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A Novel Approach to Enhance the Performance of RIP and RIPng Protocols For Ad Hoc Networks

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***Abstract*:-** In mobile ad hoc networks, there is a tradeoff between QOS and energy consumption because in order to achieve maximum quality of service , maximum energy has to be consumed. In this paper a novel approach is implemented ie integrating logical link control with MACto minimize the energy consumption and enhancing the performance of routing information protocol is studied in the context of best effort and QOS model in mobile ad hoc networks using EXATA Emulator.From emulation results we found that energy consumption ,jitter, end-to-end-dely decreases and throughput increases in QOSRIPngLLC.

Keywords: *RIP,RIPng,LLC,QOS,ENERGY CONSUMPTION ,MANETS*

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INTRODUCTION:

In ad hoc networks,each mobile node acts as both a router and an end node that takes part in node discovery and maintenance. So the failure of a node cangreatly affect the performance of the network. As wireless networking has become an integral component of modern communication in recent years for its applications in mobile and personal communications, energy efficiency will be an important design consideration due to the limited battery life of mobile terminals. The essence of using wireless device is that they can be used anywhere at anytime. One of the greatest limitations to that goal is finite power supply. Since batteries provide limitedpower, a general constraint of wireless communications is the short life time of mobile terminals. Therefore, power saving management is one of the most challenging problems in wireless communication.

Energy-Save:

This approach deals with the power loss during the idle mode and this can be minimized by increasing the amount of time a node spends in the sleep mode.

Energy or Power Efficient QoS Routing Protocol for MANET
Energy is an important resource that needs to be preserved in order to extend the lifetime of the network. There are three methods that are used to achieve the energy-efficiency in MANETs: Energy-Control, Energy-Save and Maximum-Lifetime routing. time a node spends in the sleep mode.

QoS Routing Protocol for MANET
Some of the unique characteristics of routing in MANETs are energy of nodes is crucial and depends upon battery which has limited power supply, nodes can move in an uncontrolled manner so frequent route failures are possible and wireless channels have lower and more variable bandwidth compare to wired network [3].

Quality of Service (QoS) is the performance level of a service offered by the network to the user. The QoS provisioning is to achieve more deterministic network behavior, so that information carried by the network can be better delivered and network resources can be better utilized. QoS routing usually involves two tasks: collecting and maintaining up-to-date state information about the network and finding feasible paths for a connection based on its QoS requirements [5].
Quality of Service (QoS) Routing relies on selecting network paths that have sufficient resources to satisfy the QoS requirements of all admitted connections and achieving global efficiency in resource utilization. The QoS constraints that need to be meet delay, bit error rate, bandwidth, route length etc. along with MANET specific requirements like energy, route stability and route reliability [4]. To support QoS, a service can be characterized by a set of measurable pre specified service requirements such as minimum bandwidth, maximum delay variance and maximum packet loss rate [5].
The major objectives of QoS routing are as follows:
a) To find a path from source to destination satisfying user's requirements.
b) To optimize network resource usage
c) To degrade the network performance when unwanted things like congestion, path breaks appear in the network [7].
However, some issues and challenges for providing QoS in ad-hoc networks are unreliable channel, maintenance of route, mobility of the node, limited power supply, lack of centralized control, channel contention and security [5].
Energy or Power Efficient QoS Routing Protocol for MANET
Energy is an important resource that needs to be preserved in order to extend the lifetime of the network. There are six methods that are used to achieve the energy-efficiency in MANETs RIP, QOSRIP, QOSRIPLLC, RIPng, QOSRIP, QOSRIPngLLC.
Performance Results

