M-Routing - An Optimization for Mobile Networks

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Abstract

Networks for mobile is a novel approach in computer communication which means users wanting to communicate with each other form a temporary network, without any form of centralized administration. Several routing protocols exist for routing the packets through an ad hoc mobile network. This paper explores the use of a new protocol called sev-node protocol .This protocol make use of the matrix technique and peeps into its advantages. However, relatively small networks and potentially nice applications can be easily realized with this new protocol. The performance on various parameters has been compared with other similar protocols.

Keywords: Inter-flow interference, Zeal, traffic connections, Convergence, Power saving, Listening time

1. INTRODUCTION.

In [1] the authors specify the delay-throughput trade-offs in wireless networks with stationary and mobile nodes. The main characteristic of ad hoc networks is their mobility [2].

more A distinguishing feature of mobile ad hoc network is that the end points and routers are UN-recognizable [3].   A study has revealed that sending radio signals (broadcast systems) will result in redundancy and contention. Most of the wireless [4] and mobile communications technologies make use of the Internet Protocol (IP) suite.

11. ROUTING PROTOCOLS

Most of the routing protocols in conventional wired networks are usually based upon either ad hoc on demand distance vector [5] or optimized link state routing algorithms. The main draw back of Dynamic Source Routing [6] is that the network will drop number of packets as part of the security even if there were only a few number of malicious attackers. To avoid this, DSR make use of a technique called "packet salvaging" [7].

Routing using single path (unipath) has been proposed in [8] [9].In uni path routing, only a single route is used between a source and destination node. Multipath [10] routing has also been proposed where multiple paths are established between a single source and single destination node.

A reliable ad hoc on demand distance vector routing protocol (RAODV) [11] is proposed to solve the problem of attack of malicious nodes. A routing mechanism called Secure Efficient Ad hoc Distance Vector routing protocol (SEAD) [12], which is based on DSDV in which routing tables are created and exchanged among nodes, claims that it can handle the malicious nodes. Another routing protocol called The Security-aware Ad-hoc Routing (SAR) [13] based on AODV uses some security metrics for path computation and selection.

Another proposal called CORE [14] handles selfish nodes but does not handle malicious nodes .It allows malicious node to stay in the network for some time after it has shown some positive behavior by accumulating some positive reputation. To eliminate this problem,, another method is proposed in [15] which is called the Co-operation of Nodes Fairness In Dynamic Ad-hoc

Networks (CONFIDANT) that keeps only two types of values, i,e. negative and zero

A technique called Caching and Multi pathing (CHAMP) routing protocol was proposed in [16] which exploits the temporal locality in dropped packets such as that occurs in DSR.

Mobile Ad-hoc On Demand Data Delivery protocol (MAODDP) [17] is an on demand, simple multi-hop protocol.

111. DSDV (DESTINATION SEQUENCED DISTANCE VECTOR ROUTING

Mobile Ad hoc Routing Protocols are of two types - Proactive and Reactive. In DSDV each node maintains a list of all destinations and number of hops to each destination.

IV. CLUSTER HEAD GATEWAY SWITCH ROUTING (CGSR)

The underlying protocol of CGSR is DSDV.. Each node maintains two tables viz

i) a cluster member table containing the clusterhead for each destination node.

ii) a DV routing table containing the next hop to the destination.

Routing

First, the source has to transmit the packet to its clusterhead. Then, this clusterhead sends the packet to the gateway node that connects this clusterhead and the next clusterhead along the route to the destination. The destination clusterhead then transmits the packet to the destination node.
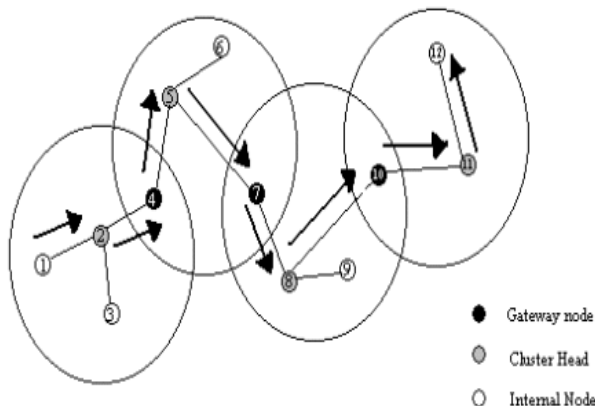

fig-1 Figure showing nodes and heads in CGSR

V.WIRELESS ROUTING PROTOCOL (WRP)

Wireless Routing Protocol (WRP) is a proactive unicast routing protocol for wireless mobile ad hoc network. The main advantage of WRP is that it achieves freedom from loops.

