Approach for Enhancing Data Availability in MANET

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ABSTRACT

A mobile ad-hoc network is a category of wireless network which does not depend on a predefined network structure or topology. Ad hoc networks require no centralized administration or fixed network infrastructure such as base stations or access points, and can be quickly and inexpensively set up as needed. Two mobile nodes can exchange data directly if they are in the defined range of each other. If not, nodes can communicate via a multi-hop route with the help of other mobile nodes.
This paper proposed an approach to improve data transmission by reducing the data traffic and it also increase data availability in the mobile ad-hoc network. Each mobile node has a buffer for temporarily storing data fragment for a specific time, If a mobile node requests for a particular data fragment and the request is multi hoped, then first request is sent to its neighbor node, neighbor node first match requested data fragment with stored data, if it is matched the request will be responded by this neighbor otherwise request will be routed to mobile server. In this way the overhead of the server and server traffic will be reduced. The proposed method reduces time consumed by data fetching directly from server routing through multiple nodes and thus, it also enhances data availability.
Keywords*—Ad hoc networks, mobile node, routing protocols, mobile server, buffer.*

I INTRODUCTION

A network is a group of stations connected to each other. By communication channels data can be transmitted between station, and how much traffic the network can support. [1]. A network may be classified based on some characteristics for example what medium is used to transfer the data and topology. Medium can be wired or wireless, with the help of medium the data or information is transferred from one place to other.

A. WIRELESS AD-HOC NETWORK (MANET)

Cellular advert Mobile AD-HOC network (MANET), also known as Wi-Fi ad hoc community or Mobile Ad Hoc network is a collection of two or more devices or nodes or terminal with wireless communication and networking capability that communicate with each other without the aid of any centralized administrator also the wireless nodes that can dynamically form a network to exchange information without using any exiting fixed network infrastructure[2].

There are the following types of mobile ad-hoc network (MANET)

- VANETs – vehicular ad hoc networks like vehicle collision and accidents.
- Smart Phone Ad hoc Networks (SPAN) – Once embedded with ad hoc networking technology, a smart phone can create ad hoc networks among other devices.
- Wireless Mesh Network (WMN) – A mesh interconnection among devices or nodes.

Characteristics of MANET

- Communication via wireless means.
- Nodes can perform the roles of both hosts and routers.
- Bandwidth-constrained, variable capacity links.
- Energy-constrained Operation.
- Limited Physical Security.

B. MOTIVATION

As time passes, the number of problems has been increasing in mobile ad-hoc network. Security problems are major issue of the cellular mobile network. The self-configuring architecture of mobile network, there are many vulnerabilities present in the wireless network. Power consumption and data traffic are also major issues of the MANET in proposed work we have focused on data traffic of the mobile ad-hoc network.

C. RESEARCH OBJECTIVES

This paper proposed to develop a new method to transmit data between mobile clients and to reduce the server load. The proposed method helps us to reduce data traffic in a particular scenario, which also

increases data availability in the mobile ad-hoc network.

II PROPOSED METHOD

In, MANET we have a tendency to Project an information access technique to stop mobile hosts from exhausting their batteries. During this technique, every mobile host selects the trail on that mobile hosts have a lot of remaining battery power and uses it for knowledge transmission. In we have a tendency to additionally projected duplicate allocation strategies for not solely rising knowledge handiness however additionally leveling the facility consumption among mobile hosts. In these strategies, every mobile host replicates knowledge things oft quantity of power.
requested knowledge things by uncast, they need to transmit again and again a similar knowledge things that area unit of accessed and so consume an outsized

This dissertation, projected transmission communication technique for not solely manage
accessed by itself and its close hosts to balance the numbers accesses performed on data things. In these strategies, however, since mobile hosts transmit the knowledge handiness however additionally reducing traffic for data access. In our projected technique, every mobile host sends request hooked up with the point to receive the requested data item by the determined time. Moreover, each mobile host collects multiple requests for data items and transmits the requested data items by multi-cast. Therefore, our proposed method reduces data traffic. We verify the effectiveness of our proposed method by simulation experiments using a network simulator, NS-2 [9]. Note that a mobile host that issues a data request is called a data requester whereas a mobile host that transmits a data item in response to a request is called a data sender. A mobile host can become a data requester and a data sender at the same time.

