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"A Proposed Process Model for Removing IP Address Conflicts when Different MANETs merge: Check the Performance of Server when Address Conflict Occurs"

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***Abstract* - As the number of nodes increases the complexity of MANET [1, 11] increases in various issues. For this reason various approaches has been produced to reduce the complexity such as cluster head technique and dominating set based gateway technique. Another issue is distribution of IP in MANET. There are various approaches is given to assign the IP address but they are not much effective and each and every approach has its limitation. In this paper a conflict free process model is proposed to solve the configuration problem where two or more than two MANET merge and remove the limitation from the above-mentioned approaches .And also the performance of server due IP address conflict is tested with the help of a scenario to solve IP address configuration [2, 4, 8, 13, and 16] problem in mobile adhoc network.**

Key-Words: Mobile Adhoc Networks, IP Address, Private Addressing Scheme.

1. Introduction

Mobile adhoc networks are infrastructreless self-organizing wireless networks. Each node can be mobile and has routing capabilities to be able to forward packets on behalf of other nodes Adhoc networks are typically composed of homogeneous nodes that communicate over wireless links without any central control. Adhoc wireless networks inherit the traditional problem of wireless and mobile communication, such as bandwidth optimization, power control and transmission quality enhancement .In addition topology is highly dynamic & random & very hard to predict. Physical security is limited. Mobile Ad-hoc Network serves as a temporary wireless network in which node changes its IP address with the help of an intelligent auto-configuration protocol [3, 14, 18]. The main role of IP address auto-configuration protocol is to manage the address space .The protocol must be able to allocate a unique network address [4] to un-configured node.

2. Related Work

There are several scenarios in which a mobile node will change its IP address:

i. Partitions of a Network in MANET[7,15]

If some mobile nodes in the MANET move out of the transmission range of the other nodes, the network becomes partitioned. Because these nodes may not be aware of the partition, they may still use the previous allocated addresses. If IP address of a node in one partition is allocated to the new node in the other partition, address conflict occurs when these two partitions become connected.

ii Merger of two independent Mobile networks [7, 15]

The second scenario is that two independent configured MANETs are merged as in Fig. 4. And the MANET before merging is shown in Fig. 1. Because these two networks are auto configured separately, there may be some duplicate addresses in both networks, such as node A in MANET1 and node B in MANET2. Thus one needs to change its addresses due to the merger.

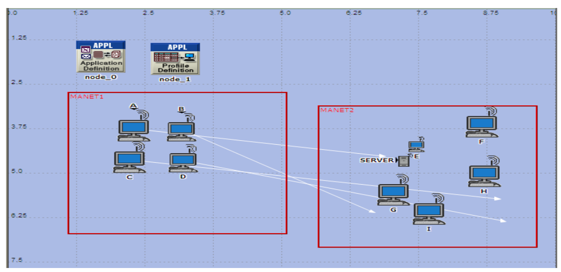

Fig. 1: Merger of two networks

3. Problem Formulation

To overcome IP address configuration problem A Frame Work is proposed in the previous paper [19].Proposed framework is divided in to three phases, each phase comprising its own level of complexity, and the aim is to achieve the optimum solution from the combined efforts of each phase. The lower phase has various level of complexity such as merger of two networks and partition of one single network into multiple networks, mobility of each node which causes the frequent disconnection of the node. In this paper we are taking the first phase of addressing of different scenarios. In this when two independent networks are merging then this leads the high degree of probability that some nodes are using same IPs, and during merging of two networks it will create the problem of confliction, which must be resolved before merging of the network. To resolve configuration problem a Proposed algorithm is applied to the MANETs (this may also be applied when number of MANETs are increases and hence solve the problem of scalability).

