An Effective Method to Reduce Cost of Elastic and Inelastic Traffic in Wireless Sensor Network

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Abstract- *Tremendous growth of wireless content access resulted in the need for content placement and scheduling at wireless base stations. We analyze a system in which users are divided in clusters and request are made either elastic or inelastic. Our proposed algorithm is designed in such a way that it stabilizes the queues and gradually reduce the deficit. Caches are of finite size which can be refreshed periodically from a media vault. We design an algorithm in such a way that requests for streaming stored content is transferred in a short life time and energy utilized is increased. We illustrate our approach through simulations. In preceding works time and energy used lot and lot for the retransmission because it start the work in beginning node or the sink node. Using entropy variation algorithm to find the fit node and unfit node in a specified area. It used to transfer the content without retransmission.*

Keywords- Wireless Sensor Network (WSN), delay-sensitive traffic, prediction, quality of service (QoS), queueing.

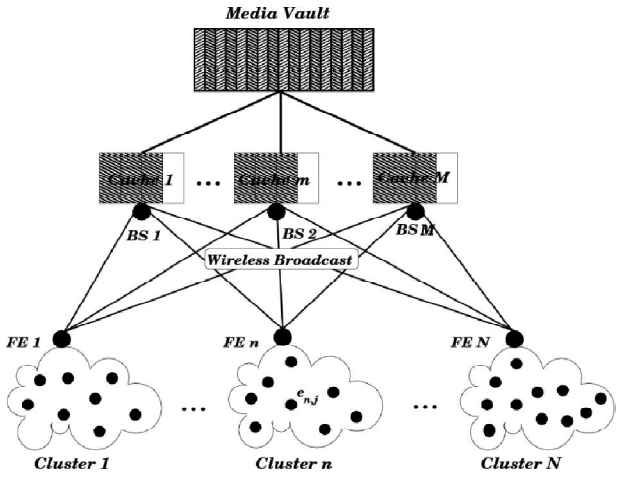
I. INTRODUCTION

A wireless sensor network (WSN) (sometimes called a **wireless sensor and actor network (WSAN)**) are spatially distributed autonomous sensors to monitor physical or environmental conditions, such as temperature, sound, pressure, etc. and to cooperatively pass their data through the network to a main location. The more modern networks are bi-directional, also enabling control of sensor activity. The development of wireless sensor networks was motivated by military applications such as battlefield surveillance; today such networks are used in many industrial and consumer applications, such as industrial process monitoring and control, machine health monitoring, and so on. The main issue in WSN considered is performance. To attain the better performance results by improvement of different factors like lifetime of network, quality of service of the network etc. We study a system under which users are divided into clusters based on their channel conditions, and their requests are represented by different queues at logical front ends. Requests might be elastic (implying no hard delay constraint) or inelastic (requiring that a delay target be met). Correspondingly, we have request queues that indicate the number of elastic requests, and deficit queues that indicate the deficit in inelastic service. Caches are of finite size and can be refreshed periodically from a media vault. We consider two cost models that correspond to inelastic requests for streaming stored content and real-time streaming of events, respectively. We design provably optimal policies that stabilize the request queues (hence ensuring finite delays) and reduce average deficit to zero and target is met at small cost.

II. METHODOLOGY

The rapid growth of wireless content access implies the need for content placement and scheduling at wireless base stations. In this paper to discover a system under which users are divided into clusters based on their channel conditions, and their requests are represented by different queues at logical front ends. Requests might be elastic (implying no hard delay constraint) or inelastic (requiring that a delay target be met). Correspondingly, we have request queues that indicate the number of elastic requests, and deficit queues that indicate the deficit in inelastic service. Caches are of finite size and can be refreshed periodically from a media vault. We consider two cost models that correspond to inelastic requests for streaming stored content and real-time streaming of events, respectively. We design provably optimal policies that stabilize the request queues (hence ensuring finite delays) and reduce average deficit to zero [hence ensuring that the quality-of-service (QoS) target is met] at small cost.

EXISTING SYSTEM ARCHITECTURE



A. Existing Work

The problem of caching, and content scheduling has earlier been studied for online Web caching and distributed storage systems. A commonly used metric is a competitive ratio of misses, assuming an adversarial model. Load balancing and placement with linear communication costs is examined. Here, the objective is to use distributed and centralized integer programming approaches to minimize the costs. However, this work does not take account for network capacity constraints, delay-sensitive traffic, or wireless aspects.