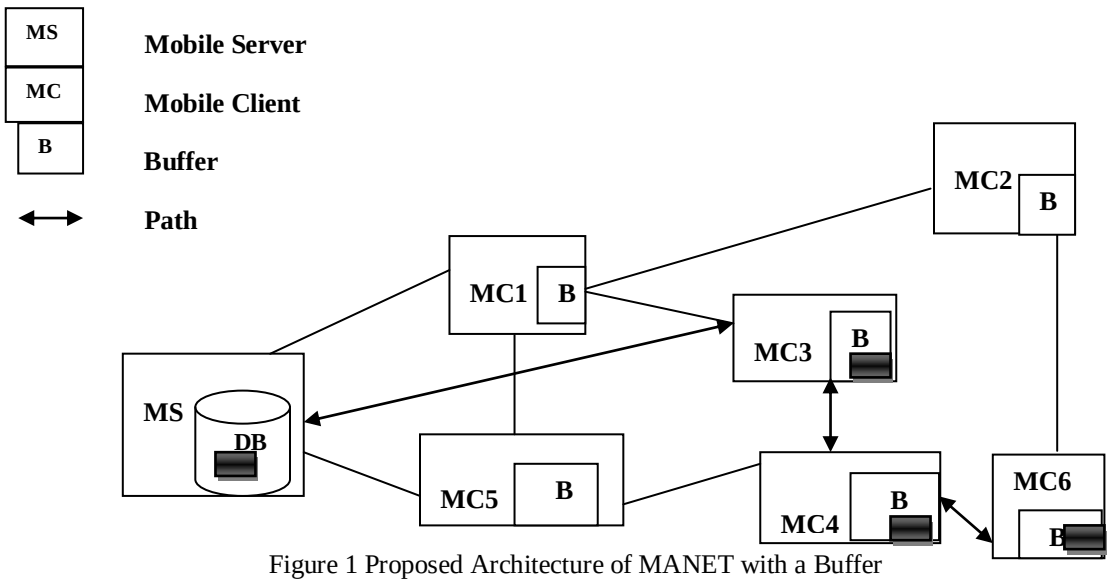

Figure 1 Proposed Architecture of MANET with a Buffer

In this diagram a mobile node shopper request for specific service or information section. Every mobile node send requests for specific information section, the start node communicate the nearest node, then nearest node send request to next nearest mobile node, throughout the fashion applied is distributed to the mobile data server, identical link is additionally used for replay to the applied request or its getting to be changed, it on current location of the cell nodes. In on prime of figure shows that cell shopper (MC6) applied for a particular data section or file, that out there on mobile server, 1st mobile shopper (MC6) sends asking to its nearest node that MC4 in present scenario, area of each mobile node is changed because of traffic network, MC4 ahead this request to its nearest that MC3, presently mobile shopper 3 send

this applied request to the mobile data base server request data is out there. Presently mobile data server will fulfill the request of mobile shopper (MC6).

III PROPOSED ALGORITHM

D. Algorithm for Mobile Client

Assumptions:
C_{Mi} = Mobile client i where i is any mobile node
C_{Mj}^{N} = Neighboring mobile client j
D_k = Data Segment k (k = 1, 2… n)
D_{k+1} = Data Segment k+1
Step 1:
C_{Mi} Sends a request to the next hope for specific service
$C_{Mi}(D_{req\,(D_k)})$ → Next hope for response (Service)
Step 2:
If don't get requested service (data), host unreachable go to step 1

Step 3:
S_M Responses for requested service
$S_M(D_{res\,(D_k)})$ → C_{Mi} Received requested data (service) with all information of the whole data (service)
Step 4:
C_{Mi} = Reassemble data packets and buffered for other nodes and go to step 1 for $D_{req\,(D_{k+1})}$

E Algorithm for Neighboring Mobile Client

Assumptions
C_{Mj}^{N} = Neighboring mobile client j
B = Buffer at each mobile node
Step 1:
C_{Mj}^{N} = Received a request from C_{Mi} for D_k or D_{k+1}
Step 2:
If (B) empty then
$C_{Mj}^{N}(\text{Req}_{(D_k \text{ or } D_{k+1})})$ → Next hope //C_{Mj}^{N} Sends this $\text{Req}_{(D_k \text{ or } D_{k+1})}$ request to the next hope
Else
If (B (D) ==$\text{Req}_{(D_k \text{ or } D_{k+1})}$)
If (Data Valid)
$C_{Mj}^{N}(D)$ → C_{Mi} // Data sent to the requested client C_{Mi}

Else
$C_{Mj}^{N}(\text{Req}_{(D_k \text{ or } D_{k+1})})$ → S_M
Step 3:
Wait for next request or do its own task.

F Algorithm for Mobile Server

Step 1:
S_M Receives request from mobile clients
Step 2:
If ($D_{req\,(k)}$)
If it is first request then send all information of all segments to the requested client
Else
$S_M(Res_{k\ or\ k+1})$ → C_{Mi}
Server sends the requested data to the requested client
Step 3:
Wait for the new request.