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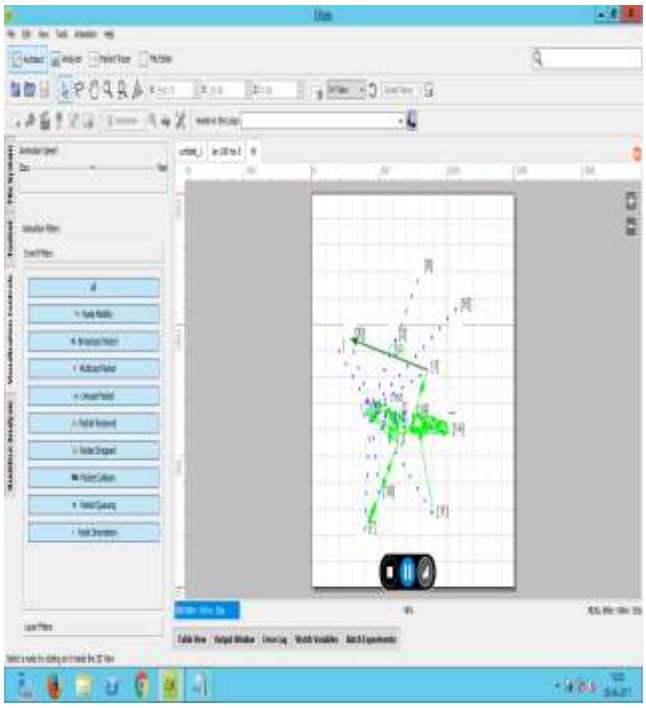
Simulation Environment

Parameters	Values
simulator	Exata5.4
Channel type	Channel/wireless channel
Antenna type	Omni-directional antenna
Network layer	PHY wireless
MAC protocol	MAC/802.11E/LLC
Network interface type	Physical/wireless phy
No nodes	20nodes
Topological area	1500X1500sq.m
Simulation time	600sec
Energy model	Generic model
Radio type	802.11b
Packet reception model	PHY802.11breception model
Data rate	2mbps
Mobility model	Random way point
Pause time	0 sec
Battery model	Linear model
Physical (radio propagation)	two-ray
Data link(MAC)	802.11MAC
mobility	10sec
Transmission power	15dBm
packetized	512bit/sec
Traffic model	CBR

Table 1: Simulation parameters:



SCENIRIO DIAGRAM

Figure1 : Snapshot of running designed scenario quality of service(QOS) for energy consumed in transmit mode ,receive mode and idle mode using RIP routing protocol

QOS METRICS	BEST EFFORT MODEL			QOS MODEL		
	RIP	QOSRIP	QOSRIPLLC	RIPPING	QOSRIPPING	QOSRIPPINGLLC
JITTER	0.00089 2979	0.00091 4777	0.000886 401	0.0009 90805	0.00106 724	0.00072 6101
THROUGHPUT	288.65	295.521	295.52	296.019	296.023	298.024
END TO END DELAY	0.0083 6495	0.00641 762	0.005112 64	0.0084 3648	0.00881 87	0.00889 46

Table 2 : comparison for best effort and QOS model

	Energy consumed (in mwh) transmitt mode
RIP	.0.036846
QOSRIPLLC	0.035837
RIPng	0.044037
QOSRIPng	0.043914
QOSRIPngLLC	0.044668
QOSRIP	0.034954