VI. AD HOC ON DEMAND DISTANCE-VECTOR ROUTING

Ad hoc on demand distance-vector routing [18] [19] is a variant of classical distance-vector routing algorithm, a confluence of both DSDV and Dynamic Source Routing (DSR)

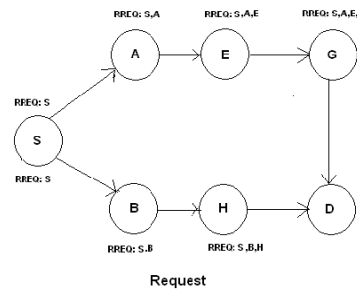## VII. DYNAMIC SOURCE ROUTING (DSR)

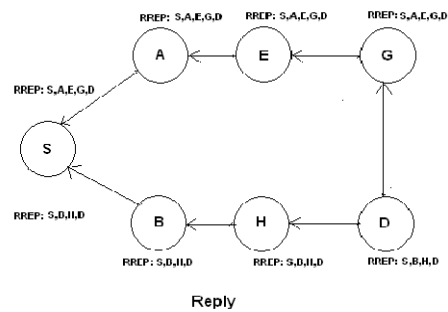
Fig-2 Route request in DSR

Fig-3 Route Reply in DSR

VIII. SIGNAL STABILITY ROUTING (SSR)

Signal Stability Routing selects route based on the signal strength between nodes and on a node's location stability. This route selection criterion has the effect of choosing routes that have stronger connectivities.

IX. NETWORK SIMULATOR

Network simulator is an object oriented simulator written in c++ with OTcl interpreter working as a front end. The features of C++ are most suited for protocol implementation. OTcl is a

slow interpreter whose feature is appropriate for simulation configuration.

X. SIMULATION

Simulation of DSDV (destination sequenced distance-vector) and dynamic source-routing were carried out with 10 nodes.

After simulation we get the output in two files - one is called the network animator file (NAM) and the other one is called the trace file. Basically these two files store the same thing but in different formats just like mentioned in [20].

Using DSDV protocol simulation is done on the files called trf and status. This will generate the NAM file and Trace file. For each execution of NAM and Trace file we can view the output in the simulator
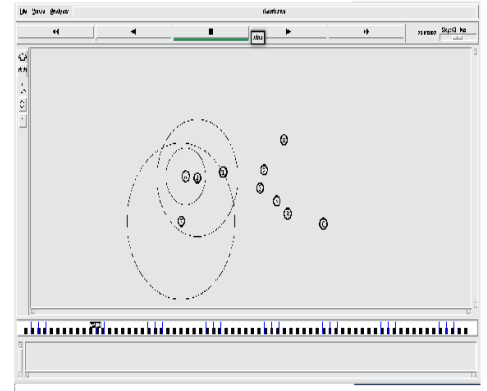
| Parameter	Value
Transmitter Range	250m
Bandwidth	2 Mbit
Simulation time	2 ms
Number of nodes	50
Pause time	1s
Environment size	1000 x 1000m
Traffic type	Constant Bit Rate
Packet rate	5 packets /sec
Packet size	64 byte
Number of flows	15

