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UNIFORM AND NON UNIFORM LOAD BALANCING FOR MANET'S USING BASE64 FOR ENCRYPTION

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ABSTRACT

Mobile adhoc networks have become enormously common now-a-days. It is free to move independently in any direction. Coordinated channel access protocols have been well suited for uniform load distribution in MANET environment. By applying the dynamic channel allocation algorithm and cooperative load balancing algorithm for managing non-uniform load distribution, for energy efficient real-time co-ordinated MAC protocols. In this paper, we dynamically allocate a channel in cluster based MANETS having uneven loads and reuse the allocated channels using stacks and CSMA. And it can efficiently forward the data. We show that both the dynamic channel allocation and co-operative load balancing improve the bandwidth efficiency under the non-uniform load distribution compared to the IEEE802.11 uncoordinated protocol and IEEE802.15 protocol.

Keywords: MANETS, mobile Adhoc networks, co-operative load balancing, non-uniform load distribution.

1. INTRODUCTION

Mobile Adhoc networks have been vital type of Adhoc network that can change location and configure itself, wireless network of mobile devices. The links to other devices change frequently. This can be a standard Wi-Fi connection, such as cellular or satellite transmission. Some MANETS restricted to a local area of wireless devices (such as a group of laptops, computers), while others may be connected to internet. The primary challenge in building a MANET is corresponding each device to always maintain the information required to accurately route traffic.

Based on collaboration level, MAC protocols for wireless network can be classified as co-ordinated and uncoordinated MAC protocols. For low networks loads, in uncoordinated protocols nodes contend with each other to share the common channel. These protocols are bandwidth efficient due to lack of overhead as the network load is indirectly proportional to bandwidth. Coordinated channels will reduce energy dissipation and increase throughput for dense networks. MAC protocol design is the maximizing of spatial reuse and providing support for non-uniform load distributions as well as supporting multicasting at the link layer. Multicasting will allow sending a single packet to multiple beneficiaries. In most of the cases, supporting multicasting services at the link layer is vital for efficient use of network resources, since this approach eliminates the need for multiple transmissions of an identical payload while sending it to different destinations. Integrating spatial reuse into MAC protocol increases bandwidth efficiency. On other hand, the traffic load may be highly non-uniform over the network area due to dynamic behaviour in MANET. So it is crucial that the MAC protocol should capably handle non-uniform traffic loads. Uncoordinated protocols intrinsically integrate spatial reuse and adjust to the changes in load distribution through the carrier sensing mechanism.

Akin to the cellular systems, coordinated MANET MAC protocols have a need of spatial reuse and channel borrowing mechanisms. Because of node mobility and dynamic nature of the sources in a MANET, the network load is non-uniformly distributed. In this paper we propose two algorithms with the non-uniform and uniform load distributions in MANETS. Dynamic channel allocation algorithm which is based on base64 algorithm will send the transmit data packets balanced and overcome the traffic problem, while sending the data to respective nodes. Nodes select their channel access providers based on the availability of resources in Co-operative load balancing algorithm.

By applying these we used to construct a dynamic channel allocation in cooperative load balancing in a cluster based MANET environment. To provide dynamic channel allocation and co-operative load balancing use DCA-TRACE. (DYNAMIC CHANNEL ALLOCATION). We create nodes and channel election process of cluster head, in which the channel is of having capacity it elected as a cluster head.

LITERATURE SURVEY

Project title: MH-Trace: Multi-Hop Time Reservation Using Adaptive Control for Energy Efficiency

Author name: Bulent Tavli and Wendi B. Heinzelman

Description: Multi-Hop Time Reservation Using Adaptive Control for Energy Efficiency (MH-TRACE) is a distributed MAC protocol for energy efficient real-time packet broadcasting in a multi-hop radio network. In MHTRACE, the network is dynamically partitioned into clusters without using any global information except global clock synchronization. The clustering algorithm is simple and robust enough to ensure that the gain from clustering is much higher than the clustering overhead, even in the presence of node mobility. In MH-TRACE, time is organized into super frames, which consist of several time frames. Each cluster chooses a frame for

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transmitting control packets and for the transmission of data from nodes in the cluster. However, each node in the network can receive all the desired packets in its receive range without any restriction based on the formed clusters. Each node learns about future data transmissions in its receive range from information summarization (IS) packets sent prior to data transmission by each transmitting node. Therefore, each node creates its own listening cluster and receives the packets it wants. By avoiding energy dissipation for receiving unwanted data packets or for waiting in idle mode, MH-TRACE guarantees the network to be highly energy efficient. Furthermore, since data transmission is contention free, the throughput of MHTRACE is better than the throughput of CSMA type protocols under high traffic loads.