First any mobile client initiates a request for specific data segment and wait for response, if it gets response from either mobile server or any neighboring mobile client with requested data, otherwise do request after some time. If mobile server is far from requested mobile client then it may gets response from any neighboring mobile client, first that mobile client check its buffer, if it is empty then forward that request to the next hope, if it is not empty then compare data contents, if it is matched then check the validity of that stored data segment, in case that the valid data to send if they needed client node either directly or using multi hoped path. If contents of data are not matched or data segment is not valid in this case request is forwarded to the next hope it may be a mobile server or any neighboring mobile client. After receiving requested data all involved node will store a copy of data segment in its buffer for future use.

IV EXPERIMENTAL ENVIRONMENT

GENERAL PARAMETERS

TABLE 1

GENERAL PARAMETERS OF EXPERIMENT

Parameter	Value
Wireless Characteristics	
Data Range	250 meters
Radio Bandwidth	2 Mbits/sec
Communicate Model	
Network load	(C B R) Constant Bit Rate
Data Packet Size & Rate	512 Bytes & 4 Packets/ Sec
Mobility Pattern	

Speed	5, 10, 15, 20 and 25 ms
Pause Time	30 and 20 sec
Simulation Parameters	
Simulation Time	120 sec
Network Number of Nodes	10 Nodes, 20 Nodes, 30 Nodes, 50 Nodes
Network Area	600X600 Meters
Routing & MAC Protocol	
Routing Protocol	SMRP (Segmented Multicast Routing Protocol), AODV
MAC Protocol	802.11a

V. RESULTS

For the simulation results, we've chosen the end-to-end delay and outturn as a metrics so as to gauge the Performance of the various protocols [7].

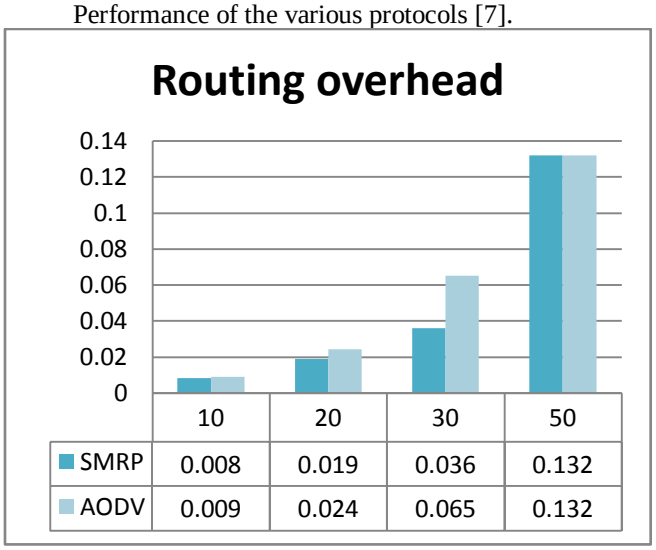

Figure 2 Routing Overhead for Finding Path

This results shows the total overhead of finding path between client and server. First client finds the path and make a routing table based on server location. This routing table is used for further communication.

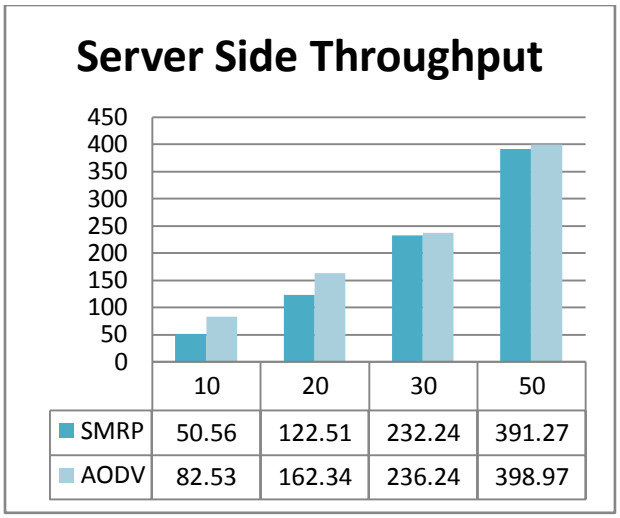

Figure 3 Server Side Load

This result shows the server load, it means how many request received by the server, which are sent by the different clients.