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Process Model for IP configuration: This process works when a mobile node(s) finds another

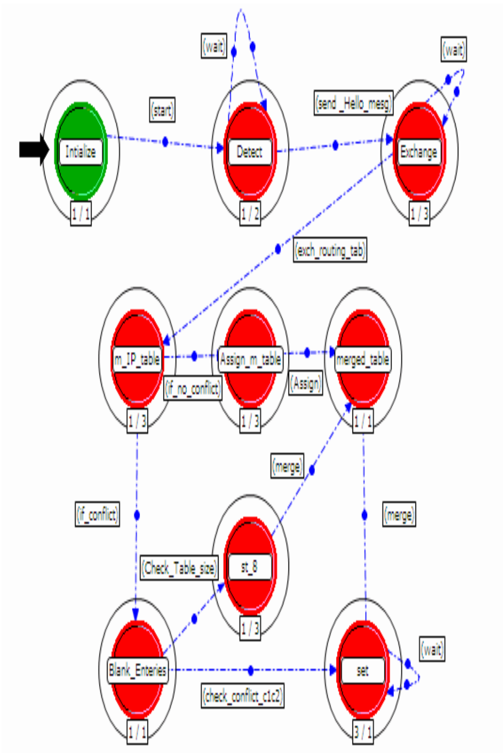

Fig. 2: Process Model

node in the network. It sends a signal to initiate the request by using a hello Message and waits until a response comes. The node in this process model (Fig. 2) works as a network head.

Initialize: when a process starts. (Start)

Detect: When a node(s) finds (send_Hello_mesg) another nodes in the network and wait for the response

Exchange: At this state nodes Exchange their routing table and update the latest entries. (exch_routing_tab)

M_IP_table: Table entries are updated at this state and marked a new table.

Assign_m_table: AT this state the size of the table is checked and if the size of the node1 is greater than the size of node2 then the node1 will be the new head for the merged network.

Merged_ table: This state results a merged table or complete table having all the entries in the MANET.

Blank_ entries: The conflict entries in the table after merge is left as blank to assign unique IP address.

St_8: Check table size

Set: Assign a random number to blank entries.

The background details and functions of each node in this process model is explained in the forthcoming paper. For ease of computation we are assuming that in the Scenario there is one network head that is having the central authority for managing the IP addressing, a Process Model is proposed to solve the various cases where IP addresses confliction occurs .The IP address table Tab. 1 describe

Name Of Node	IP Address	Host number
A	192.168.1.1	1
B	192.168.1.2	2
C	192.168.1.3	3
D	192.168.1.4	4
E	192.168.1.5	5
F	192.168.1.6	6
G	192.168.1.7	7
H	192.168.1.8	8
I	192.168.1.9	9
The Remaining Addresses may be assigned to the duplicate node/new node when an address conflict occurs		

Tab. 1: IP Address Table

IP addresses for this simulation. Node from A TO D is assigned to MANET1 and node from E TO I is assigned to MANET2.

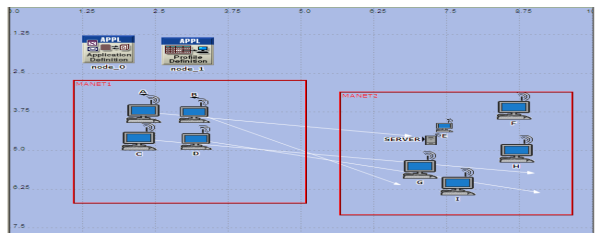

Fig. 3: Two MANETs before merging

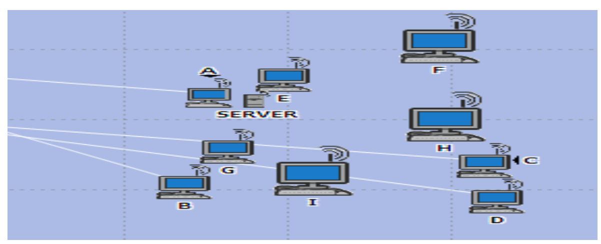

Fig. 4: After merging two MANETs

The table Tab. 2 described all the parameters used in this simulation.

Result Analysis: In this paper two nodes (1, 5) are selected to check the performance of the server. The performance is checked by using the private IP address as follows:

Case 1: When the node A is assigned an IP address 192.168.1.1 and the E is assigned an IP address 192.168.1.5, the load on the server is simulated .In this simulation observation are taken in terms of request (Fig. 5) on the server, Total traffic (Fig. 6) delay and the number of packet dropped (fig. 7) during simulation as shown in Fig. 5.