B. Difficulties in Existing Work

Do not consider content distribution with its attendant question of content placement. Only considers elastic traffic and has no results on the value of prediction.

Problem Definition

In this thesis, we are interested in solving the joint content placement and scheduling problem for both elastic and inelastic traffic in wireless networks. In doing so, we will also determine the value of predicting the demand for different types of content and what impact it has on the design of caching algorithms. Main problem is to reduce the cost and save time energy compare to the previous papers.

- Load balancing and placement with linear communication costs is examined in. Here, the objective is to use distributed and centralized integer programming approaches to minimize the costs.
- However, this work does not take account for network capacity constraints, delay sensitive traffic or wireless aspects.

III. RELATED WORK

N. Abedini and S. Shakkottai [1] et al performed a work, "CONTENT CACHING AND SCHEDULING IN WIRELESS BROADCAST NETWORKS WITH ELASTIC AND INELASTIC TRAFFIC," in Proc. IEEE/ACM TRANSACTIONS ON NETWORKING, VOL. 22, NO. 3, JUNE 2014 The rapid growth of wireless content access implies the need for content placement and scheduling at wireless base stations. We study a system under which users are divided into clusters based on their channel conditions, and their requests are represented by different queues at logical front ends. Caches are of finite size and can be refreshed periodically from a media vault. We consider two cost models that correspond to inelastic requests for streaming stored content and real-time streaming of events, respectively. We design provably optimal policies that stabilize the request queues (hence ensuring finite delays) and reduce erage deficit to zero [hence ensuring that the quality-of-service (QoS) target is met] at small cost.

Hou, V. Borkar, and P. Kumar,[2] et al performed a work "A THEORY OF QOS FOR WIRELESS," in Proc. IEEE INFOCOM, Rio de Janeiro, Brazil, Apr. 2009.

In this paper is assumed that all clients generate packets at the same rate and the delay requirements are the same for all packets.

Eryilmaz and R. Srikant [3] et al performed a work, "JOINT CONGESTION CONTROL, ROUTING, AND MAC FOR STABILITY AND FAIRNESS IN WIRELESS NETWORKS," IEEE J. Sel. Areas Commun., vol. 24, no. 8, pp. 1514–1524, Aug. It is well known that adaptive window flow control mechanisms such as TCP respond to congestion feedback not instantaneously, but gradually.

X. Lin and N. Shroff [4] et al performed a work, "JOINT RATE CONTROL AND SCHEDULING IN MULTIHOP WIRELESS NETWORKS," in Proc. 43rd IEEE CDC, Paradise Islands, Bahamas, Dec. 2004 An issue that has not been treated thoroughly in the literature is how to control the data rates of the applications so that they fall within the capacity region.A network without an appropriate rate control mechanism could perform poorly in practice.

S. Borst, V. Gupta, and A. Walid [5] et al performed a work, "DISTRIBUTED CACHING ALGORITHMS FOR CONTENT DISTRIBUTION NETWORKS," In Proc. IEEE INFOCOM, San Diego, CA, USA, Mar. 2010

However, nodes cannot recognize such opportunities for mutually beneficial cooperation, since they are generally unaware of the remote demand patterns. On the other hand, they cannot know the impact (bad or good) that the SO object placement strategy may have on their own local utility.

Chakchouk, N.; Hamdaoui [6] et al performed a work, B., "TRAFFIC AND INTERFERENCE AWARE SCHEDULING FOR MULTIRADIO MULTICHANNEL WIRELESS MESH NETWORKS," Vehicular Technology, IEEE Transactions on , vol.60, no.2, pp.555,565, Feb. 2011. This paper proposes a scheduling scheme for wireless mesh networks that are capable of multiple channel access and equipped with multiple radio interfaces. The proposed scheme is interference and traffic aware in that it increases the overall achievable throughput of the network by eliminating the interference

between the wireless mesh routers and maximizes the satisfaction ratios of all active sessions by accounting for the sessions' data rate requirements.

