

# A Framework for Improving the Performance of MANET by Controlling Data Traffic using Proposed Mechanism

Sushama Sainwar  
M.Tech. Scholar,  
Department of CSE,  
Arya College of Engineering & IT

Prof. Vishal Shrivatava  
M.Tech. Coordinator, Department of CSE,  
Arya College of Engineering & IT

**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. In the proposed approach, MANET is server client based network, means a mobile host acts as a server and fulfill the others node's request. 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.. The firstly undertaking in build a MANET is equipping each device to constantly hold the facts correctly path visitors such networks additionally perform through them may be connected to the largest internet. They will be contain one or more than one and exclusive transceiver among mobile nodes [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

- Power consumption constrains for node using batteries or energy harvesting.
- Ability to cope with node failures.
- Mobility of node.
- Dynamic network topology.
- Communication failures.
- Heterogeneity of node.
- Scalability to large scale of deployment.
- 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. PREVIOUS RELATED WORK

### *A Data Transmission Method Using Multicast in Mobile Ad-Hoc Networks*

In the paper [3] authors have described mobile ad-hoc networks, when a mobile host receives request from another host; the host sometimes transmits the requested data item by unicast. They additionally targeted on information things that square measure often requested by others, they need to transmit the information things over and over and consume an outsized quantity of power. They need got planned a data transfer methodology to improvement data convenience however in addition lowering website guests the planned technique is every cell host ends a facts request connected with the deadline to induce hold of the asked statistics item by the determined time. Moreover, every mobile host collects multiple requests for information things and transmits requested information things by multicast, and thus, reduces information traffic.

### *Applying Heuristic Technique to Ad-Hoc on Demand Distance Vector Routing to Reduce Broadcast*

In the paper [5] authors have represented propose associate degree approach to enhance the performance of existing flood primarily based routing rule Ad-hoc on demand Distance Vector Routing for mobile Ad-hoc wireless networks supported heuristic looking technique. They conjointly explained the way to avoid the matter of wireless broadcast storm, authors conjointly targeted on the heuristic looking approach was introduced within the method of finding route from supply node to destination node. Heuristic operate considers the characteristics of painter.

### *Effective Data Transmission in Mobile Ad Hoc Networks*

In the paper [6] authors have explained mobile ad-hoc networks, once a mobile host receives request from another host; the host sometimes transmits the requested data item by unicast. However, if mobile hosts hold knowledge things that square measure oftentimes requested by others, they need to transmit the info things again and again and consume an outsized quantity of power. During this paper,

they discuss effective knowledge transmission for not solely maintaining knowledge convenience however conjointly prolonging the life time of mobile hosts. In our projected methodology, every mobile host sends request hooked up with the point in time to receive the requested data item by the determined time.

### *Structured Segmented Data for Improving Collaborative Edition on MANETs*

In paper [7] author presents CDMAN (Collaborative knowledge Management in Ad-hoc Network) an information sharing system designed for Mobile unexpected Networks (MANETs). These system targets restricted capability devices comparable to PDAs. Specifically it takes into consideration restricted battery capability and restricted memory, structured mesmeric knowledge. CDMAN is predicated on analyzes however structured mesmeric knowledge improves the system potency specifically if it involves mobile nodes with restricted capability devices.

## III. 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 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 requested knowledge things by unicast, they need to transmit again and again a similar knowledge things that area unit of accessed and so consume an outsized quantity of power.

This dissertation, projected transmission communication technique for not solely manage 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.

