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Dynamic Mesh Networks for Mobiles

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ABSTRACT:

Mobile ad hoc networks (MANETs) are ideal for situations where a fixed infrastructure is unavailable or infeasible. Today's MANETs, however, may suffer from network partitioning. This limitation makes MANETs unsuitable for applications such as crisis management and battlefield communications, in which team members might need to work in groups scattered in the application terrain. In such applications, intergroup communication is crucial to the team collaboration. To address this weakness, we introduce in this paper a new class of ad-hoc network called Dynamic Mesh Networks for Mobiles(DMNM) Unlike organizing them into a suitable network topology to ensure good connectivity for both intra- and intergroup communications. We propose a distributed client tracking solution to deal with the dynamic nature of client mobility, and present techniques for dynamic topology adaptation in accordance with the mobility pattern of the clients. Our simulation results indicate that DMNM is robust against network partitioning and capable of providing high relay throughput for the mobile clients.

INTRODUCTION

What is Mobile Computing?

Mobile computing is the discipline for creating an information management platform, which is free from spatial and temporal constraints. The freedom from these constraints allows its users to access and process desired information from anywhere in the space.

The state of the user, static or mobile, does not affect the information management capability of the mobile platform. A user can continue to access and manipulate desired data while traveling on plane, in car, on ship, etc. Thus, the discipline creates an illusion that the desired data and sufficient processing power are available on the spot, where as in reality they may be located far away. Otherwise **Mobile computing** is a generic term used to refer to a variety of devices that allow people to access data and information from where ever they are.

Structure of mobile computing

Different types of devices used for the mobile computing:

1. Personal digital assistant/enterprise digital assistant
2. Smartphones
3. Tablet computers
4. Netbooks

5. Ultra-mobile PCs
6. Wearable computers
7. Palmtops/pocket computers

Applications of Mobile Computing:

1. Vehicles:

Tomorrow's cars will comprise many wireless communication systems and mobility aware applications. Music, news, road conditions, weather reports, and other broadcast information are received via digital audio broadcasting (DAB) with 1.5 M-bits/s. For personal communication, a global system for mobile communications (GSM) phone might be available offering voice and data connectivity with 384 k-bits/s. For remote areas satellite communication can be used, while the current position of the car is determined via global positioning system (GPS). Additionally, cars driving in the same area build a local ad-hoc network for fast information exchange in emergency situations or to help each other keeping a safe distance. In case of an accident, not only will the airbag be triggered, but also an emergency call to a service provider informing ambulance and police. Cars with this technology are already available. Future cars will also inform other cars about accidents via the ad hoc network to help them slow down in time, even before a driver can recognize the accident. Buses, trucks, and train are already transmitting maintenance and logistic information to their home base, which helps o improve organization (fleet management), and thus save time and money.

2. Emergency:

Just imagine the possibilities of an ambulance with a high quality wireless connection to a hospital. After an accident, vital information about injured persons can be sent to the hospital immediately. There, all necessary steps for this particular type of accident can be prepared or further specialists can be consulted for an early diagnosis. Furthermore ,wireless networks are the only means of communication in the case of natural disasters such as hurricanes or earthquakes.

3. Business:

Today's typical traveling salesman needs instant access to the company's database: to ensure that the files on his or her laptop reflect the actual state, to enable the company to keep track of all activities of their traveling employees, to keep databases consistent etc., with wireless access, the laptop can be turned into a true mobile office.

Benefits of Mobile Computing

Improve business productivity by streamlining interaction and taking advantage of immediate access. Reduce business operations costs by increasing supply chain visibility, optimizing logistics and accelerating processes Strengthen customer relationships by creating more opportunities to connect, providing information at their fingertips when they need it most. Gain competitive advantage by creating brand differentiation and expanding customer experience. Increase work force effectiveness and capability by providing on-the-go access.

Advantages of Mobile Computing:

Mobile computing has changed the complete landscape of human being life. Following are the clear advantages of Mobile Computing:

Location flexibility: This has enabled user to work from anywhere as long as there is a connection established. A user can work without being in a fixed position. Their mobility ensures that they are able to carry out numerous tasks at the same time perform their stated jobs.

Saves Time: The time consumed or wasted by travelling from different locations or to the office and back, have been slashed. One can now access all the important documents and files over a secure channel or portal and work as if they were on their computer. It has enhanced telecommuting in many companies. This also reduces unnecessary expenses that might be incurred.

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Enhanced Productivity:

Productive nature has been boosted by the fact that a worker can simply work efficiently and effectively from which ever location they see comfortable and suitable. Users are able to work with comfortable environments.