Table 3 :Energy consumed (in mwh) transmitt mode

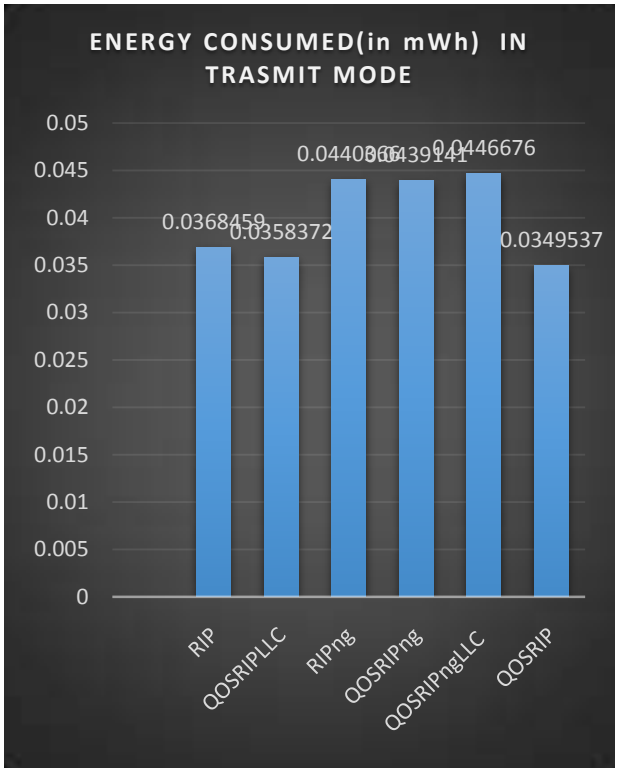


Figure – 2 :Energy consumed (in mwh) transmit mode

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	Energy consumed (in mwh)received mode
RIP	0.0133916
QOSRIPLLC	0.0128445
RIPng	0.0153989
QOSRIPng	0.0152551
QOSRIPngLLC	0.0155095
QOSRIP	0.0123992

Table 4 :Energy consumed (in mwh) received mode

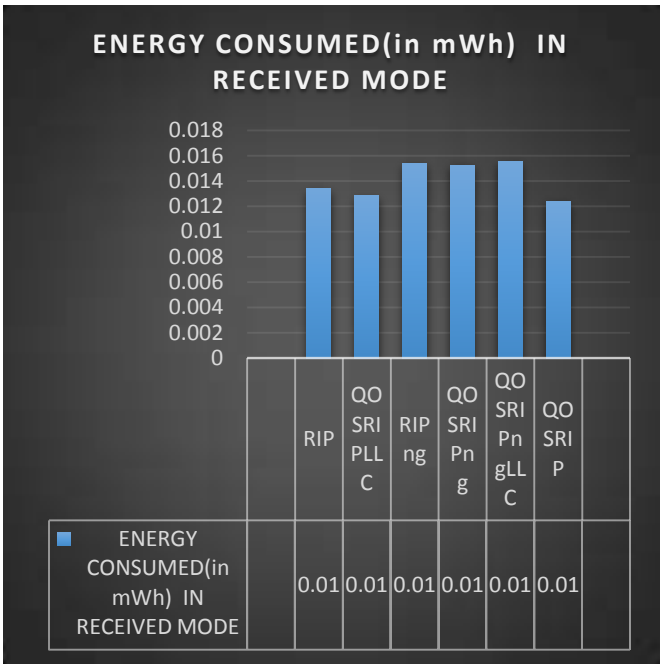

FIGURE4 :Energy consumed (in mwh) received mode

	Energy consumed (in mwh)idle mode mode
RIP	19.9846
QOSRIPLLC	19.9852
RIPng	19.9821
QOSRIPng	19.9823
QOSRIPngLLC	19.982
QOSRIP	19.9856

TABLE5: Energy consumed in idle mode

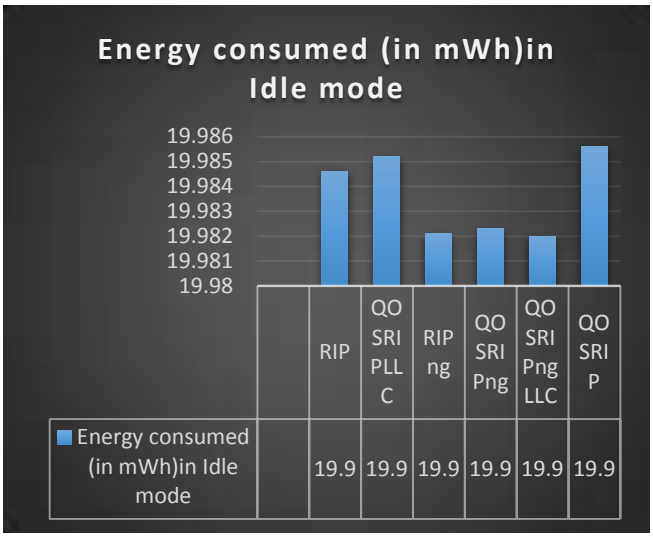

FIGURE 5: ENERGY CONSUMED IN IDLE MODE

TABLE 6 consumed (in mwh) total = transmit+received+idle mode

	Energy consumed (in mwh) transimitt mode	Energy consumed (in mwh) received mode	Energy consumed (in mwh) idle mode	Energy consumed (in mwh) total = transmit+received+idle mode
RIP	0.0368459	0.0133916	19.9846	20.03484
QOSRIPLLC	0.358372	0.0128445	19.9852	20.03388
RIPng	0.440366	0.0153989	19.9821	20.04154
QOSRIPng	0.0439141	0.0152551	19.9823	20.04147
QOSRIPngLLC	0.0446676	0.0155095	19.982	20.03121
QOSRIP	0.0349537	0.0123992	19.982	20.03295