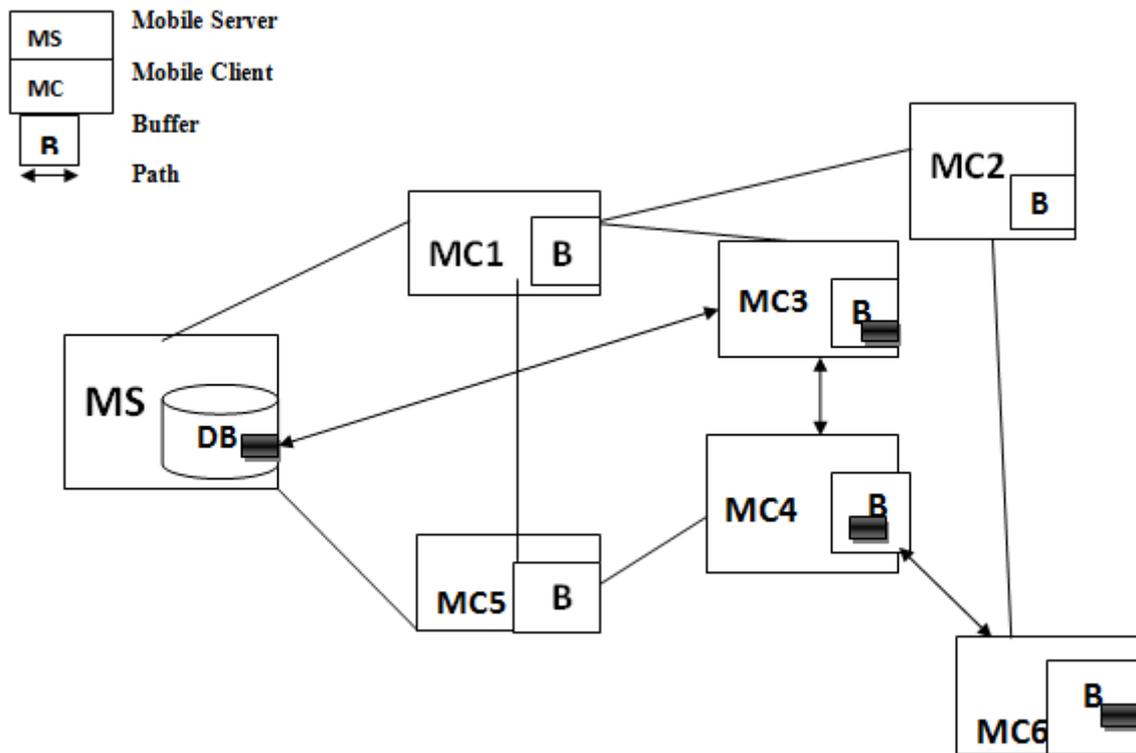


Figure 1 Proposed Architecture of MANET with a Buffer

In this diagram occurred that but 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).

**D. PROBLEMS IN ABOVE SCENARIO**

The higher than state of affairs is extremely little just for define the matter, the three hops count; however it's going to

be an oversized range in real wireless ad-hoc network. There are an unit four mobile host area concerned in communication, there are a unit solely 2 mobile nodes ought to have concerned instead four, bandwidth, range of mobile nodes that area unit concerned in communication, and energy-consuming area unit confrontation in cellular ad-hoc network. There are four wireless mobile nodes area unit concerned to communication between mobile server and cellular node six cellular nodes consume additional power throughout data transfer disable their batteries in an exceedingly short-lived time because battery quantity of wireless host area unit restricted, hop count is 3, and 4 wireless mobile node battery energy is utilize in communicate. The often all as a result of information is barely offered on wireless mobile server, there was required to extend information convenience in wireless mobile ad-hoc network. Information convenience means that data is available and prepared to be used in any respect present time. Here we not solely targeted on reduce of rush for data access however conjointly maintaining the information convenience.

