International Journal of Computer Networks and Communications Security

VOL. 4, NO. 7, JULY 2016, 213–217
Available online at: www.ijcncs.org
E-ISSN 2308-9830 (Online) / ISSN 2410-0595 (Print)

Simulation of Mobile Backbone Network

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ABSTRACT

The Mobile Backbone Network (MBN) architecture has been introduced to support multimedia applications for mobile adhoc wireless network. Under the MBN architecture, backbone nodes are dynamically elected to construct a mobile backbone network (Bnet). The MBN employs Mobile Backbone Network Routing with Flow Control (MBNR-FC) mechanism. It reduces the routing control overhead by selectively flooding route discovery messages solely across the Bnet. The MBNR-FC protocol also guides routing to traverse areas that are less congested. When the synthesized Backbone net is unable to cover the whole network area, the use of backbone paths can limit the overall throughput capacity. It also presents a Mobile Backbone Network Routing with Flow Control and Distance Awareness Control (MBNR-FC/DA) scheme. Under the MBNR-FC/DA scheme, flows that travel a distance no longer than the distance threshold can employ non backbone routes In this way, the capacity of communication links that are located away from the Bnet is utilized to to upgrade the overall throughput capacity. Analytical procedure for the calculation of the effective distance threshold level under various the MBNR-FC/DA scheme.

Keywords: *IEEE 802.15.6, HBC, BER, Hamming, Jaccard*.

1 INTRODUCTION

Adhoc networking protocols are devised for mobile wireless networks that operate in an environment that lacks an existing networking infrastructure.

In this work, the focus is on Heterogeneous Cluster Routing to Support QoS in Mobile Adhoc Networks. This simulation tries to achieve performs intra-cluster routing efficiently. Here each of these objectives depends upon Heterogeneous Routing parameters. Depending upon the parameters considering and usage, different objectives can be achieved. These parameters can be varied depending upon the application. As every application have different requirements of the QOS and thus have different priorities of each parameter.

1.1 Mobile Backbone Network

A Mobile backbone network is a high speed network that connects many networks in a single company. It may also be called an enterprise network if it connects all networks within a company. In such networks, a set of Mobile Backbone Nodes (MBNs) are deployed to provide an end-to-end communications capability for the Regular Nodes (Rns) of the network.

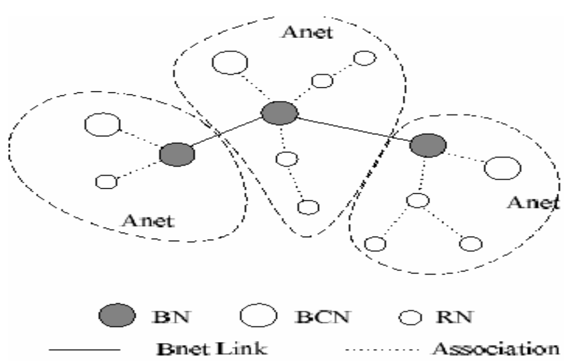


Fig. 1. MBN Architecture

Under Mobile Backbone Network, certain BCNs are dynamically elected to serve as Backbone Nodes (BNs). The latter form an interconnected backbone net (Bnet). The Bnet serves as an infrastructure for supporting the transport of multimedia streams and messaging flows across the network. Each BCN/RN is required to associate with a single BN. RNs and BCNs that have associated with a BN form an Access Network (Anet) have presented so-called Mobile Backbone Network Routing with Flow Control (MBNR-FC) mechanism for routing flows across the MBN. Under this protocol, route discovery packets are selectively flooded across the Bnet. Due to its use of restricted flooding of route request packets, this operation significantly reduces the routing control overhead, leading to a highly scalable network operation.

1.2 Benefits of Mobile Backbone Network

Improve business productivity by streamlining interaction and taking advantage of immediate access.

- o Reduces business operations costs by increassupply chain visibility, optimizing logistic and a ccelerating processes
- o Strenthen customer relationships by creatinconnceting more opportunities to connect providing information at their fingertips when they need it most
- o Gain competitive advantage by creating brand differentiation and expanding customer experience = Increase work force effectiveness and capability by providing on-the-go access

Improve business cycle processes by redesigning work flow to utilize mobile devices that interface with legacy applications.

2 APPLICATION OF MBN

Dynamically changing MANET, Multi-hop wireless network, Dense MANET, Tactical Military networks. Sensors with lower capabilities.

2.1 Performance of MBNR-FC/DA Under insufficient backbone coverage

In this section, the performance behavior of the MBNR-FC scheme is briefly presented under the condition that all network nodes are BCNs. In this case, each node is within 1-hop from the Bnet.