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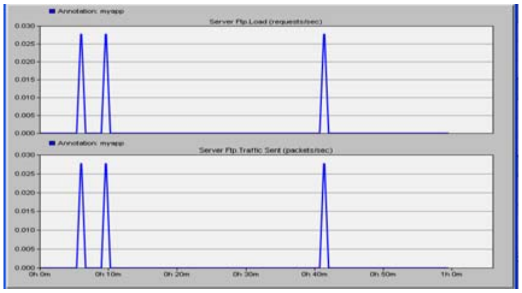

Fig. 5: Different IP on A, E node (request/sec)

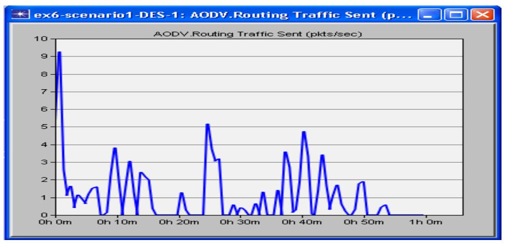

Fig. 6: Total traffic sent (packets/sec)

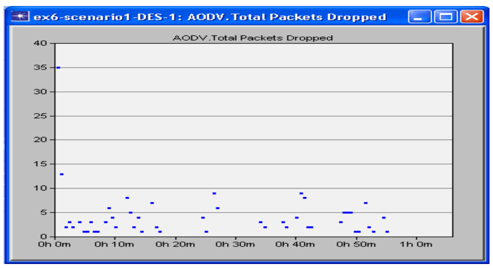

Fig. 7: Packet dropped-without conflict (packet/sec)

S.NO	Name		Description	Value			
1.	Simulation Setup	Mobility Configuration	Used to define Mobility Profile for the mobile nodes	Speed(m/s)	10(const)		
				Start Time(s)	10(const)		
				Pause Time(s)	100(const)		
		Application Definition	Used to define different Application used in this scenario for all participating nodes	Type Of application	FTP	IRT (s)	10
						File Size (Bytes)	5000
						Type of Service	Delay, throughput
		Profile Definition	Used to specify the common profile on different nodes in the network	Protocol Used	AODV	Active Route Time Out(s)	3
						Hello Interval(s)	Min(-1), Max(1.1)
						Network Dia.	35
				Addressing Mode	IPV4		
2.	Simulation Parameters		Transmit Power(W)	0.005			
			Packet Reception Power Threshold(W)	-95			
			Simulation Time(hrs)	1			
			No. Of Nodes	9			
			Environment Size	1000*1000(meters)			
			Traffic Type	FTP			

Tab. 2: Simulation parameter

Case 2: When the node A is assigned an IP address 192.168.1.1 and the E is assigned an IP address 192.168.1.1, the load on the server is simulated .In this simulation observation are taken in terms of request on the server. In this case an IP address conflict occurs because of duplicate address. The server treats the request (Fig. 8) (coming from

A after moving to server and from E) as the same and

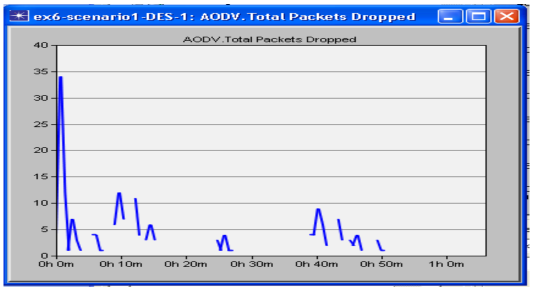

Fig. 8: Packet dropped -conflict (packets/sec)

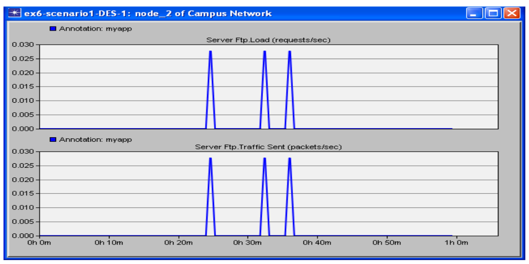

Fig. 9: Same IP on A, E (request/sec)

response both the nodes at once. By comparing dropped packets (Fig. 9) we have found that in this case the rate of packet dropped is very high and hence information is lost in this case.

Conclusion & Further Discussion:

In this paper a process model is designed to solve the configuration problem when two or more than two MANETs are merge to assign the conflict free IP address in the network. The information loss and delay in response is tested when IP address conflict occurs with the help of a scenario .Further discussion may include the designing of a node model and add the above process side by side as an alternative to DHCP .The aim of the research is to implement all the phases of the framework for IP Address configuration in MANET given in previous paper.

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