International Journal of Engineering and Technical Research (IJETR)
ISSN: 2321-0869, Volume-3, Issue-6, June 2015

Power Saving Network Protocol System Using Hyper Quorum System

Saranya. R, Meenatchi. A, Makuru. M

Abstract— **The web network protocols have been proposed for ad hoc networks in to increase the power saving, energy efficiency and prolong the operational time of mobile stations. These protocols assign to each station a cycle pattern that specifies when the station should wake up to transmit data and receive data from the network and sleep to save battery power and energy . In all old system QPS protocols, the cycle length is either identical for all stations or node is restricted to certain number of port node. These restrictions on cycle length severely limit the practical use of QPS protocols as each individual station may want to select a cycle length that is best suited for its own need for the terms of remaining battery power, tolerable packet delay, and drop ratio. We propose the notion of hyper quorum system (HQS)-a generalization of QPS that allows for arbitrary cycle lengths of data and network. We describe algorithms to generate two different classes of HQS given any set of arbitrary cycle lengths as input. We then present analytical and simulation results that show the benefits of HQS-based power-saving protocols over the existing QPS protocols. The HQS protocols yield up to 41% improvement in energy efficiency under heavy traffic loads while eliminating more than 90% delay drops under light traffic loads.**

Index Terms— **Power saving, quorum systems, wireless ad hoc networks.**

I. INTRODUCTION

The IEEE 802.11 standard defines two operational modes for WLANs: *infrastructure-based* and *infrastructure-less* or *ad hoc*. Network interface cards can be set to work in either of these modes but not in both simultaneously. The infrastructure-based is the mode commonly used to construct the socalled Wi-Fi hotspots, i.e., to provide wireless access to the Internet. The drawbacks of an infrastructure-based WLAN are the costs associated with purchasing and installing the infrastructure. These costs may not be acceptable for dynamic environments where people and/or vehicles need to be temporarily interconnected in areas without a pre-existing communication infrastructure (e.g., inter-vehicular and disaster networks), or where the infrastructure cost is not justified (e.g., in-building networks, specific residential communities' networks, etc.). In these cases, a more efficient solution can be provided by the infrastructure-less or ad hoc mode.

Saranya.R undergoing her Master of Computer Science and Engineering in MeenakshiRamaswamy Engineering College, Thathanur, Tamil Nadu,India.

Meenatchi.A undergoing her Master of Computer Science and Engineering in MeenakshiRamaswamy Engineering College, Thathanur, Tamil Nadu, India.

Makuru.Mobtained his M.E., degree from various recognized universities. He is currently working as a associate professor inMeenakshiRamaswamy Engineering College, Thathanur, Tamil Nadu, India.

The IEEE 802.11 standard specifies both the MAC layer and the Physical Layer. The MAC layer offers two different types of service: a contention free service provided by the *Distributed Coordination Function* (DCF), and a contention-free service implemented by the *Point Coordination Function* (PCF). These service types are made available on top of a variety of physical layers. Specifically, three different technologies have been specified in the 6 standard: Infrared (IF), Frequency Hopping Spread Spectrum (FHSS) and Direct Sequence Spread Spectrum (DSSS). The DCF provides the basic access method of the 802.11 MAC protocol and is based on a *Carrier Sense Multiple Access with Collision Avoidance* (CSMA/CA) scheme. The PCF is implemented on top of the DCF and is based on a polling scheme. It uses a *Point Coordinator* that cyclically polls stations, giving them the opportunity to transmit. Since the PCF cannot be adopted in ad hoc mode, it will not be considered hereafter.

Power management functionalities are thus extremely importantboth in the infrastructure-based and in the ad hoc modes. Obviously, in the ad hoc mode, i.e.,inside an IBSS, Power Saving (PS) strategies need to be completely distributed in order topreserve the self-organizing nature of the IBSS. A station may be in one of two differentpower states: *awake* (station is fully powered) or *doze* (the station is not able to transmit orreceive). Multicast and/or directed frames destined to a power-conserving station are firstannounced during a period when all stations are awake. An Ad hoc Traffic Indication Map (ATIM) frame does the announcement. A station operating in the PS mode listens to theseannouncements and, based on them, decides whether it has to remain awake or not.

II. RELATED WORK

M. Anand, E. Nightingale, and J. Flinn, (2) Current wireless network power management often substantially degrades performance and may even increase overall energy usage when used with latency-sensitive applications. We proposed self-tuning power management that adapts its behavior to the access patterns and intent of applications, the characteristics of the network interface, and the energy usage of the platform. We have implemented STPM as a Linux kernel module our results show substantial benefits for distributed file systems, streaming audio and thin-client applications. Compared to default 802.11b power management, STPM reduces the total energy usage of an iPAQ running the Coda distributed file system by 21% while also reducing interactive file system delay by 80%. Further, STPM adapts to diverse operating conditions: it yields good results on both laptops and handhelds, supports 802.11b network interfaces with substantially different characteristics, and performs well across a range of application network access patterns.