To study the performance of the MBNRFC/DA scheme, when the number of BCNs and/or their geographical distribution is limited to that the synthesized Bnet is not able to offer sufficient coverage. To demonstrate the performance attributes of routing scheme configure the system as follows:

The system consists of 20 nodes that are uniformly deployed in an area of 250 pixels × 250 pixels, serving to emulate a large scale adhoc network. The configurations that are investigated consist of the following layouts:

A 2-hop Anet configuration, with the number of BCNs set to 30. A 3-hop Anet configuration, with the number of BCNs set to 20.

The node queue size threshold at RNs is set to 564 bytes. In this way, a maximum queue level that is equal to the size of a single UDP packet is prescribed.

Packets arrive at an active source, in accordance with a Poisson process. The average wait-size of 1 packet for a node whose queue size behavior is modeled as an M/M/1 queue is obtained when the relative loading of the node is equal to 0.67. Assuming a MAC layer utilization level of 0.67 estimates the effective utilization of the channel MAC resources to be of the order of 0.4-0.5.

• Source and destination nodes are set to remain stationary for the duration of their flows. Other nodes move in a Random Waypoint manner, at an average speed of 3m/s.

2.2 Performance under adequate RN processing capabilities

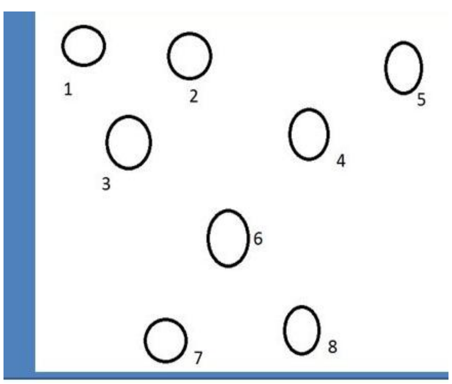
This section shows the use of the MBNRFC/DA routing scheme is crucial to fully utilize the MBN network capacity resources when assuming RNs have sufficient resources to act as relay nodes. To study the network performance, 20 UDP traffic flows are deployed simultaneously and continuously over time. For each flow, packets are generated by the source node at random times, in accordance with a Poisson process. Each packet yields a 564 bytes MAC layer frame. The network is loaded at an overall rate that ranges from 450.12 Kbps to 1289.1 Kbps. The distribution of the traffic load as follows:

2.3 Performance under limited RNprocessing capabilities

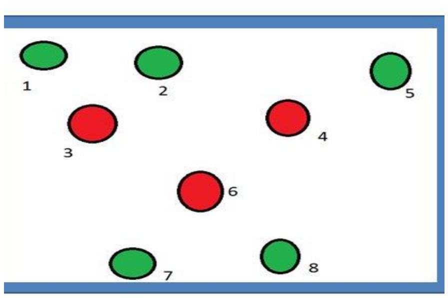
Consider the situation under which RNs are assumed to possess limited processing capabilities and limited energy resources. In this case, it is preferable to not use RNs for non-essential relay purposes. Consequently configure the MBNR-FC/DA scheme to operate in the same way as that used by the basic MBNR-FC scheme. The Fig. 5-6 have also shown the delay-throughput performance of flows under the MBNR-FC/ADA scheme when the distance threshold value is set to be zero; i.e., when the global (non backbone centric) route discovery process is not invoked. Such an operation may have to be employed when it is desirable to reduce the fraction of time that RNs are used to relay messages, due to their limited processing and energy resources.

2.4 Performance comparison of MBNR-FC/DA Under different backbone coverage span

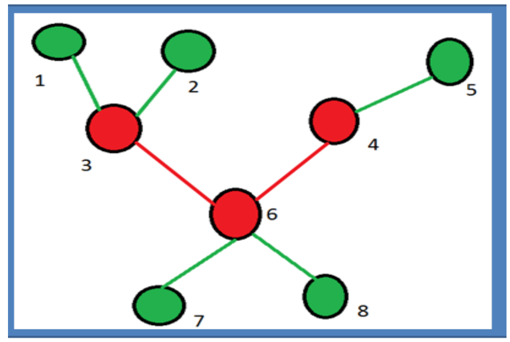
It shows that the delay-throughput performance under the MBNR-FC/DA scheme does not change in a substantial manner under different levels of backbone coverage. Thus,the operation utilizes effectively the global network capacity resources. The results confirm the effectiveness of the above distance threshold computation procedure to adapt to the level of coverage achieved by the Bnet layout. To implement a QoS oriented AODV operation and thus improve the delay-throughput performance of a flat ad hoc network system, incorporate the flow control mechanism into the AODV route discovery process. This new QoS-oriented AODV protocol is identified as AODV-FC. The MBNR-FC/DA scheme yields better delay-throughput performance behavior than that exhibited by the AODV-FC scheme. This is induced by the reduced flooding scope imposed on route discovery messages.



