. R. Li, and R. W. Yeung, "Network Information Flow," IEEE Transactions of Information Theory, July 2000.