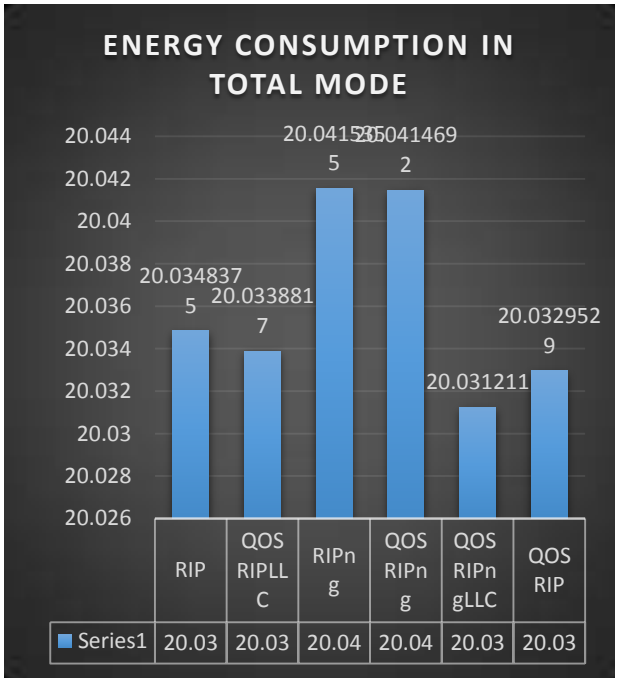

Figure - 5 :Energy consumed (in mwh) total = transmit+received+idle mode

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	average unicast jitter(seconds)
RIP	0.000892979
QOSRIPLLC	0.000886401
RIPng	0.000990805
QOSRIPng	0.00106724
QOSRIPngLLC	0.000726101
QOSRIP	0.000914777

Table 7 :average unicast jitter (seconds)

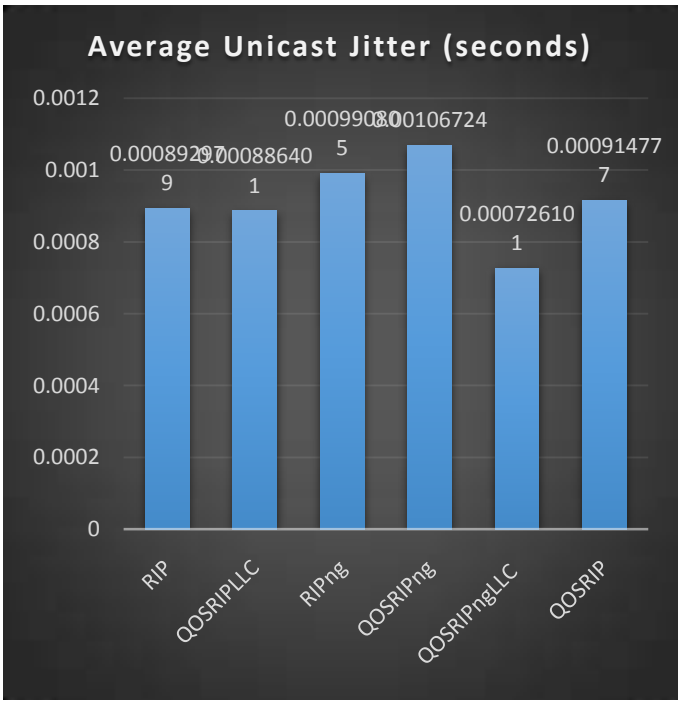

Figure - 6 :average unicast jitter (seconds)

	average unicast end-to-end delay(seconds
RIP	0.00836495
QOSRIPLLC	0.00511264
RIPng	0.00843648
QOSRIPng	0.0088187
QOSRIPngLLC	0.0088946
QOSRIP	0.00641762