***Step 1**: **Initial nodes:** Set up the number of nodes in the network*



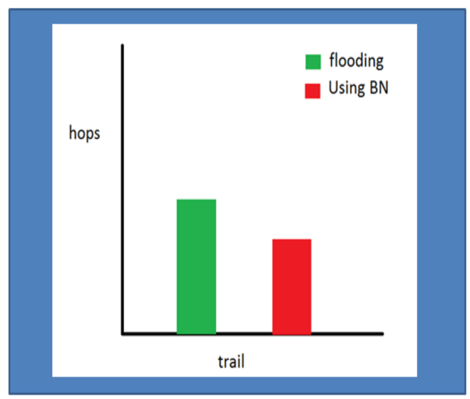
***Step 2: Selection of BN and RN**: This step defines the number of backbone nodes and regular nodes*



***Step 3: Establishing connection:** Connection between the regular nodes and backbone nodes are established here*

***Step 4: Routing using flooding**: Request message will be sent to destination through global flooding method*

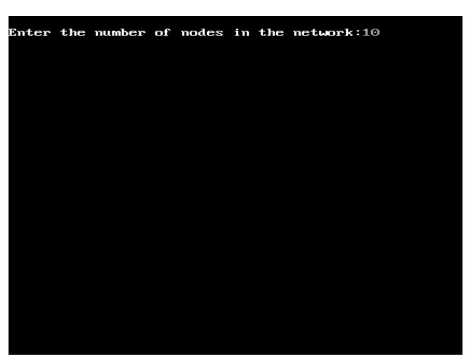
***Step 5: Routing using BN**: Request message will be sent to destination using backbone network*



***Step 6 : Simulation result** : Number of hops taken by request message in both flooding and backbone routing will be simulated in this step. And the same will be depicted in the graph.*

3 RESULTS

Output 1:



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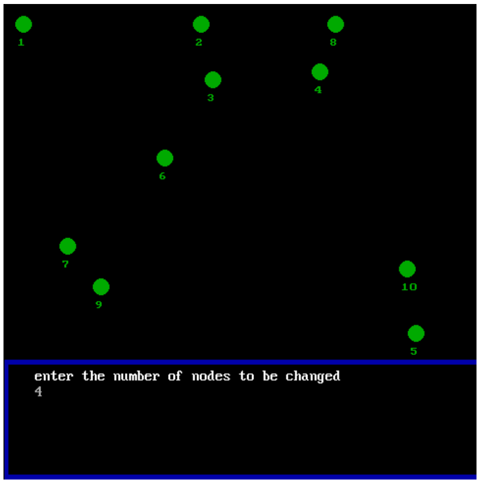
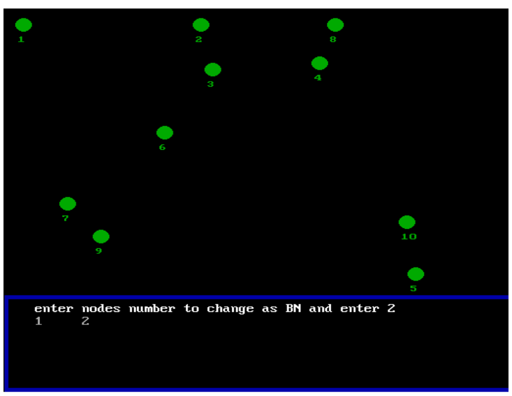
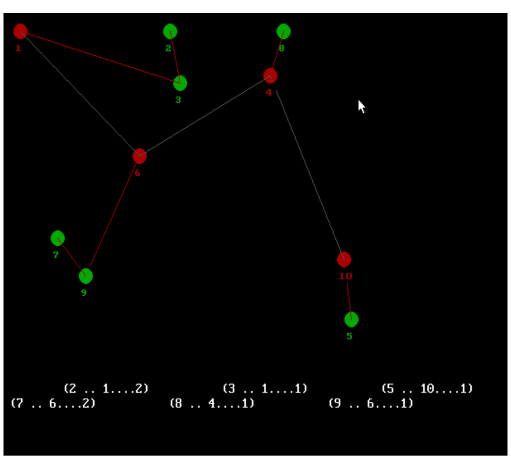
Step 1: User has to enter the number of nodes to be present in the network.

