RESEARCH ARTICLE OPEN

Efficient Load Balancing for Multimedia Transmission

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Abstract:

In wireless network application are built and used in various domain like health care system, education, utilities, field sales, public network, etc…the critical factor in wireless network are energy and quality video delivery. The biggest challenges in wireless network is handling video data. The quality of video data application mainly depends on delivery rate i.e without delay and error rate. E-Mesh, an energy-aware QoS ensured wireless routing algorithm is proposed that utilize the energy levels at each mesh router. the factor like current traffic load amount and distance between mesh routers for the selection of routers and are considered to enable the video delivery over optimal route. If the video content is large and if the same path is used for prolong then it leads to energy inefficiency of the nodes in the specific path. To overcome such problem, video content is sent simultaneously via multiple paths which are efficient in terms of energy, load and distance. so a new modified routing algorithm(MRP) is proposed . That in turn decrease end to end of video delivery with minimized error rate.

Keywords — **Energy-aware, MRP , Multimedia, Multipath, QoS**.

A.INTRODUCTION

The rapid growing demand of real time multimedia applications over mobile wireless networks, e.g.live streaming video,video conference,multi-player on-line gaming,etc opens the possibility to consider multipath transport as a promising solution due to its benefits,including high throughput and improved reliability. The tremendous growth of multimedia application together with advanced development in digital technology and with the increased use of mobile terminal has pushed the research towards new network technologies and standards for wireless environment.

Viewers can now watch television at home or in a vehicle during transit using various kinds of handheld terminals, including mobile phones, laptops computers, and in-car devices. The concept of providing television-like services on a handheld device has generated much enthusiasm. Mobile telecom operators are already providing video-streaming services using their third-generation cellular networks. Simultaneous delivery of large amounts of consumer multimedia content to vast numbers of wireless devices is technically feasible over today's existing networks, , it is possible to use a multi-layer hierarchic platform that use satellite segment together with wireless network based on IEEE802.11 standard [2,3,4] and with cellular network in order to have an ubiquitous coverage. In order to grapple with the continuously increasing demand on multimedia traffic over high speed wireless broadband networks it is also necessary to make network able to deal with the QoS constraints required by users. In order to provide quality of service to user applications, networks need optimized scheduling and connection admission control algorithm. These mechanisms help to manage multimedia traffic guaranteeing QoS to calls already admitted in the system and providing QoS to the new connection. In order to evaluate the quality of video traffic with the mobility it is important to examining the quality.

Multiple disjointed paths have been demonstrated to be effective in delivering multimedia traffic in wireless sensor networks, and improving the network performance in terms of bandwidth aggregation, reliability and network lifetime. In this paper, we investigate the use of directional geographical routing for multipath construction for multimedia data dissemination, and identify the challenging issue of achieving multipath balancing in proximity to the source/sink.

Loadin the network is balanced to enhance the throughput minimize the delay thereby enhancing the Qos . It enhances the lifetime of the network channel.The performance can be improvised by using the Modified Routing Protocol(MRP) is proposed to achieve the effectiveness of the network

B. RELATED WORK

In (12)A hybrid multimedia delivery solution is proposed which balances the benefits of multimedia content adaptation and of network selection to decrease power consumption in a heterogeneous wireless network environment.

E-PoFANS(3) enables the battery of the mobile device to last longer, while performing multimedia content delivery, and maintains an acceptable user perceived quality by selecting the energy-aware cross-layer solution for high quality multimedia deliveries over wireless mesh networks.

The core idea of E-Mesh(1) is to save energy at mesh network devices by managing their sleep-periods in a more smart way, while also trying to maintain high multimedia delivery quality. E-Mesh includes an innovative MAC-layer scheme for mesh device sleepperiod management and an energy-aware extension of the Optimized Link State Routing algorithm network.

AOC-MAC(6) is deployed in conjunction with E-Mesh, an energy-aware routing algorithm in an energy-aware cross-layer solution for

video delivery over wireless mesh networks, in order to provide fair trade-off between energy depletion on one side and network delivery performance and user-perceived quality on the other that offers the best energy-quality tradeoff. To facilitate energy trend estimation develop an energy flow model that accounts for communication and energy harvesting equipment hardware specifications; high resolution, time-varying weather information; and the complex interaction among them. To show the model's practical benefits,