SYSTEM ARCHITECTURE:

EXISTING SYSTEM:

In a standard wireless mesh network, stationary mesh nodes provide routing and relay capabilities. They form a mesh-like wireless network that allows mobile mesh clients to communicate with each other through multihop communications. Such a network is scalable, flexible, and low in maintenance cost. When a mesh node fails, it can simply be replaced by a new one; and the mesh network will recognize the new mesh node and automatically reconfigure itself.

Disadvantages of Existing System:

Difficult to design robust MANETs for minimize network partitions.

PROPOSED SYSTEM:

In this paper, we introduced a mobile infrastructure called DMNM. Unlike conventional mobile ad hoc networks that suffer network partitions when the user groups move apart, the mobile mesh routers of an DMNM track the users and dynamically adapt the network topology to seamlessly support both their intragroup and intergroup communications. Since this mobile infrastructure follows the users, full connectivity can be achieved without the need and high cost of providing network coverage for the entire application terrain at all time as in traditional stationary infrastructure.

Advantages of Proposed System:

DMNM can forward data for mobile clients along the routing paths built by any existing ad hoc routing protocols. DMNM is robust against network partitioning and capable of providing high relay throughput for the mobile clients.

IMPLEMENTATION

MODULES:

1. DMNM.
2. Adapting to Intragroup Movement
3. Reclaiming Redundant Routers
4. Interconnecting Groups
5. Topology adaptation.

MODULES DESCRIPTION:

DMNM:

An DMNM is a mesh-based infrastructure that forwards data for mobile clients.Tharoles in this network:

Intra-group routers: A mesh node is an intra-group router if it detects at least one client within its radio range and is in charge of monitoring the movement of clients in its range. Intra-group routers that monitor the same group of clients can communicate with each other via multi-hop routing. For example, routers r1and r2 are intra-group routers that monitor groupG1.

Intergroup routers: A mesh node is an intergroup router, i.e., square nodes, if it plays the role of a relay node helping to interconnect different groups. For each group, we designate at least one intergroup router that can communicate with any intra-group routers of that group via multi-hop forwarding as the bridge router, for example, routerb1for groupG1.

Free routers: A mesh node is a free router if it is neither an intra-group router nor an intergroup router.

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Adapting to Intra-group Movement

Each client continuously broadcasts beacon message to notify its present within the ratio range of an intra-group router. When this router no longer hears the expected beacon messages, one of two possible scenarios might have happened. The first scenario is client moves out of the communication range of router into the communication range of an adjacent router in the same group.The second scenario isthe missing client moves from the communication range of router to a space not currently covered by any of the routers in the group.

Reclaiming Redundant Routers

When the intra- and intergroup routers are no longer required due to client mobility, the DMNM should reclaim them for future use.

Interconnecting Groups

Given a set of intra-group routers that provide communication coverage for a group of mobile users, these mobile users might move out of this coverage area in smaller groups. To avoid network partitioning, each of the new groups must be supported by their local intra--group routers; and intergroup routers must organize themselves into a sub-network of bridges to support the intergroup communications.

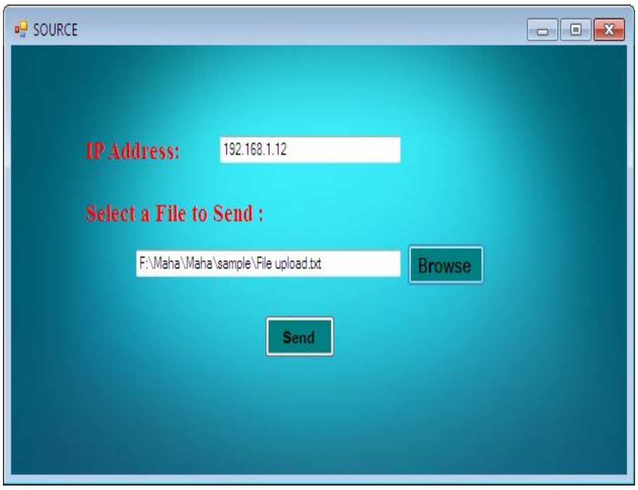
Topology adaptation

In this Module, we use two topology adaptation schemes, namely local adaptation and global adaptation, each with a different resolution of location information to shorten the relay paths between groups.

SCREEN SHOTS

SOURCE:

File Transfer: Internet Protcol is a server where you can get your Web Pages.