Table 8 :average unicast end-to-end delay(seconds)

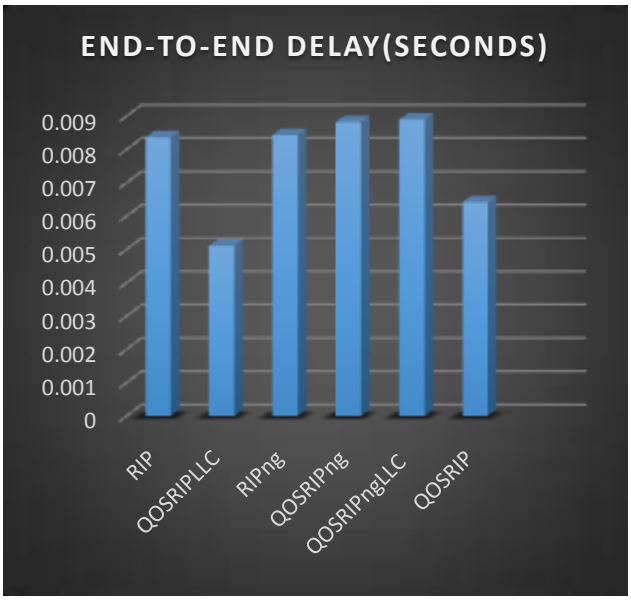

Figure - 7 :average unicast end-to-end delay(seconds)

	unicast received throughput(bits/seconds)
RIP	288.65
QOSRIPLLC	295.52
RIPng	296.019
QOSRIPng	296.023
QOSRIPngLLC	298.024
QOSRIP	295.521

Table 9: unicast received throughput(bits/seconds)

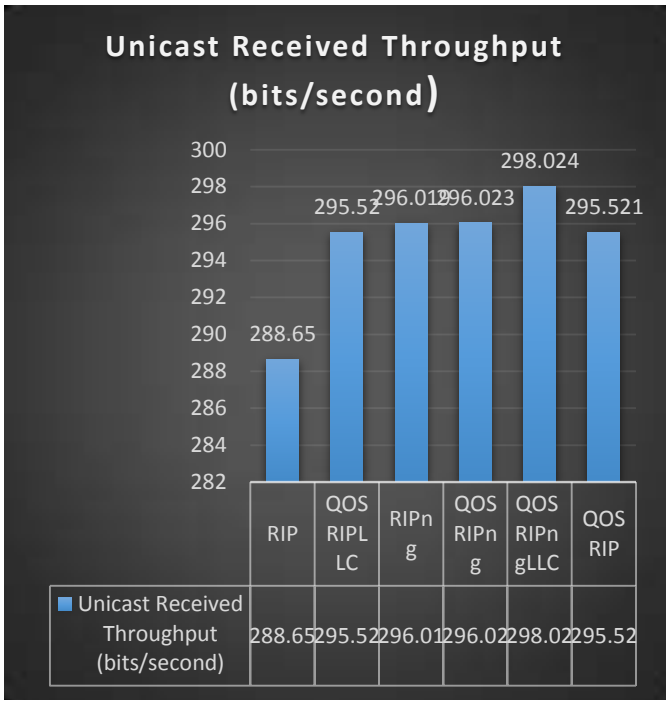

Figure 8: unicastreceived throughput(bits/seconds)

Conclusion :

This paper resembles an effort to re-examine two popular routing protocols RIPV2 and RIPng in presence of integrated

protocols MAC and LLC. we have analyzed theperformance of RIP, QOSRIPLLC, RIPng, QOSRIPng, QOSRIPngLLC, QOSRIP protocols by Emulation using Exata5.4 , with mobility 10 sec and traffic model CBR. . In this paper we compare the impact of logical link control to provide a QOS in energy consumption for routing information protocol in the context of best effort and QOS model in mobile ad hoc networks. From emulation results we found that energy consumption ,jitter, end-to-end-dely decreases and throughput increases in QOSRIPngLLC.

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