C. SYSTEM ARCHITECTURE

Different routing protocols for mobile adhoc networks could be opposed depending upon the network design and the application. MRP uses an improved energy conservation techniques using the energy efficient routing protocols in MANETS.Energy efficiency and QoS of E-Mesh routing protocol is improved further through Modified routing protocol. In Modified routing protocol use energy optimal routes to reduce the energy consumption of nodes.A Mobile Ad-hoc Network (MANET) is a self-configuring network composed of mobile nodes without any fixed infrastructure. Energy efficiency is a major issue of concern in mobile ad hoc networks as mobile nodes rely on batteries, which are limited sources of power, and in several environments, it is quite a unwieldy task to replace or renew them. Energy is limited factor in case of Ad-hoc networks. The life of a node is directly relative to the battery in the instrument operating at the node. Maximize the use of energy and maximize the life of network is still the key challenge of Mobile Ad hoc network. MRP selects the multiple optimal pathbased on the utility calculation results provided by the Energy-Load-Distance Utility Function module, multiple efficient paths are selected. Optimal utility values paths are filtered in route selection modules present in the MRP protocol. Video content is sent simultaneously via multiple opimal paths which are efficient in terms of energy, load and distance.in the first phase the information of energy,load, position of the source ad neighbor nodes are calculated from the cross layer (i.e physical layer and MAC layer).then AOC-MAC duty cycle management scheme is implemented in the MAC layer. This duty cycle management scheme manages the sleep periods of the mesh nodes present in the network in an innovative way. so that energyconsumption of mesh nodes even when the mesh nodes are idle is reduced. hence overall residual energy of the network is increased.

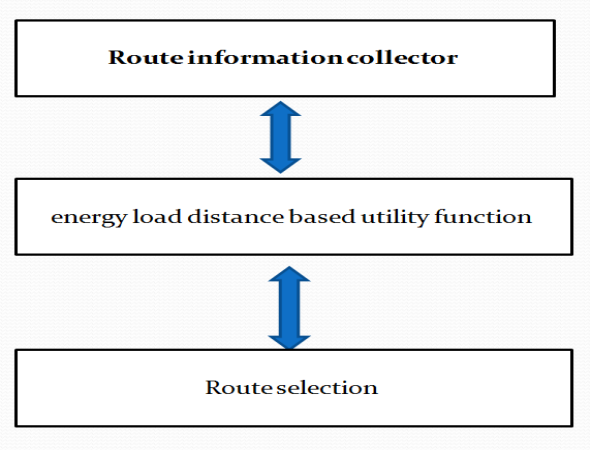

FIG 1: MRP BLOCK DIAGRAM

1.Information Collection

From the cross layer, device-condition-based information from the mesh routers, including the remaining energy levels at each mesh router, current traffic load amount and distance between mesh routers, are gathered this was calculated using the position of each router

2.AOC- MAC Implementation

The duty cycle of each mesh router is controlled with the MAC-layer solution, which periodically observes the communication states of the mesh routers included and adjusts the length of the active periods of the mesh router in the duty cycle according to the communication states.

3.Data Transmission

Each mesh router ni considers the following three key criteria for utility calculation: its local position in terms of the (Xi , Yi) coordinates, its present network traffic load Li and its remaining energy Ei. By using this utility function is calculated.

4.Load Balancing Routing Protocol

In this module, based on the utility calculation results provided by the module, multiple efficient paths are
selected.

5.Performance Evaluation

The protocol is developed bymodifying routing algorithm. Comparison is made between the E-Meshand enhanced MRP protocol. Both are evaluated for the simulation settings as per the simulation model and compared. Metrics such as Delay are evaluated for varying number of nodes as 30, 40, and 50. Graphs are plotted for performance metrics using Xgraph in NS-2.

D. RESULT AND DISCUSSION

EAPR and MRP protocols are compared for thescenarios of varying number of nodes. Scenario is kept same for both protocols with same topology, energy and mobility. Totally 3 simulation runs are made by varying number of nodes as 30, 40, and 50. Parameters such as delay is computed and plotted as Xgraph.

Performance Metrics
Delay

It is the time taken for the packet to reach from source sensor to destination. The delay is calculated by differing the no of nodes the resultant graph Fig[2] denotes the comparison values of E-MESH and the modified routing protocol(MRP). The graph is denoted in the x graph x-axis denote nodes y axis denotes the delay. It shows that the MRP delay is very less when compared with EARP delay. When the number of nodes increased the delay is increased.

The graph denotes E-Mesh incurs increased delay compared to MRP(Modified Routing Protocol)

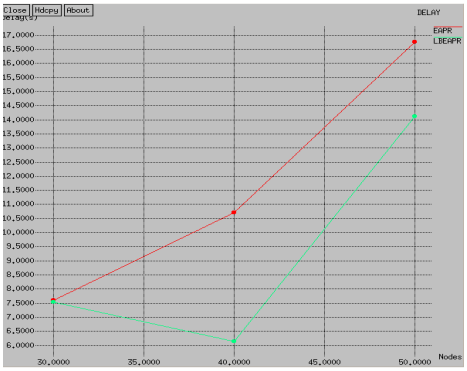

FIG 2: GRAPH THAT DENOTE DELAY

CONCLUSION

This articleproposes MRP,anew routing metric that addresses in WMNs along with the AOC-MAC duty cycle management in the MAC layer for balancing energy and quality of a video application.This algorithm selects the path through less congested areas and balances traffic loads among the nodes. The paths selected are multipath based on the utility function.Furthermore, MRP balances the energy consumption of the whole network and extends the overall lifetime of WMNs. Simulation results show that the performance of the proposed protocol outperforms existing algorithm.

Future enhancement can be done in increasing the PDR and the energy consumption so that QoS of the network is increased.

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