G. BianchiIn, (4) this paper, an improved analytical model for IEEE 802.11 distributed coordination function under finite load is proposed by closely following the specifications given in IEEE 802.11 standard. The model is investigated in terms of channel throughput under perfect and slow Rayleigh fading channels. It is shown that the proposed model gives better insight into the operation of DCF.

C. Chao, J. Sheu, and I. Chou, (5) Multi-hop wireless sensor networks are mainly designed for environment monitoring. The lifetime of networks depends on the durability of the battery resource sensors, so it is crucial for sensors to efficiently use limited battery resource. The energy expends by sensor nodes in communication makes-up a quantum of their total amount of energy consumption. In existing research, most of the energy-saving MAC protocols reduce energy consumption by putting periodically sensors to sleep mode. Such a regular active/sleep schedule fails to adjust individual sensor node sleep duration according to per-sensor node communication traffic loads, which causes unnecessary idle listening problem and low power-efficiency. The basic idea of this proposed protocol is an analytical model for estimating the accurate per-sensor node communication traffic load in a multi-hop wireless sensor network and a grid-based quorum concept for regular active/sleep schedule.

L. Feeney and M. Nilsson, (11)Energy-aware design and evaluation of network protocols requiresknowledge of the energy consumption behavior of actual wirelessinterfaces. But little practical information is available about the energyconsumption behavior of well-known wireless network interfaces and devicespecifications do not provide information in a form that is helpful toprotocol developers. The measurements of the energy consumption of an IEEE 802.11wireless network interface operating in an ad hoc networking environment.The data is presented as a collection of linear equations for calculating theenergy consumed in sending, receiving and discarding broadcast and point to pointdata packets of various sizes.

J. Jiang, Y. Tseng, C. Hsu, and T. Lai, (12) this paper presents a novel method to arrange wakeup schedule for sleeping stations such that the number of wakeup stations in each beacon interval is balanced in IEEE 802.11 wireless local area networks (WLANs). This method reduces the probability of collision and thus the station can save more power. Next, we consider how to poll the wakeup stations to send the PS-Poll frame to get back their buffered data so that the contention can be avoided. Three different access scheduling mechanisms are proposed for the contention avoidance. In the first mechanism, only one of wakeup stations is scheduled to access the buffered data. The second and third mechanisms based on the smallest association ID (AID) first and the smallest queue length first, respectively, arrange a subset of wakeup stations to get back their buffered data within a beacon interval. Simulation results show that the proposed methods are effective in the power-saving.

R. Kravets and P. Krishnan, (15) an ad hoc mobile network is a collection of mobile nodes that are dynamically located in a manner that interconnections between nodes are capable of changing on continual basis. In order to provide communication within network different power aware routing protocols to discover routes between nodes. The main goal of such routing protocols is to establish a route between a pair of nodes so that messages can be delivered in a proper manner

III. EXISTING SYSTEM

A. IEEE 802.11 Power-Saving Mode

In PSM, time is divided into beacon intervals and each beacon interval starts with an ATIM window. This window is the period during which nodes must remain active and no stations are permitted to power down their wireless interface. The ATIM window size is a parameter that can be adjusted. Setting it to 0 means no power management is used. There are four possibilities for a node in terms of ATIMs: the node has transmitted an ATIM, received an ATIM, neither transmitted nor received, or both transmitted and received. Nodes that transmit ATIM frames do not sleep because this indicates an intent to transmit buffered traffic. Nodes to which an ATIM is addressed must also keep awake so they can receive data packets from the ATIM sender. A node that both transmits and receives of course needs to be active. Thus, only those nodes that neither transmit nor receive an ATIM can go to sleep after the ATIM window.

