International Conference on Systems, Science, Control, Communication, Engineering and Technology 2016 [ICSSCCET 2016]

ISBN	978-81-929866-6-1	**VOL**	02
Website	icssccet.org	**eMail**	icssccet@asdf.res.in
Received	25 – February – 2016	**Accepted**	10 - March – 2016
Article ID	ICSSCCET103	**eAID**	ICSSCCET.2016.103

Survey on Packet Delivery Mechanisms in Manets

V Sathya Narayanan[1], Jasmine Thomas[2], K S Prashanthini[3], P Keerthi[4]
[1234]Students Scholar, Department of IT, Karpagam Institute of Technology, Coimbatore, Tamil Nadu, India.

Abstract-*Due to increase in wireless networks, mobile ad hoc networks (MANETs) are becoming an important aspect in many applications. It is a flexible and self-autonomous wireless network architecture, is very promising to find many important applications in the daily life information exchange, disaster relief, military troop communication, etc. In the packet delivery scheme it combines erasure coding and packet replication techniques in MANETs. Under this packet delivery scheme a group of packets is first encoded into coded packets using erasure coding, and each coded packet is then replicated and forwarded to the destination node. The original packets can be recovered when coded packets reach the destination node. Each packet is sent to only one relay node, due to the increase of packets, higher complexity will occur. During the process of packet transmission the nodes are awake all the time and more energy is consumed for the execution time. We propose a new technique called sleep and awake scheduling where the nodes are awake only at the communication time. Sleep and awake scheduling wake up nodes only on packet transmission and reception time.*

Index keys: *MANETs, source node, destination node, relay node, erasure coding, sleep and awake scheduling*

I. INTRODUCTION

MANETs provides a wireless communication between the mobile devices connected in a network. Since MANETs are wireless they are used in many places and they improve the working progress in mobile networks. In this paper we have enhanced the working of mobile ad hoc networks by regulating the nodes connected in a network. We first use the Two-hop relay packet delivery scheme which includes packet replication technique and erasure coding. This Two-hop relay packet delivery scheme is used to deliver the packets from source to destination through the nodes which is connected to a network. We aim at improving the efficiency of the delay-tolerant network's (DTN's) operation by letting the source distribute not only the original frames, but they also additional redundant frames. This results in a spatial coding of the distributed storage of the frames. Coding is considered based on either forward error correction techniques or on network coding approaches. Our main contribution is to provide a closed-form expression for the performance of DTNs (in terms of message delivery probability and energy consumption) as a function of the coding that is used. Scaling laws are also derived for the success probability of message delivery. An efficient use of nodes is made through by using a technique. An algorithm called SLEEP and AWAKE scheduling algorithm which makes the nodes to be awake only during communication time.

Once the communication or transmission of packets is over then the node need not to be awake. By using this algorithm, a lot of battery energy consumption is saved by making the nodes working only at the required time, so at the remaining time they are set to sleep. By following this method a very less amount of energy is used by the nodes. In the past MANETs process, the nodes in a network will be sharing the resources all the time, which makes the network unreliable. The life time of the network can be increased by reducing the work load carried out by the nodes in a network.

II. Related Works

In the existing system, for the delivery of packets they used erasure coding based packet delivery scheme. The two hop relay combines both the erasure coding and packet replication. This packet delivery scheme is based on the Delay Tolerant Network (DTNs). In this

Cite this article as: V Sathya Narayanan, Jasmine Thomas, K S Prashanthini, P Keerthi. "Survey on Packet Delivery Mechanisms in Manets". *International Conference on Systems, Science, Control, Communication, Engineering and Technology 2016*: 515-517. Print.

network a fluid model was developed to analyze its delivery ratio performance and corresponding delivery cost. For a given lifetime constraint the packet delivery ratio is defined as the probability that the destination node can recover the original packets of a group before the lifetime expires. At first, by using erasure coding the packets are encoded into a coded packets and the copies of the coded packets are then distributed to the relay nodes. The technique is meant to increase the efficiency of DTNs under uncertain mobility patterns. In the performance gain is compared to simple replication, i.e. the technique of releasing including two-hop routing. The delivery delay of a packet is defined as the time elapsed between the time slot when source node starts to deliver copies of this packet and the time slot when the destination node successfully recovers this packet. The delivery delay includes all the delays which occurs in a network. The delay caused in a network will make a severe impact on the packets. If the expiry time is met then the packets will become useless and there will be no useful information in it. This will make the packets useless. So time constrain is one of the important aspect that should be considered when transmitting the packet from source to destination. If the packet reaches the destination node after the expiry time then the communication taken place become waste. Because the energy consumed and the communication resources used by the nodes in a network will become useless.

