Performance evaluation of TCP Variants for GSM quality in MANET using AODV

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ABSTRACT

In this paper the performance of TCP variants is analyzed for voice application in GSM quality by varying voice frame per packets. These are compared by using KARAN and NAGLE theorem. This performance is analyzed over AODV protocol. This performance is compared in terms of throughput, packet delay variation and Load. To compare this performance OPNET modeler-14.5 is used. The result shows that the performance of Nagle is better than Karan further if we increase the voice frame per packet the performance also increase. The result also shows that the performance of New Reno comes better either in Nagle or Karan's which shows that overall New Reno is better than other.

Key words: MANET, TCP, New Reno, Reno, Tahoe, GSM Voice, AODV.

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INTRODUCTION

A remote system is a developing new innovation that will permit clients to get to administrations and data electronically, independent of their geographic position. Today's the interest of remote system is at the top point on account of its simple utilization and less cost as contrast with wired system. Bluetooth, WI-Fi is the shabby mean of remote correspondence which is utilized by everybody as a part of all recorded. There are numerous kind of remote system which give correspondence implies over expansive ranges, for example, Mobile impromptu system, MESH system, WWAN[1,5].

Wireless networks can be grouped in two sorts: - First is Infrastructure system which comprises of an altered framework alongside wired entryways and second one is foundation less (specially appointed or ad hoc) systems [4, 9, and 7].

A Mobile impromptu system is a gathering of remote versatile PCs (or node) in which nodes work together by sending parcels for one another to permit them to impart outside scope of direct remote transmission. Specially appointed systems oblige no concentrated organization or altered system foundation, for example, base stations or access focuses, and can be rapidly and reasonably set up as required [2,5].

- MOBILE AD-HOC NETWORK

Mobile Ad-hoc system (MANET) is one of the systems which give shared correspondence over wide zone [1, 6, and 10]. MANET is a system comprises of numerous nodes which impart to one another with no focal control power, so it is an open system. A MANET comprises of versatile nodes, a switch with different hosts and remote specialized gadgets. The nodes of MANET are remote radio sort and remote correspondence radio sort and they are versatile in nature, these Mobile nodes gadgets are transmitters, receivers and smart brilliant receiving antennas. To speak with other nodes, the destination node must lies between the radio scopes of the source node. Because of security gave by MANET it can be utilized as a part of military combat zones, classrooms and salvage locales. The portable nodes are joined with one another and information is course over the remote system through transitional node, information is expected to be exchange by means of diverse routing protocol these routing protocols are AODV, DSR, GRP, OLSR and so forth [13, 14].

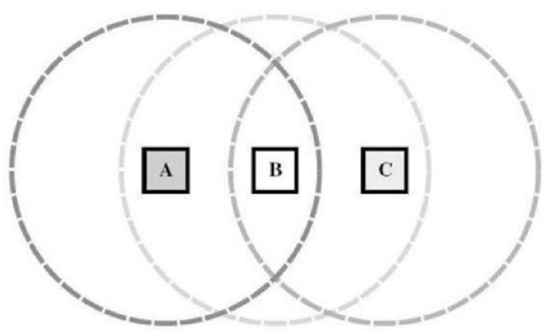

Figure 1: MANET

- ROUTING PROTOCOL

Steering in MANET intends to pick a privilege and suitable way from source to destination. Routing phrasing is utilized as a part of different systems, for example, in telephony innovation, electronic information systems and in the web. Here we are more worry about directing in portable ad hoc impromptu systems [3, 4, and 7]. Thus, Routing Protocol is a standard which controls how nodes choose which approach to course sends between processing devices in MANET. Along these lines, when a sender node needs to send information to a recipient node, it should first gain a path to the receiver node accordingly information exchange among nodes is acknowledged by method for different hops, and as opposed to simply serving as a solitary terminal, each versatile node goes about as a switch to secure a route. At the point when a source node plans to exchange information to a destination node, packets are exchanged through the halfway nodes; these routing protocols are AODV, DSR, GRP, OLSR and so forth [9, 11, 12].

- Ad Hoc On-Demand Distance-Vector Routing Protocol (AODV)

AODV is a source started on-demand routing protocol, it is a novel calculation for the operation of ad hoc systems. In AODV, if a source node needs to send information to destination node then firstly it will check the course, if course exists then it essentially advances the packets to destination node, if course does not exists, a route revelation procedure starts [3,4,5].