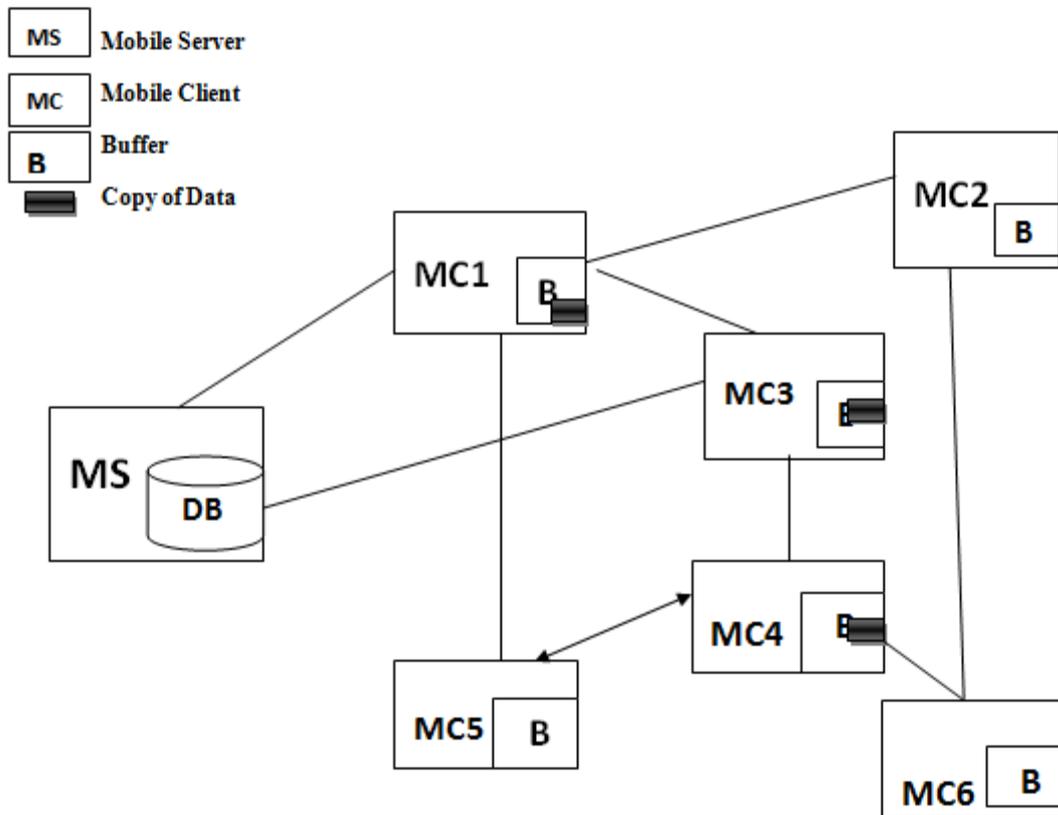


Figure 2 Proposed Architecture of MANET with Data Transmission

**E. DATA AVAILABILITY**

Data availableness suggests that information is present and prepared to be used in the slightest degree time. In our analysis work we got targeted on contraction of data traffic for information access and additionally manage the info availableness. In ad-hoc mobile network data availability is major challenge. We have focused in increasing data availability as well reduction in network traffic. In MANET mobile node just route the request and data packets, no mobile nodes have buffer, buffer is a temporary data storage, store and forward concept is used in message switching for data communication.

**F. PROPOSED ALGORITHM**

*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

$C_{Mi}(D_{req}(D_k)) \rightarrow$  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

$S_M(D_{res}(D_k)) \rightarrow C_{Mi}$  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  $D_{req}(D_{k+1})$

*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

$C_{Mj}^N$  (Req<sub>(D<sub>k</sub> or D<sub>k+1</sub>)</sub>) → Next hope //  $C_{Mj}^N$  Sends this  
 Req<sub>(D<sub>k</sub> or D<sub>k+1</sub>)</sub> request to the next hope

Else

If (B (D) == Req<sub>(D<sub>k</sub> or D<sub>k+1</sub>)</sub>)

If (Data Valid)

$C_{Mj}^N$  (D) →  $C_{Mi}$  // Data sent to the requested client  $C_{Mi}$

Else

$C_{Mj}^N$  (Req<sub>(D<sub>k</sub> or D<sub>k+1</sub>)</sub>) →  $S_M$

**Step 3:**

Wait for next request or do its own task.

**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<sub>k or k+1</sub>) →  $C_{Mi}$

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 hopped 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.

**G. EXPERIMENTAL ENVIRONMENT**

Our experimental platform consists of 2 things one is Network machine for virtual representation of mobile ad-hoc network and C++ artificial language for implementation.

**IV. RESULTS**

We choose two different bandwidth and two different packet sizes is used for same network. First we choose the bandwidth is 1mbps and packet size is **1 mb/s** then we calculated the starting time of mobile node M6 is 112 and Second, the bandwidth of mobile node is 2mbps and packet size is **0.5 mb/s** we calculate the starting time of mobile node M6 is 118 we find the bandwidth is higher and packet size is less then starting time is higher the data will not frequently transmitted to mobile node. That's why we choose first case data will be frequently transmitted.

**H. PERFORMANCE ANALYSIS**

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].