Table-1 Parameters used in all simulations

XI. Simulation Results of DSDV and DSR Transmission of packets

Fig-4 discovery of route

Fig-5 Showing transmission of packets
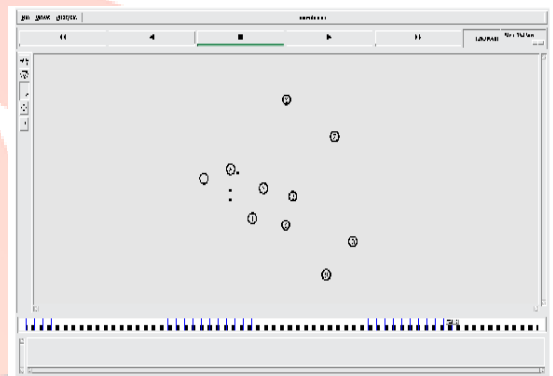
Fig-6 dropping of packets
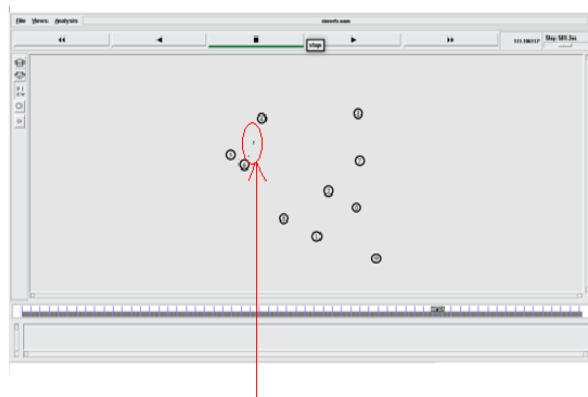
XII. Sev-node Protocol Based Routing (SPBR)

No protocol do perform well in all environments. Sev-node is an on demand protocol where route discovery and data delivery are simultaneously performed. File downloaded from node i to node j can be positive or negative which are denoted as below:

$$tr(i,j)=1 \qquad \text{or}$$
$$tr(i,j)=-1$$

. A localized honest value is defined for the download from i to j which is given by the expression

$$H_{ij}= \sum tr_{ij}$$

This expression gives the sum of the ratings of the individual transactions that node i has

downloaded from node j. The transactions that are performed between nodes i and j can be either harmonizing [Har(i,j)] or disconnected [dis(i,j)]. Now the local honest value can be defined as follows:

$$Hij = Har(i,j) - dis(i,j).$$

The normalized local honest value is defined as $Vij = \dfrac{max(Vij, 0)}{\sum_j max(Vij,0)}$

In order to aggregate the local honest values, we consider the virtues got to node j by node i. e

$$T_{ik} = \sum V_{ij} V_{jk}$$

XIII. Implementation

For implementing and testing the protocol five laptop computers were used running in Ubuntu linux operating system and Network Simulator2 was installed.

XIV. Results

After generating the CBR and scenario files, these are used to create the output of the simulating program. The output is obtained in two files called NAM files and TRACE files. These two files can be used in an animator to view the animated result and various parameters can be analysed. The screenshot of the animator is shown below.
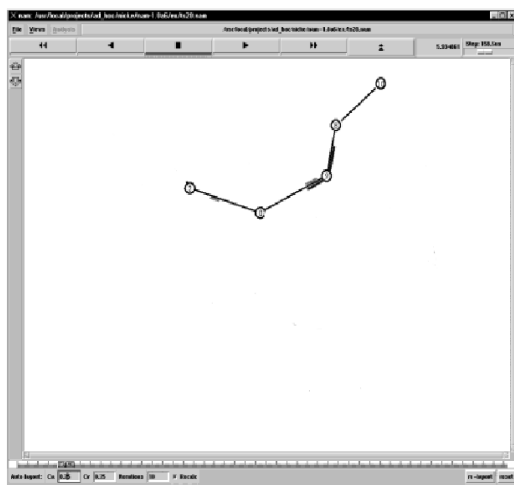

Fig-7 Animator screenshot showing output of FPBR

XV. CONCLUSION

Ad hoc networks can be implemented using various techniques like Bluetooth or WLAN for example. The definition itself does not imply any restrictions to the implementing devices. Ad Hoc networks need very specialized security methods. There is no approach fitting all networks, because the nodes can be any devices. In this paper we have implemented the sev-node protocol and analyzed the output by comparing the various parameters with that of similar protocols.The protocol used in the nodes and the type of node, are the sole factors for the network to work and no assumptions can be made .Here the existing protocols and newly designed protocol and their issues have been discussed, because the emphasis has been on ad hoc protocols.

	DSDV	AODV	TORA	SPBR
Distributed	Yes	Yes	Yes	Yes
Reliability	No	No	No	No
Multiple Routes	No	No	Yes	Yes
Security	No	No	No	Yes
QoS Support	No	No	No	No
Power Saving	No	No	No	Yes
Broadcasting Interval	Yes	Yes	Yes	Yes
Link	No	No	No	Yes
Multicasting	No	Yes	No	No
Loop free	Yes	Yes	Sort lived	Yes
Reactive	No	Yes	Yes	Yes

Table-2 Table showing the comparison of parameters

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