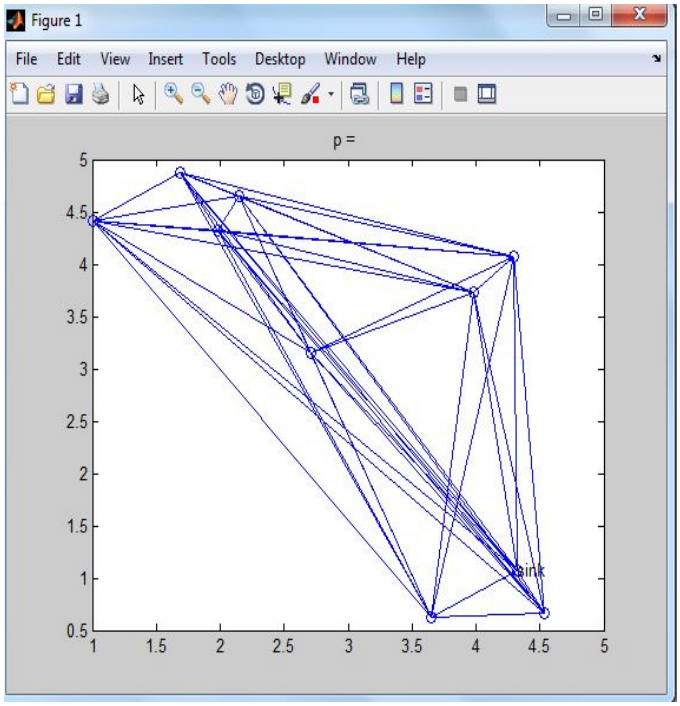
Mohammad A. Salahuddin, Halima Elbiaze, Wessam Ajib, Roch Glitho [7] et al performed a work "SOCIAL NETWORK ANALYSIS INSPIRED CONTENT PLACEMENT WITH QOS IN CLOUD-BASED CONTENT DELIVERY NETWORKS" (Submitted on 28 Jun 2015 (v1), last revised 12 Aug 2015 (this version, v2))
In this paper, we present our novel CP model, which optimally places content on surrogates in the cloud, to achieve (a) minimum cost of leasing storage and bandwidth resources for data coming into and going out of the cloud zones and regions, (b) guarantee Service Level Agreement (SLA), and (c) minimize degree of QoS violations.

Bo Zhou, Ying Cui, Meixia Tao [8] et al performed a work "OPTIMAL DYNAMIC MULTICAST SCHEDULING FOR CACHE-ENABLED CONTENT-CENTRICWIRELESS NETWORKS"(Submitted on 17 Apr 2015 (v1), last revised 21 Apr 2015 Caching and multicasting at base stations are two promising approaches to support massive content delivery over wireless networks. However, existing scheduling designs do not make full use of the advantages of the two approaches. In this paper, we consider the optimal dynamic multicast scheduling to jointly minimize the average delay, power and fetching costs for cache-enabled content-centricwireless networks. We formulate this stochastic optimization problem as an infinite horizon average cost Markov decision process (MDP).

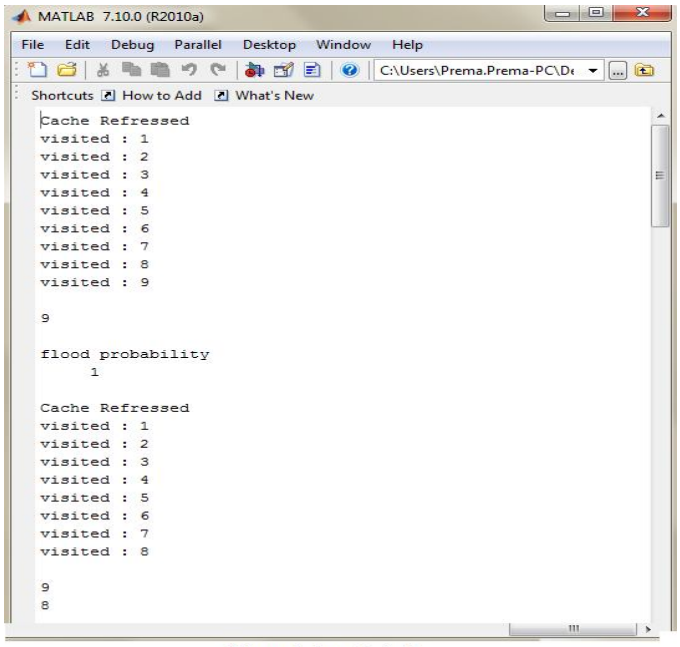
Ahlehagh, H.; Dey, S. [9] et al performed a work, "VIDEO-AWARE SCHEDULING AND CACHING IN THE RADIO ACCESS NETWORK," Networking, IEEE/ACM Transactions on , vol.22, no.5, pp.1444,1462,Oct.2014 In this paper, we introduce distributed caching of videos at the base stations of the Radio Access Network (RAN) to significantly improve the video capacity and user experience of mobile networks. To ensure effectiveness of the massively distributed but relatively small-sized RAN caches, unlike Internet content delivery networks (CDNs) that can store millions of videos in a relatively few large-sized caches, we propose RAN-aware reactive and proactive caching policies that utilize User Preference Profiles (UPPs) of active users in a cell.