Project title: Analytical performance of soft clustering protocols

Author name: Bora Karaoglu ⇑, Tolga Numanoglu, Wendi Heinzelman

Description: The success of a mobile ad hoc network (MANET) is strongly related to the protocol used at the medium access control (MAC) layer. Depending on the requirements and the specific network under concern, the protocol parameters at the MAC layer can be arbitrated to make best use of the channel resources. Typically, extensive simulation studies are used to find the best values for these variables. The problem with this approach is the need for excessive amounts of processing power and time. As the dimensions of the decision space increase, the need for processing power grows exponentially. This paper addresses this problem by developing an analytical model that reflects the relationships between protocol parameters and the overall performance of the protocol under various network conditions. Specifically, we model the MH-TRACE cluster-based protocol, which is capable of supporting real-time data transmission. The model is capable of estimating performance measures such as energy consumption and number of receptions while being simple enough to be run for a large set of parameters. The model can be used to optimize parameters of the protocol (such as the number of frames per super frame) as well as to predict the performance variations as the external conditions (such as data generation rate) vary.

Project title: Efficient Use of Resources in Mobile Ad Hoc Networks

Author name: Bora Karaoglu

Description:

Efficient use of the resources in mobile ad hoc networks (MANETs) is of great importance to maintain the required quality of service and to prolong the network lifetime. The utilization of the resources such as bandwidth and energy depends on a number of conditions such as network size, node density, and load distribution. These conditions are uncontrollable and often vary throughout the operation of the network. In order to efficiently use the resources, the protocols that determine the behaviour of the network should dynamically adapt to these changing conditions. My thesis is that a protocol architecture for MANETs that dynamically adapts to changing conditions based on cooperation and information sharing leads to more efficient use of the system resources compared to competition based architectures. In particular, in this dissertation we explore the benefits of adaptation based on cooperation and information sharing at the medium access control (MAC) and network (routing) layers of the protocol stack. At the MAC layer, we develop an analytical model that reacts the relationships between protocol parameters and the overall performance of the protocol under various network conditions. This model reveals that the protocol parameters at the MAC layer can be adjusted to make best use of the channel resources depending on the application requirements and network conditions obtained through information sharing, such as average network load density. In order to provide a dynamic system that adapts not only to changing conditions but also to spatially non-uniform load distributions, a lightweight dynamic channel allocation vii algorithm and a cooperative load balancing algorithm that facilitate efficient use of resources based on local information sharing are proposed. Through extensive simulations, we show that both dynamic channel allocation and cooperative load balancing improve the bandwidth efficiency under non-uniform load distributions compared with protocols that do not use these mechanisms as well as compared with the IEEE 802.11 uncoordinated protocol. Properly routing the data over a MANET is another challenging topic due to the dynamic behaviour of the network, yet it is also crucial in terms of efficient use of resources. Two important routing schemes, network-wide broadcasting and multicasting, are investigated for trade-o s and merged into a single framework. The framework allows the selection of the optimal routing scheme based on the network conditions obtained through information sharing, leading to the best use of the system resources in terms of spectrum efficiency and energy efficiency. The interaction of a network with other networks coexisting at the same site also strongly determines its efficiency. We developed an approach for symbiotic networking using hybrid nodes, and our results clearly show that symbiotic networking can provide vital support to co-located networks, which is especially important in resource-constrained networks such as MANETs. Although theoretical analysis and simulations are efficient tools to comparatively evaluate the efficiency of different protocols, they cannot re ect many of the challenges for real implementation of these protocols, such as clock-drift, synchronization, imperfect physical layers, and interference from devices outside of the system. In order to prove the feasibility of the MAC and Network layer algorithms proposed in this thesis, a working prototype system that incorporates these algorithms is implemented on the Microsoft Research's SORA software de ned radio (SDR) platform. The experiments with the prototype system show not only the viability of real time

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communications but also show the resilience of the system against interference. viii To sum up, a variety of methods ranging from MAC layer techniques for optimal spatial reuse and dynamic channel allocation, to network layer techniques for optimal data dissemination schemes and symbiotic interactions with co-located networks are described in this thesis. These concepts enable protocol architectures for MANETs that dynamically adapt to changing conditions based on cooperation and local information sharing. The efficient use of the limited bandwidth and energy resources obtaind through such protocol architectures with a realistic set of constraints ensure the viability of future applications.