A. Quest for Fundamental Performance Limits

A theoretical framework is designed for determining fundamental performance limits of wireless ad hoc networks. The framework expands the traditional definition of Shannon capacity to incorporate notions of delay and outage. This approach integrates tools and methodologies from traditional Shannon Theory along with network theory, combinatorics, optimization, control, and game theory. Preliminary results have already led to significant performance gains as well as new wireless networking techniques, protocols, and insights. Further progress will entail integration of the results, ideas, and tools across all three research areas within our framework.

B. Fountain Codes in Multihop Relay Networks

Fountain codes have been extensively employed in delay-tolerant networks (DTNs) due to their near-capacity performance with very low encoding/decoding complexity. A decodeand-forward-based relaying strategy is ideally suited for fountain codes in such networks due to its ability to recover the source message from any subset of encoded packets with sufficient mutual information. the average packet loss can be minimized by optimizing the total delay based on the performance across each link. Finally, the pros and cons of using DCNs and DTNs employing fountain codes are evaluated and theoretical grounding to the simulated results is provided.

C. Dynamic Control in Delay Tolerant Networks

The replication mechanisms that include ReedSolomon type codes as well as network coding in order to improve the probability of successful delivery within a given time limit. We propose an analytical approach to compute these and study the effect of coding on the performance of the network while optimizing parameters that govern routing

D. Progressive Packet Arrivals in DTNs

In Delay Tolerant Networks (DTNs) the core challenge is to cope with lack of persistent connectivity and yet be able to deliver messages from source to destination. In particular, routing schemes that leverage relays' memory and mobility are a customary solution in order to improve message delivery delay. When large files need to be transferred from source to destination, not all packets may be available at the source prior to the first transmission.

E. Capacity and Delay Tradeoffs for Ad Hoc Networks

To reduce delays in the network, each user sends redundant packets along multiple paths to the destination. Assuming the network has a cell partitioned structure and users move according to a simplified independent and identically distributed (i.i.d.) mobility model, we compute the exact network capacity and the exact end-to-end queueing delay when no redundancy is used.

F. Two-Hop Relay Algorithm with Packet Redundancy and Erasure Coding in MANETs

Two-hop relay algorithm serves as a class of promising routing protocols for mobile ad hoc networks (MANETs). This paper proposes a general two-hop relay algorithm with combination of both packet redundancy and erasure coding techniques, and focuses on the delay performance there. Our new algorithm is abbreviated as 2HR-(f,x), where f is the packet redundancy limit and x is an erasure coding parameter. The 2HR-(f,x) covers available two-hop rely algorithms as special cases, such as the two-hop relay algorithm with packet redundancy ($f > 1, x = 1$), and two-hop relay algorithm with erasure coding($f = 1, x > 1$). To investigate the delay performance of our proposed 2HR-(f,x) algorithm, a multidimensional Markov chain model is developed, which depicts the complicated system state transitions. With the help of the Markov chain model, closed-form expected delivery delay is derived. Extensive simulations are conducted to verify the efficiency of our Markov chain model and the correctness of the derived delivery delay result. Finally,

Cite this article as: V Sathya Narayanan, Jasmine Thomas, K S Prashanthini, P Keerthi. "Survey on Packet Delivery Mechanisms in Manets". *International Conference on Systems, Science, Control, Communication, Engineering and Technology 2016*: 515-517. Print.

numerical results are provided to examine how network parameters will affect the delivery delay performance of the 2HR-(f,x) algorithm.

III. Conclusion

In this paper we have addressed the problem of battery energy consumption and use of communication resources during processing of a node. We considered SLEEP and AWAKE scheduling algorithm to get an efficient transmission of outcome. This scheduling algorithm defines the nodes to be in a sleep state when there is no communication is taking place in the particular node. The nodes wake up when a packet is send to it. Until the communication time gets over the nodes will be awake and the resources can be shared. This scheduling algorithm will make a credential impact on improvement in battery consumption and also increases the life time of the network.