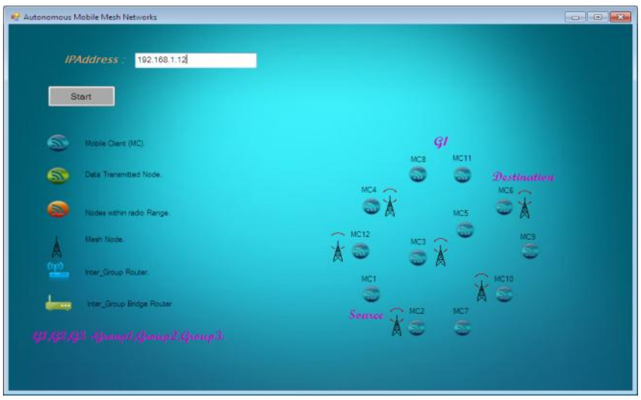


DESTINATION :

Set Receiving Path: You can bring your data where your data will be store.

ROUTER:

Start Simulation with single group: You can simulate every modules through one by one.



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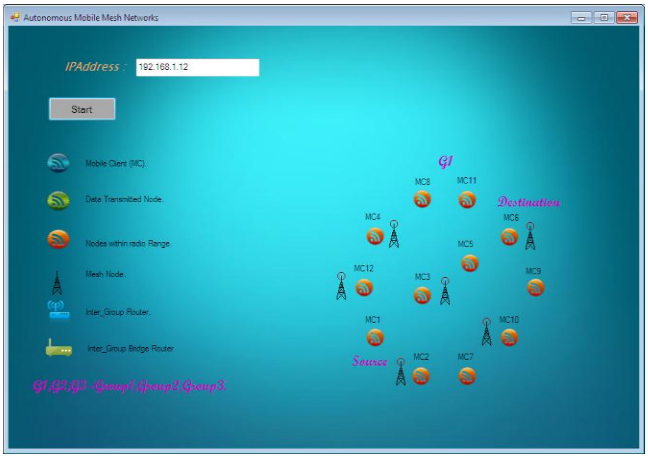
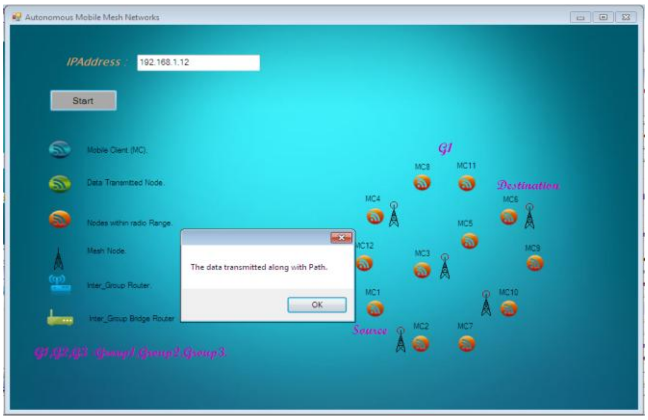
Broadcast Beacon Message: Connect with Transmission to Server and then Broadcast the Messages.



Data transfer: Data intermission between client and server called data transfer. The data transmitted along with Path



CONCLUSION:

For applications such as crisis management and battlefield communications, the mobile users need to work in dynamically formed groups that occupy different parts of a large and uncertain application terrain at different times. There is currently no cost-effective solution for such applications. Since the user groups occupy only a small portion of the terrain at any one time, it is not justifiable to deploy an expensive infrastructure to provide network coverage for the entire application terrain at all time. Other challenges are due to the potentially hostile environment and the uncertainty in how the application terrain unfolding with time. In this paper, we introduced a mobile infrastructure called DMNM. Unlike conventional mobile ad hoc networks that suffer network partitions when the user groups move apart, the mobile mesh routers of an DMNM track the users and dynamically adapt the network topology to seamlessly support both their intragroup and intergroup communications. Since this mobile infrastructure follows the users, full connectivity can be achieved without the need and high cost of providing network coverage for the entire application terrain at all time as in traditional stationary infrastructure. We conducted extensive simulation study to assess the effectiveness of DMNM. The results confirm that the proposed distributed topology adaptation scheme based on autonomous mobile mesh routers is almost as effective as a hypothetical centralized technique with complete knowledge of the locations of the mobile clients.

The simulation results also indicate that DMNM is scalable with the number of users. The required number of mobile mesh nodes does not increase with increases in the user population. Although an excessively large number of user groups may affect the performance of DMNM, the number of user groups is typically very small relative to the number of users for most applications and DMNM is effective for most practical scenarios. There are still many interesting issues not yet examined in our study such as searching for disappearing mobile clients, minimizing routing paths, and utilizing nonoverlapping channels. We leave these changes for future research.

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