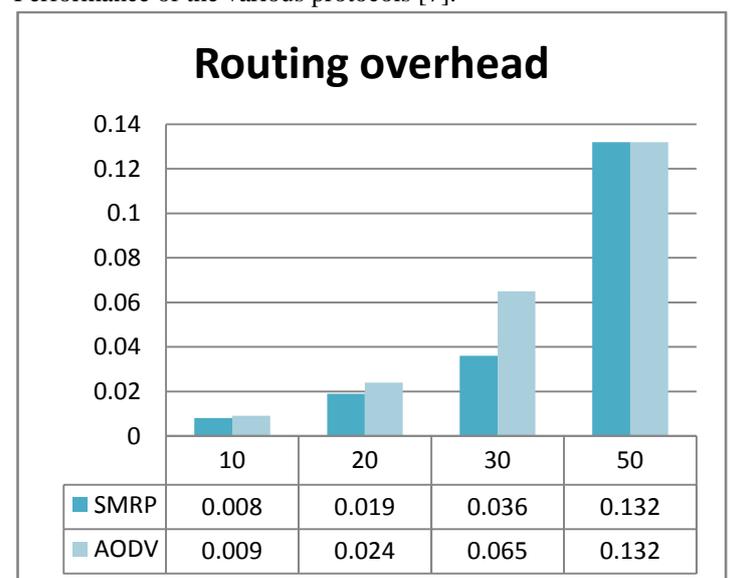


Figure 3 Routing Overhead for Finding Path

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.

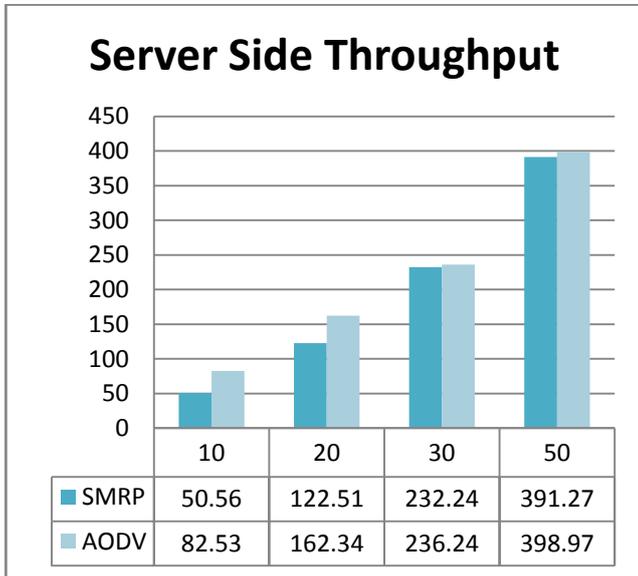


Figure 4 Server Side Load

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

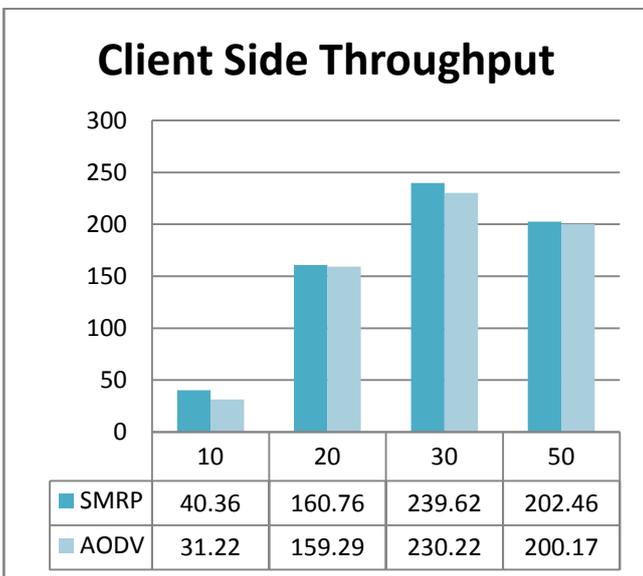


Figure 5 Client Side Load

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.