3. PROPOSED SYSTEM

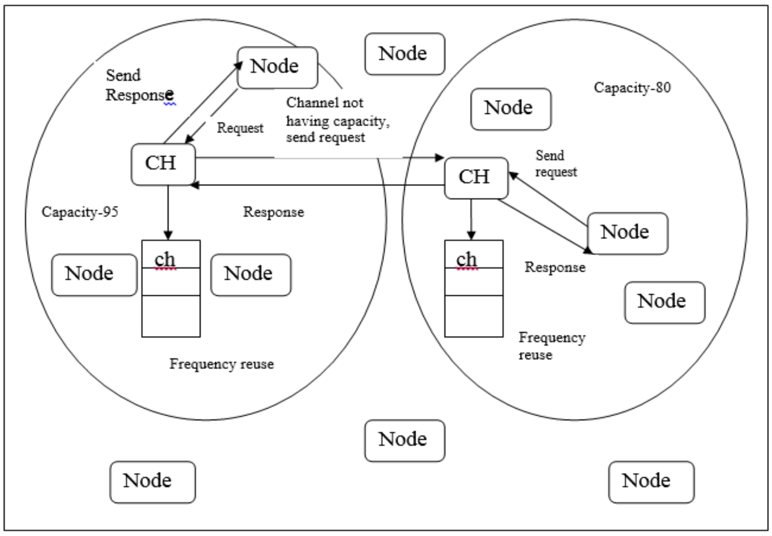
In this project we construct a dynamic channel allocation in cooperative load balancing in a cluster based MANET environment. To provide cooperative load balancing and dynamic channel allocation use DCA-Trace (Dynamic channel Allocation). DCA-TRACE protocol contains two types of slots contention slots, data slots. Contention slots are utilized by the nodes to send their channel access request. Data slots are used to all nodes are receiving the data successfully by sending acknowledgement to nodes. The need for dynamic channel allocation is the channel controller continuously monitor the power level in all the available channel in network and assess the availability of the channels by comparing the measured power level is below means it access the other channel in the network

We create Nodes and channel Election process of cluster head; channel having high capacity is choosen as cluster head. Beacon packets are used to recognise channel coordinator if beacon packets are not available until time expires then it will automatically create cluster head. Allocation of a channel depends on power level. Reuse of channel is based on channel capacity. Cluster head maintain's stack which depends on size. Data can be split in to packets and then it is transmitted to destination nodes.

3.1 Advantages

- Frequency reuse.
- For security
- Overcome traffic problem while sending data to respective nodes.
- Not only uniform load balancing but also non uniform load balancing is done in MANETS for energy efficiency.

3.2 Proposed design



- CH-cluster head
- Ch-channel

4. METHODOLOGIES

4.1 Creation of regions and nodes

We can create the number of regions we want to create depending upon the range. When we click on the region icon an region page will appearing and there by clicking on the regions blank spaces will be popped out. In the region page region intimation, frequency pool, channel coordinator and frequency allocated columns will be present. A table will be present consisting of the serial number, cc names, strength, channels, frequencies allocated, and in this table depending upon the regions and nodes the columns in the table will be filled. We can give the distance and range in the nodes by clicking on the node icon. When we click on the node icon a box will be popped out to enter the distance and next to enter the range a box will be appeared and depending upon the distance and range which have be entered in the node memory,

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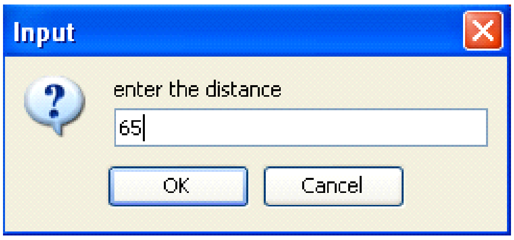
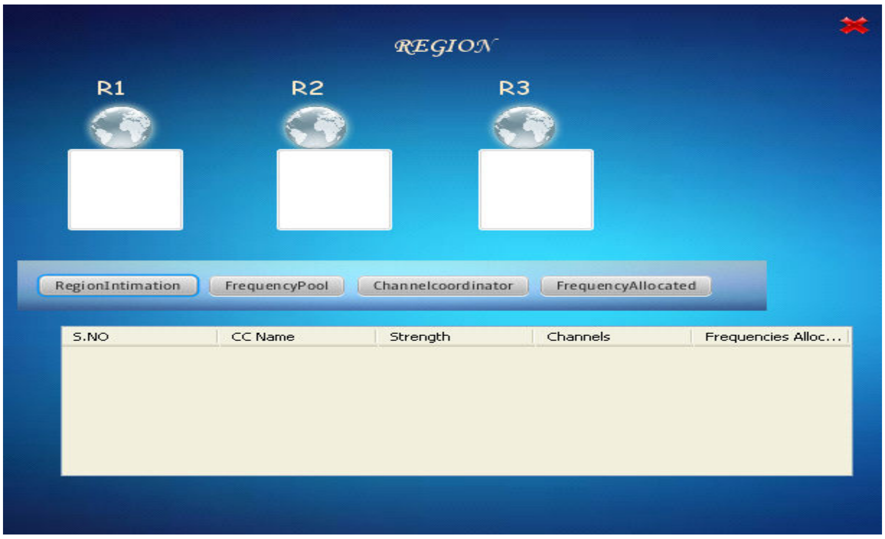
mobility and battery will be calculated. We can create many number of nodes and depending upon the nodes range and distance it will be allocated into region.