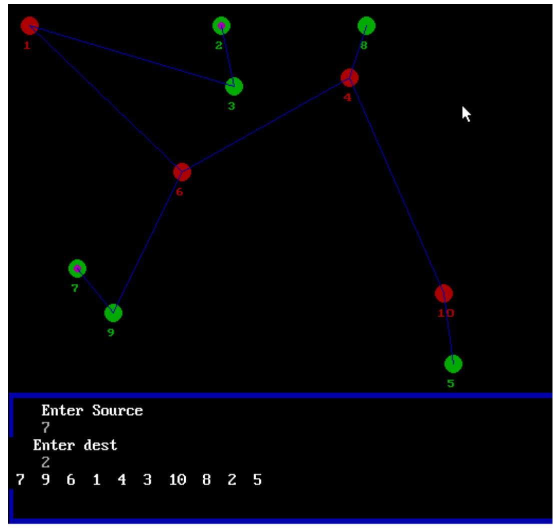


That are to be changed as backbone nodes.

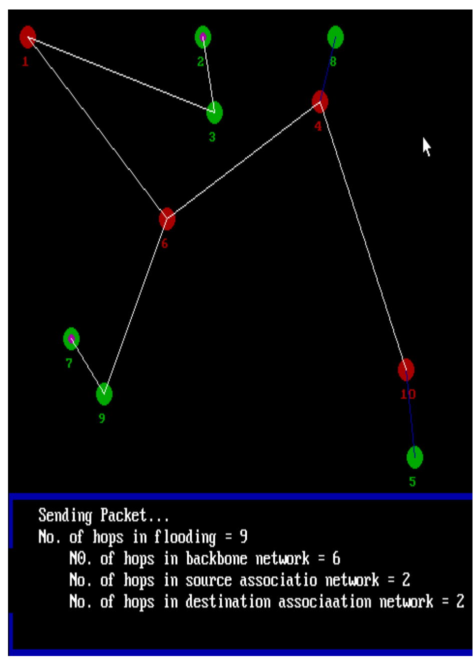




Step 4: Establishment of connection between backbone nodes and regular nodes . Here (2...1…2) represents, from Node 2 to BackboneNode 1 the number of hops in association network is 2 . i.e., (From…BN…No.of hops).



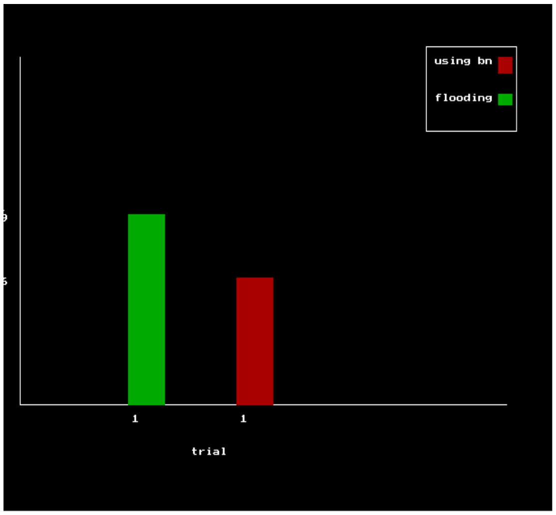
Step 5: Request message is being sent from source node 7 to destination node 2 by flooding mechanism.



Step 6: Request message is being sent from source node 7 to destination node 2 by backbone.

Step 2: User

Step 3: User l



Step 7: Simulation of number of hops taken by request message in both flooding and backbone routing . From the simulation result it is clear that backbone routing takes lesser number of hops than flooding.Here backbone node routing took 8 hops where as flooding took 13 hops .

4 CONCLUSION

The current requirement to support opportunistic data forwarding in MBNRs. It presented a routing of data scheme for mobile backbone network (MBN) based on hierarchical adhoc wireless networks. The routing protocol follows a distributed flow control mechanism to manage the congestion state of the network. This is combined with a flow admission control operation that ensures quality of service (QoS) performance.The routing protocol presented consists of backbone centric and global route identification processes. It shows that when there is a sufficient number of BCNs distributed in a manner that properly covers the area of operations, the MBNR-FC scheme yields excellent delay–throughput performance that is distinctly superior to that exhibited by non-hierarchical routing protocols such as the AODV scheme. When the Bnet is not able to offer complete network coverage, a global route discovery process is invoked to discover routes across the whole network for flows that travel a distance that is no longer than a distance threshold level. Such an operation utilizes effectively global network capacity resources.

5 FUTURE WORK

In the future, further complex simulations could be carried out using other existing performance metrics, in order to gain a depth performance analysis of the MBNR FC/DA scheme.

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