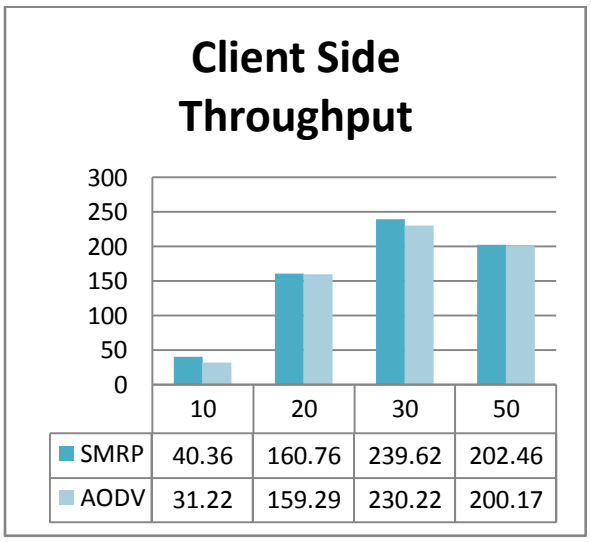

Figure 4 Client Side Load

This result shows the client load, it means how many request sent by the client, which are sent by the different clients on the behalf of server.

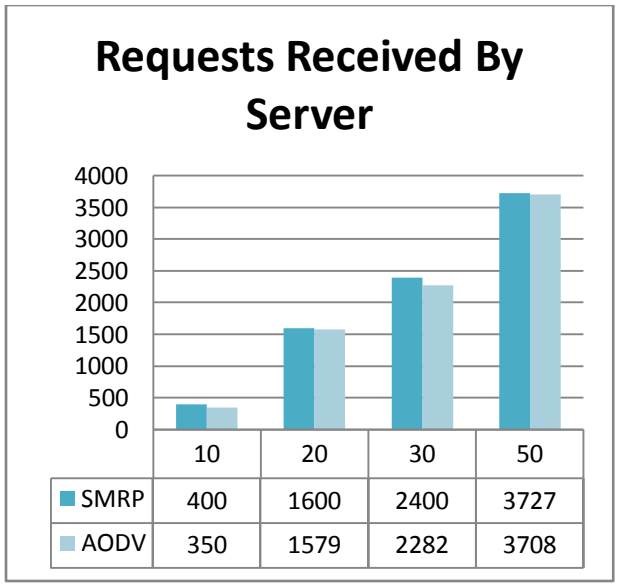

Figure 6 Requests Received By Server

Total number of requests received by the server for which server has to reply for all received request.

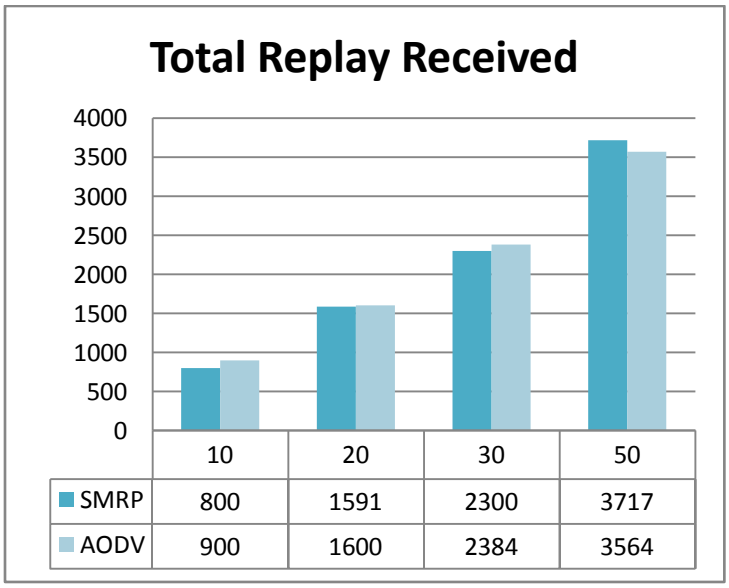

Figure 5 Total Received Reply

Existing technique of data transmission in MANET does not use the concept of data buffering at mobile node, most of the time consumed in retransmission of requested data items to all the mobile nodes. Due to this the throughput of data transmission is reduced. In our technique we have used two concepts first is data segmentation and other is data segment buffering. Our results clearly show that the throughput of the proposed technique is much better than that of existing previous techniques.

VI CONCLUSION

Projected methodology shows higher performance in heavy networks than the very traditional network Data traffic is reduced and maintain knowledge accessibility and augment battery lifetime of mobile hosts. During this approach, we tend to stop a server mobile host and purchasers from redundantly transmit a similar knowledge item. The neighboring mobile host first matches requested data segment with its stored copy, if it is matched then respond to the needed mobile client, otherwise forward request to the server. Our proposed method is for a specific environment with data segmentation technique. As a part of our future work, we tend to arrange to enhance our technique for every atmosphere. We tend to conjointly show our experimental result with comparison of existing technique.

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