IV. EXPRIMENTAL ANALYSIS

In order to evaluate and analyze the performance of the proposed algorithm, we do a series of simulation experiments in the 2.0 GHz PC by MATLAB 10.

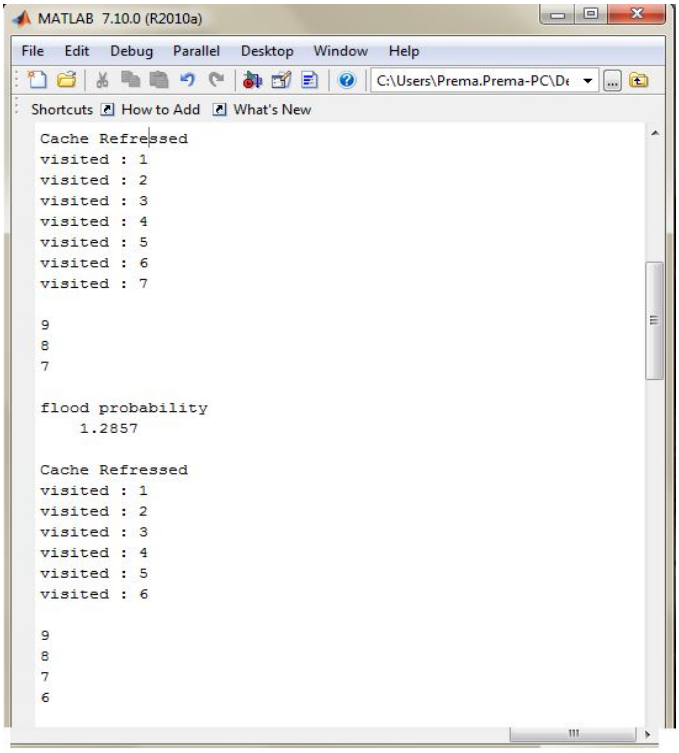


In this figure tell about the node to node content transfer in the sink node or starting node to ending node through the diagrammatic view.



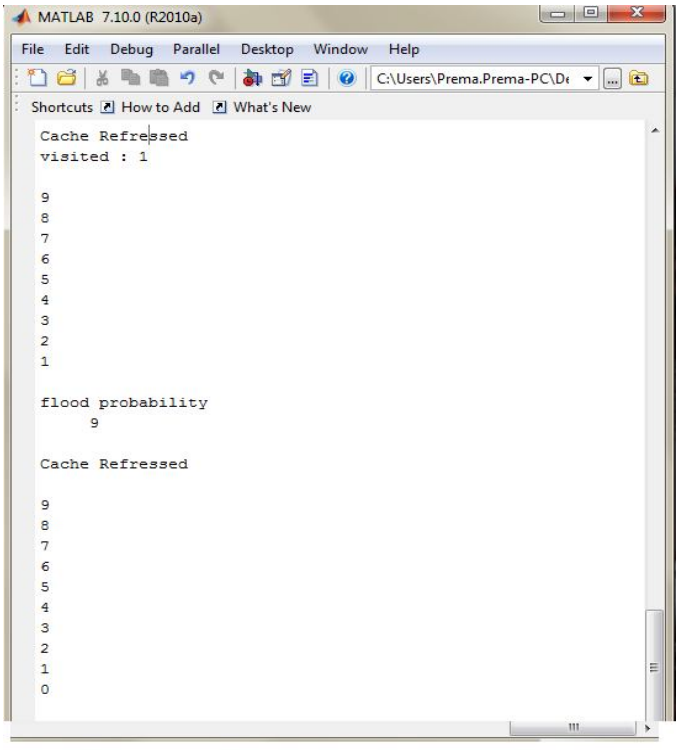
all the node first refreshed

In this work we have to refresh all the nodes in the starting level for the content transfer and then we have to find the fit and unfit node. And the fit nodes are only have the chance to visit otherwise it will refresh the media vault.