AODV manages three imperative messages for course disclosure process [7, 9, 11, and 12]:

RREQ (Route Request): When source node needs to launch correspondence with destination node then it spread the RREQ message through middle of the road node in system.

RREP (Route Response): After getting RREQ message, destination node answer as a RREP to source node and elucidate the route in the middle of source node and destination node, so communication will begin in the middle of them.

RERR (Route Error): When the connection breakage happens the node must refute the current route in the steering table passage. The node must rundown the influenced destinations and figure out which neighbors can be influenced with this breakage. At long last the node must send the route lapse (RERR) message to the comparing neighbors.

Thus, In AODV, at whatever point source node needs to send information to destination node then firstly source node send a path demand message to its neighbors. In the event that neighbor has data about destination it sends route reaction message to source node in unicast mode, if not then it makes an impression on every last bit of its neighbors etc. This methodology will remain proceed until the data about destination won't found. On the premise of this process a route called converse way is recorded, which distinguish the way. By utilizing this way path answer message is send over to the source node. At the point when the source node get path answer message the route gets to be prepared and the source node begins sending information packets.

Experimental Setup

In this paper two experiments is carried out to compare the performance of TCP variants(New Reno, Tahoe and Reno) by using KARAN and NAGLE theorem . In each experiment 60 nodes are placed randomly over an area of 100*100m. This comparison is done by using AODV protocol. To analyze this performance Opnet Modeller14.5 [9] is used.

Experiment 1- in this experiment the effect of TCP variant (Reno, New Reno and Tahoe) for two different algorithm (Nagle and Karan) on voice for GSM application is analyzed. In this experiment different scenario is made for different TCP variants. In these scenario Nagle theorem is applied first and then Karan theorem is applied. Here the packet per voice frame used is 1

Experiment 2- in this experiment the effect of TCP variant (Reno, New Reno and Tahoe) for two different algorithm (Nagle and Karan) on voice for GSM application is analyzed. In this experiment different scenario is made for different TCP variants. In these scenario Nagle theorem is applied first and then Karan theorem is applied. Here the packet per voice frame is 2.

The Simulation parameters used are shown in table 1-

Table 1: Simulation Parameters

Parameters	Value
Protocol	AODV
TCP Variants	Reno, New Reno and Tahoe
Area	100*100
No. of Nodes	60
Voice Quality	GSM Quality
Speed	2 m/s
Mobility Model	Random Waypoint

Results

In this experiment the performance of TCP Variants such as New Reno, Reno and Tahoe are compared in terms of Throughput, Packet delay variation and Load.

Throughput

Table 2 shows the throughput for Karan theorem for voice frame per packet 1 it shows that throughput for New Reno is 13000000, for Reno 12500000 and for Tahoe is 1280000. this shows that the performance of New Reno is better than other when we are using Karan’s,s algorithm.

Table 2: Throughput of AODV for RENO. New RENO and TAHOE for Nagle and Karan theorem

Voice Frame per packet	*Theorems*	*RENO*	*New RENO*	*TAHOE*
1	Nagle	14000000	14000000	13500000
	Karan	12500000	13000000	12800000
3	Nagle	15000000	14500000	14200000
	Karan	12500000	12000000	14000000

Table 2 shows the throughput for Nagle theorem for voice frame per packet 1. It shows that throughput for New Reno is 14000000, for Reno is and for Tahoe is 13500000. This shows that the performance of New Reno is better than other when we are using Nagle algorithm. This table also shows that when we are using Nagle algorithm the throughput comes better than Karan algorithm.

Table 2 shows the throughput for Karan theorem for voice frame per packet 3 it shows that throughput for Tahoe is 14000000, for Reno is 12500000 and for New Reno is 12000000. This shows that the performance of Tahoe is better than other when we are using Karan algorithm. This table also shows that when we increase the voice frame per packet the performance of Tahoe comes better than other.