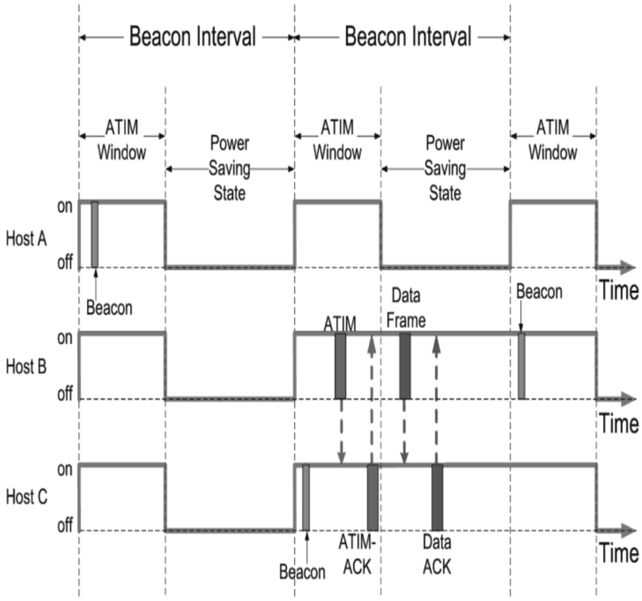

Fig.1. Power saving mechanism in IEEE 802.11

B.Quorum-based power-saving (QPS) protocol

Quorum-based power-saving (QPS) protocols have been proposed for ad hoc networks (e.g., IEEE 802.11 ad hoc mode) to increase energy efficiency and prolong the operational time of mobile stations. These protocols assign to each station a cycle pattern that specifies when the station should wake up (to transmit/receive data) and sleep (to save battery power). In all existing QPS protocols, the cycle length is either identical for all stations or is restricted to certain numbers (e.g., squares or primes). These restrictions on cycle length severely limit the practical use of QPS protocols as each individual station may want to select a cycle length that is best suited for its own need.

C. Demerits of Existing System

- In all those systems where the application requires no constraints during acquisition phase
- Manual system is time consuming process.

- As the system is manual, the previous system is error prone.
- Existing system are not able to grant acceptable performance or to produce any kind of response at all.
- The performance obtained using old techniques are not good enough to implement effective commercial systems.

IV. PROPOSED SYSTEM

A. Hyper Quorum System Based Power Saving Protocol

We are generate two different classes of HQS given any set of arbitrary cycle lengths as input. We also describe how to find the optimal cycle length for a station to maximize energy efficiency, subject to certain performance constraints. We then present analytical and simulation results that show the benefits of HQS-based power-saving protocols over the existing QPS protocols. The HQS protocols yield up to 41% improvement in energy efficiency under heavy traffic loads while eliminating more than 90% delay drops under light traffic loads.Thediagram for synchronous cycle patterns are shown inFig. 4(a) and 4(b). Alternatively the station choose theasynchronous cycle pattern as depicted in Fig 4(c) and4(d).Fig. 4. HQPS protocol

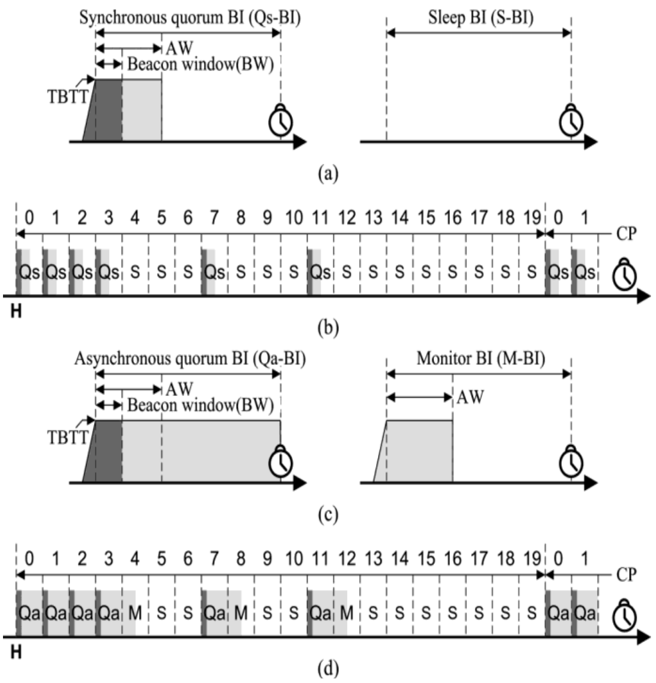

Fig. 2. HQS protocol

B. Merits of Proposed System

- The advantage of this project over other net monitoring tool is that it can be extended to support mobile based net monitoring.
- Here the user can set his mobile details, and can manage his network using the mobile.
- Whenever an event occurs in the network the system intimates him over the mobile and he can take necessary steps. More over the network status of each node will be updated timely.

V. MODULE DESCREPTION

A. Network Constructions Module

In this module, a cache validation request is initiated according to a schedule determined by the cache. There are variants of such systems that try to achieve strong consistency by validating each data item before being served to a query, in a fashion similar to the "If-modified-since", each cache entry is validated when queried using a modified search algorithm.

B. Key Allocations

In this module, we obtain key size, using key allocation algorithms. That is how many public keys and private keys allocated based on network size(number of user). After allocation keys, generate the distinct private key sets those who are all registered in Authentication server. Each user stored the common public keys and a own private key set.

C. Encryption

After stored keys in each User. Every user in mission critical environment is able to communicate securely with other user, with the help of their stored keys. Before Encryption, the user to make a request ID to the user whom is going to send message. After that, the public keys would be getting for Encryption based on receiver ID (Binary value). Here, the sending message would be encrypted using public key one, and then cyber text is encrypted one more time using public key two. Finally the message is transmitted to destination user.