For example:-In region 1 we will be allocating from 0-50, in region 2 51-100, in region 3 101-150. If the range and distance is above 150 it will be allocated in the out of coverage region. if we give range and distance as 25 and 11 then the mobility, memory, battery will be calculated as 70,49,29.

4.2 Cluster head

By giving range and distance in the node the mobility, memory and battery will be calculated. The node which has more capacity which will be calculated by the average of the mobility, memory and battery will be elected as the cluster head to that particular region. Each region will be consisting of cluster head. Through the cluster head only the data will be sent by checking the packets in its own region.

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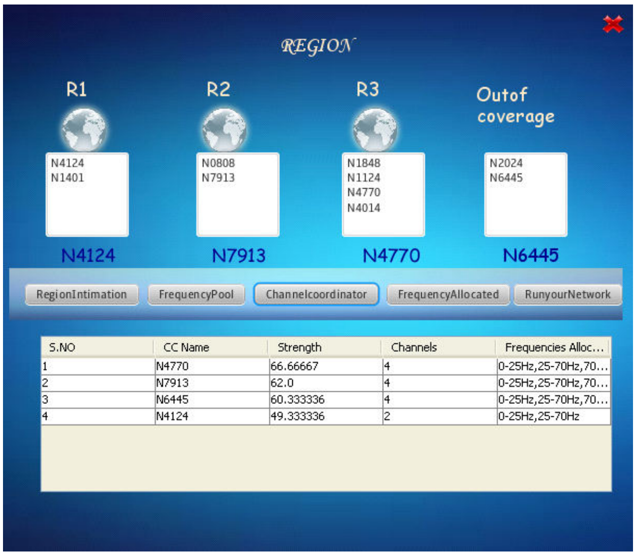
4.3 Frequency and channel allocation

Channel allocation will allocate the channels within the cell to communicate through the available channels. By clicking the frequency it will create a table in it channels will be formed based on the strength while the strength is 0-25 it channel is 1 ,25.1-50 it allocate channel 2, 50.1-60 it allocate as channel 3, 60.1 - 70 it allocate as channel 4.



4.4 Sending data

In this we have to give destination node from the path which we want to send the data. The node in which we have given the destination will first send to its particular cluster head region and it will check for the available channels to send the data to the destination within the short time and the best path. Here if all the channels are busy it will also check in the out of coverage region and send the data to the destination Here depending upon the channels availability the path will be formed and final path will be appeared. A channel column will be present and under it the frequencies will be present and the channels which are in red colour indicates that particular channel is busy and the channels in green colour indicates that particular channel is available to send the send. Firstly we should give the destination and then we should click on the file chooser and select the file we want to send, then we should click on the final path and at last we should select the send data in the node and the data will be sent.

5. RESULT AND DISCUSSIONS

The destination which we want to send the data will be receiving the data through the path which is allocated to it. After receiving the data it will be displayed in the receiver column. While sending the data we will be getting the status of how many packets were being sent. After sending all the packets the data will be sent completely and we check whether the data is sent to the destination or not in the receiver column.

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6. CONCLUSIONS

In this paper, DCA algorithm approaches the problem of non-uniform load distribution from the channel co-ordinator. For managing non-uniform load distributions for energy efficient real time co-ordinated MAC protocol we apply both CLB and DCA algorithms. Where it is energy efficient compared to CSMA protocol.

The data can be sending very balanced. Traffic overhead problem is achieved. Data can be sending immediately to respective nodes. Here work overload problem is overcome by dynamic channel allocation. So that the data can be sending in secured and also balancing manner in MANET network.

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