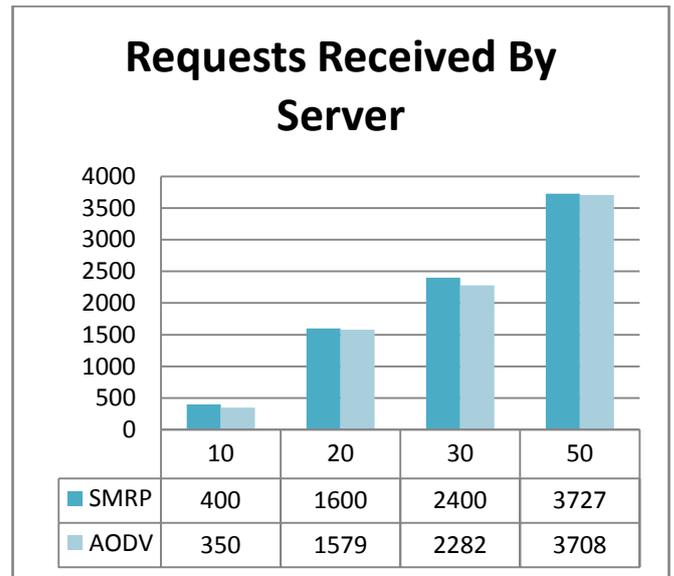


Figure 6 Requests Received By Server

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

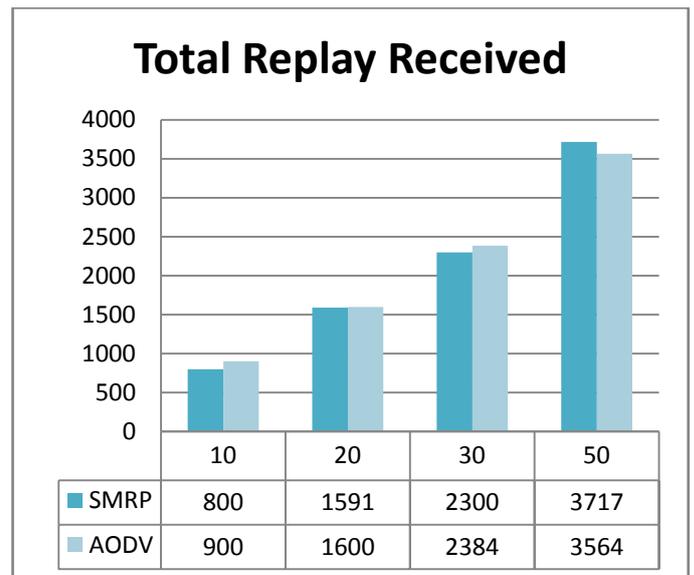


Figure 7 Total Received Reply

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.

## V. CONCLUSION

Projected methodology shows higher performance in heavy networks than the very traditional network. In our projected methodology in mobile ad-hoc mobile network atmosphere along with server consumer design. However, in a very real atmosphere, there's no specific server however each mobile node acts as freelance cell. The access is incredibly effectively use different bandwidth and different packet size to calculate transmission time of packet. In proposed method to find less starting time to data transmit frequently in the network. Data traffic reduced and maintaining knowledge accessibility and additionally for augment battery lifetime of mobile hosts. The approach is, each mobile host features a buffer for temporary storing knowledge phase and responds to requests from alternative purchasers like the servers. 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 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.

## REFERENCES

- [1] Robert M. Metcalfe and David R. Boggs, "Ethernet: Distributed Packet Switching for Local Computer Networks", Xerox Palo alto research center, vol. 37, Dec 1998.
- [2] Geetha Jayakumar and Gopinath Ganapathy, "Performance Comparison of Mobile Ad-hoc Network Routing Protocol", IJCSNS International Journal of Computer Science and Network Security, vol. 7 no.11, pp no 77-82, November 2007.
- [3] Masako Shinohara, Takahiro Hara, and Shojiro Nishio, "A Data Transmission Method using Multicast in Mobile Ad Hoc Networks", 22nd International Conference on Advanced Information Networking and Applications Workshops, IEEE, conference, pp no 232-237, Jun 2009.
- [4] A Nagaraju, Dr S Ramachandram, Dr C R Rao, "Applying Heuristic Technique To Ad-Hoc On Demand Distance Vector Routing To Reduce Broadcast", IEEE, conference, vol 2, pp no 978-988, July 2007.
- [5] Masako Shinohara, Takahiro Hara, and Shojiro Nishio "On Effective Data Transmission in Mobile Ad Hoc Networks", 22nd International Conference on Advanced Information Networking and Applications –

Workshops, IEEE, conference, pp no 874-879, Dec 2008.

- [6] L. Martin, "Structured segmented data for improving collaborative edition on MANET", IEEE, conference, pp no 1 – 5, 08 December 2008.
- [7] Mohamed Amnai, Youssef Fakhri, Jaafar Abouchabaka, "Evaluation of Impact of Traffic VBR and Mobility on the Performance of AODV Routing Protocols in Mobile Ad hoc Networks", IEEE conference, pp no 993-978, 2010.
- [8] "Network Simulator" [online] Available: en.wikipedia.org.