D. Decryption

In this module, Decrypt message using already stored private keys set. First Decrypt the message using private key one and then to make another decryption using second private key. Finally we can show message in receiver Text Area.

E. File Sharing

Precondition: Here the Initiator is a client, who wants to send a file.

Actor Initializing: A department personnel (One client).

The User connects to the Server to send a file or a message.

The User selects another client to whom he wanted to send a file.

The User has to give the source path and the destination path correctly.

Exit.

*Post condition:*The Specified file will be transferred to the specified location if exists, in the remote system, if not 'Path not found' message has to be displayed appropriate to these structures.

VI. CONCLUSION

We generalized traditional quorum systems and proposed the Hyper Quorum System. We showed that Hyper Quorum System is fully adaptive in the sense that a station can select any value of cycle length that is best suited to its own requirements in terms of packet delay and power constraint. Two Hyper Quorum System constructing schemes were presented that facilitate power saving under both delay-constrained and best-effort traffic. Both the constructing schemes run in time, which may be readily adopted by nodes with limited computing power. We derived an analytical model characterizing the performance of a quorum based power saving protocol, based on which stations can determine a proper scheme and the optimal cycle length. Experimental results showed that our Hyper Quorum System based power management protocol renders significantly more stable performance under various traffic loads as compared to traditional quorum based power saving protocols. In particular, it gives up to 41% improvement in energy efficiency under heavy traffic loads while eliminating more than 90% delay drops under light traffic loads.

REFERENCES

[1]"The Network Simulator (ns-2)," [Online]. Available: http://www.isi.edu/nsnam/ns
[2]P. Bernstein, V. Hadzilacos, and N. Goodman, Concurrency Control and Recovery in Database Systems. Reading, MA, USA: Addison Wesley,1987.
[3]L. S. Committee, "Wireless LAN medium access control and physical layer specifications," 1999.
[4]G. Bianchi, "Performance analysis of the IEEE 802.11 distributed coordination function," IEEE J. Sel. Areas Commun., vol. 18, no. 3, pp. 535–547, Mar. 2000.
[5]R. Kravets and P. Krishnan, "Application-driven power management for mobile communication," Wireless Netw., vol. 6, no. 4, pp. 263–277, 2000.
[6]L. Feeney and M. Nilsson, "Investigating the energy consumption of a wireless network interface in an ad hoc networking environment," in Proc. IEEE INFOCOM, 2001, pp. 1548–1557.
[7]E. Jung and N. Vaidya, "An energy efficient MAC protocol for wireless LANs," in Proc. IEEE INFOCOM, 2002, pp. 1756–1764.
[8]Y. Chow and H. Teicher, Probability Theory: Independence, Interchangeability, Martingales. New York, NY, USA: Springer-Verlag,2003.
[9]D. Collins, Carrier Grade Voice over IP.NewYork, NY, USA: McGraw-Hill, 2003.
[10]J. Jiang, Y. Tseng, C. Hsu, and T. Lai, "Quorum-based asynchronous power-saving protocols for IEEE 802.11 ad hoc networks," MobileNetw. Appl., vol. 10, no. 1–2, pp. 169–181, 2005.
[11]R. Krashinsky and H. Balakrishnan, "Minimizing energy for wireless Web access with bounded slowdown," Wireless Netw., vol. 11, no. 1–2, pp. 135–148, 2005
[12]M. Anand, E. Nightingale, and J. Flinn, "Self-tuning wireless network power management," Wireless Netw., vol. 11, no. 4, pp. 451–469, 2005.
[13]C. Chao, J. Sheu, and I. Chou, "An adaptive quorum-based energy conserving protocol for IEEE 802.11 ad hoc networks," IEEE Trans. MobileComput., vol. 5, no. 5, pp. 560–570, May 2006.
[14]Z. Chou, "Optimal adaptive power management protocols for asynchronous wireless ad hoc networks," in Proc. IEEE WCNC, 2007, pp. 61–65.
[15]B. Choi and X. Shen, "Adaptive asynchronous sleep scheduling protocols for delay tolerant networks," IEEE Trans. Mobile Comput., vol. 10, no. 9, pp. 1283–1296, Sep. 2011.

Saranya.R undergoing her Master of Computer Science and Engineering in MeenakshiRamaswamy Engineering College, Thathanur, Tamil Nadu,India.

Meenatchi.Areceived **B.E.**, computer science and engineering degree from Arasu engineering College, Kumbakonam in 2012.Now currently pursuing doingundergoing her Master of Computer Science and Engineering in MeenakshiRamaswamy Engineering College, Thathanur, Tamil Nadu, India.

Makuru.Mobtained his M.E., degree from various recognized universities. He is currently working as a associate professor inMeenakshiRamaswamy Engineering College, Thathanur, Tamil Nadu, India.