Table 2 shows that the throughput for Nagle theorem for voice frames per packet 3. It shows that throughput for Reno is 15000000, for New Reno is 14500000 and for Tahoe is 14200000. This shows that the performance of Reno is better than other when we are using Nagle algorithm. This table also shows that when we increase the voice frame per packet the performance of Tahoe comes better than other and the performance of other TCP variants also increase. Table 1 also shows that the performance of Nagle theorem is better than Karan theorem. In the previous work the throughput is 2000000 which is very less as compare to our work.

Load

Table 3: Load of AODV for RENO. New RENO and TAHOE for Nagle and Karan theorem

Voice Frame per packet	*Theorems*	*RENO*	*New RENO*	*TAHOE*
1	Nagle	2240000	2230000	2100000
	Karan	1240000	1250000	1230000
3	Nagle	2190000	2230000	2180000.
	Karan	1180000	1300000	1450000

Table 3 shows the load for Karan theorem for voice frame per packet 1 it shows that load for New Reno is 1250000, for Reno is 1240000 and for Tahoe is 1230000. this shows that the performance of New Reno is better than other when we are using Karan algorithm.

Table 3 shows the load for Nagle theorem for voice frame per packet 1. it shows that load for Reno is 2240000 , for New Reno is 2230000 and for Tahoe is 2100000. this shows that the performance of Reno is better than other when we are using Nagle algorithm.

Table 3 shows the load for Karan theorem for voice frame per packet 3 it shows that load for Tahoe is 1450000 , for New Reno is 1300000 and for Tahoe is 1180000. This shows that the performance of Tahoe is better than other when we are using Karan algorithm. This table also shows that when we increase the voice frame per packet the performance of Tahoe becomes better when we use Karan algorithm

Table 3 shows the load for Nagle theorem for voice frame per packet 3. It shows that load for New Reno is 2230000 , for Reno is 2190000 and for Tahoe is 2180000. This shows that the performance of New Reno is better than other when we are using Nagle algorithm. This table also shows that when we increase the voice frame per packet the performance is decrease a little bit when we use Nagle thermo. In the previous work the load is 800000 which is very less as compare to our work.

Packet delay variation

Table 4: packet delay variation of AODV for RENO. New RENO and TAHOE for Nagle and Karan theorem

Voice Frame per packet	*Theorems*	*RENO*	*New RENO*	*TAHOE*
1	Nagle	35.5	35	36.7
	Karan	60.5	56	52
3	Nagle	32	26	29
	Karan	68	63	66

Table 4 shows that the Packet delay variation for Karan's theorem for voice frame per packet 1. It shows that packet delay variation for New Reno is 56, for Reno is 60.5 and for Tahoe is 52. This shows that the performance of Tahoe is better than other when we are using Karan's algorithm.

Table 4 shows that the Packet delay variation for Nagle theorem for voice frame per packet 1. it shows that packet delay variation for Reno it is 35 , for New Reno is 35 and for Tahoe is 36.7. This shows that the performance of New Reno is better than other when we are using Nagle algorithm.

Table 4 shows that the Packet delay variation for Karan theorem for voice frames per packet 3. it shows that packet delay variation for Tahoe is 66 , for New Reno is 63 and for Reno is 68 . This shows that the performance of New Reno is better than other when we are using Karan's algorithm. This table also shows that when we increase the voice frame per packet the performance of Tahoe becomes better when we use Karan algorithm

Table 4 shows that the Packet delay variation for Nagle theorem for voice frame per packet 3. It shows that packet delay variation for New Reno is 63 , for Reno is 68 and for Tahoe is 66. this shows that the performance of New Reno is better than other when we are using Nagle algorithm. the table also shows that when we increase the voice frame per packet the performance is decrease a little bit when we use Nagle thermo.

CONCLUSION

In this experiment the effect of TCP variant by using Nagle and Karan's theorem is analyzed over voice application for GSM quality in terms of throughput, load and packet delay variation. For this AODV protocol is used. In this experiment 60 nodes are used which are randomly placed over 100*100 m area. The result shows that Performance of Nagle is better than Karan's further if we increase the voice frame per packet the performance also increase. The result also shows that for Karan's New Reno performs better and for Nagle Reno works better. Further if we increase the voice frame per packet the Tahoe performs better for Nagle and for Karan's New Reno performs better. These result shows that the performance of New Reno comes better either in Nagle or Karan's which shows that overall New Reno is better than other.

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