IV. References

1. A.Goldsmith*etal.*, "Beyond Shannon: The quest for fundamental performance limits of wireless ad hoc networks, "*IEEE Commun. Mag.*, vol.49, no.5, pp.195–205, May2011.
2. E.Altman, F.D.Pellegrini, and L.Sassatelli, "Dynamic control of coding in delay tolerant networks,"in *Proc. IEEEINFOCOM*, 2010, pp.1–5.
3. E.AltmanandF.D.Pellegrini,"Forward correction and fountain codes in delay-tolerant networks," *IEEE/ACM Trans. Netw.*, vol.19, no.1, pp.1–13, Feb.2011.
4. E.Altman, L.Sassatelli, and F.D.Pellegrini,"Dynamic control of coding for progressive packet arrivals in DTNs, "*IEEETrans. Wireless Commun.*, vol.12,no.2,pp.725–735,Feb.2013.
5. A.James, A.S.Madhukumar ,E.Kurniawan ,and F.Adachi, "Performance Analysis of fountain codes in multi hop relay networks, "*IEEE Trans.Veh. Technol.*, vol.62, no.9, pp.4379–4391, Nov.2013.
6. F.D.Pellegrini, R.E.Azouzi, and F.Albini, "Interplay of contact times, fragmentation and codingin DTNs, "in*Proc .WiOpt*, 2013, pp.580–587.
7. Z.Kong, E.M.Yeh, and E.Soljanin,"Coding improves the through put- delay tradeoff in mobile wireless networks, "*IEEETrans. Inf.Theory*, vol.58, no.11, pp.6894–6906, Nov.2012.
8. Y.Li, D.Jin, Z.Wang, L.Zeng, and S.Chen, "Coding or not Coding or not: Optimal Mobile data off-loading in opportunistic vehicular networks, "*IEEE Trans. Intell. Transp. Syst.*, vol.15, no.1, pp.318–333, Feb.2014.
9. Y.Cai, X.Wang, Z.Li, and Y.Fang, "Delay and capacity in MANET surender random walk mobility model,"*WirelessNetw.*, vol.20, no.3, pp.525–536, Apr.2014.
10. M.J.Neely and E.Modiano, "Capacity and delay trade-offs for ad-hoc mobile networks, "*IEEE Trans.Inf. Theory*, vol.51, no.6, pp.1917–1936, Jun.2005.
11. B.Yang, J.Gao, Y.Zhou, and X.Jiang, "Two-hop relay algorithm with packet redundancy and erasure coding in MANETs,"in *Proc . IEEE/CIC ICCC*, 2013, pp.651–656.
12. C.Zhang, Y.Fang, and X.Zhu, "Throughput-delay tradeoffs in largescale MANETs with network coding,"in*Proc. IEEEINFOCOM*, 2009, pp.199–207.
13. C.Zhang,X. Zhu,and Y. Fang,"On the improvement of scaling laws for large-scale MANETs with network coding,"*IEEEJ.Sel.AreasCommun.*, vol.27,no.5,pp.662–672,Jun.2009.
14. P. Li, Y. Fang,J.Li, andX. Huang,"Smooth trade-offs between through- put and delay in mobile adhoc networks,"*IEEE Trans.MobileComput.*, vol.11,no.3,pp.427–438,Mar.2012.
15. P.LiandY. Fang, "On the throughput capacity of heterogeneous wireless networks,"*IEEETrans. MobileComput.*, vol.11, no.12, pp.2073–2086, Dec.2012.
16. J.Liu,X.Jiang,H.Nishiyama,andN.Kato,"Delay and capacity in ad-Hoc mobile networks with f-cast relay algorithms,"*IEEE Trans. Wireless Commun.*,vol.10,no.8,pp.2738–2751,Aug.2011.
17. S.Panichpapiboon and W.Pattara-Atikom, "Are view of information dissemination protocols for vehicular adhoc networks, "*IEEECommun.SurveysTuts.*, vol.14, no.3, pp.784–798,2012.
18. P.GuptaandP.Kumar,"The capacity of wireless networks ,"*IEEE Trans. Inf.Theory*,vol.46,no.2,pp.388–404,Mar.2000.
19. M. Haenggi and R. Ganti, *Interference in Large Wireless Networks*. Delft, The Netherlands: Now, 2009.
20. Y.Chen, J.Liu, X.Jiang, and O.Takahashi, "Throughput analysis in mobile adhoc networks with directional antennas, "*AdHocNetw.*, vol.11, no.3, pp.1122–1135, May2013

Cite this article as: V Sathya Narayanan, Jasmine Thomas, K S Prashanthini, P Keerthi. "Survey on Packet Delivery Mechanisms in Manets". *International Conference on Systems, Science, Control, Communication, Engineering and Technology 2016*: 515-517. Print.