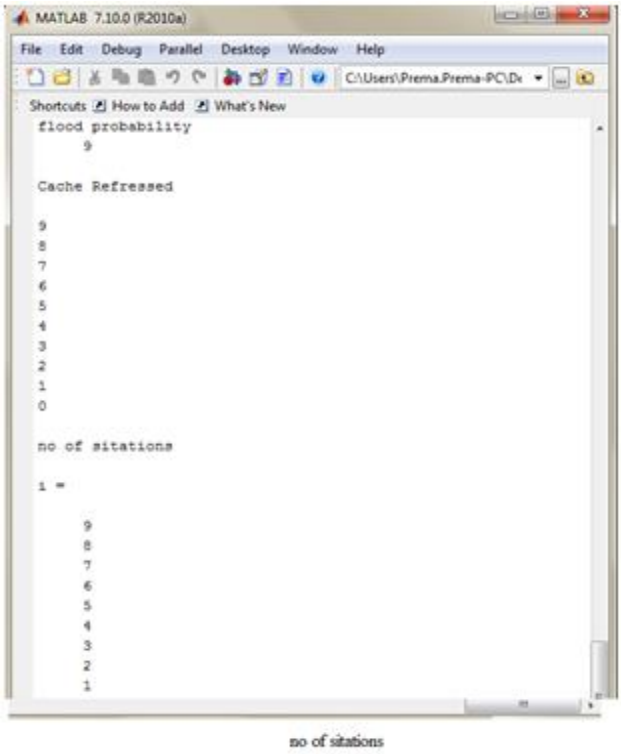
second probability

In this preceding work we find the probability for the nodes and calculated by some formulas.
9/length multiplied to the neighbor nodes.



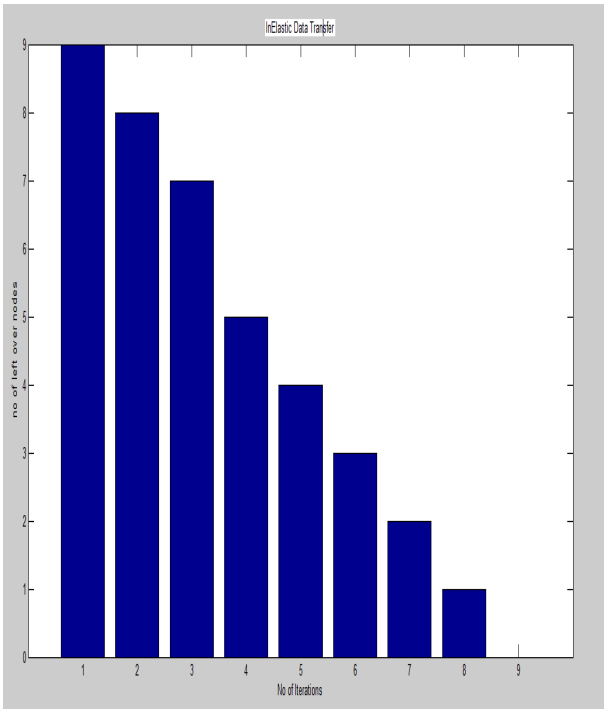
last node refreshed

And then the last node to be refreshed at the finishing stage.



no of sitations

Now we have to find the no of sitations in the transmission. It used to find the visited nodes and also the unvisited or cache refreshed node. In this paper cache reference means unvisited nodes.



This figure shows the no of iteration reduced level beginning to last. It means that the energy and time will secured and saved because of retransmission is not occur here. And now this reason the cost also reduced.

V. RESULT & ANALYSIS

Energy is one of the most critical resources for WSNs. Most of works in the literatures about WSN routing have emphasized energy conservations as an important optimization goal. However, merely saving energy is not enough to effectively prolong the network lifetime. The uneven energy depletion often results in network partition and low coverage ratio which deteriorate the performance. Energy saving in wireless sensor networks has attracted a lot of attention in the recent years and introduced unique challenges compared to traditional wired networks. In our system by avoiding revisiting the nodes we are able improve resource efficiency. In this paper, we have summarized some research results which have been presented in the literature on energy saving methods in sensor. Although many of these energy saving techniques look promising, there are still many challenges that need to be solved in the sensor networks. Therefore, further research is necessary for handling these kinds of situations

- We use a request queue to implicitly determine the popularity of elastic content.
- It provides Energy efficiency nodes.
- Minimum cost.

VI. CONCLUSION

Wireless sensor Networks are chief for the investigation purpose. The different features that affect the presentation are assumed in this paper. We have considered algorithms related to wireless sensor networks and different features that affect the performance in the wireless sensor network. The main issue considered is performance. The better performance results in improvement of different features like generation of network, excellence of service of the network etc. This is reached by not visiting the previously stayed nodes .So this study has cheap the energy and growth the through put.

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