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QoS Oriented Coding For Mobility Constraint in Wireless Networks

Sudha Arvind[1], Dr.V.D.Mytri[2]
[1]*(Assoc. Prof. ECE Dept., CMRTC Hyd. / JNTU Hyderabad, India)*
[2]*(Principal, Appa Institute of Technology, Gulbarga/ VTU, Karnataka, India)*

Abstract: *With the increase in service demand in wireless network, new quality oriented communication approach are in need. In the process of wireless communication, user mobility is of greater importance. As the users are moved at a random fashion, the impact of offered quality of service is degraded. Towards providing quality of service in mobility scenario an improved QoE based communication model, under user mobility in random mode is proposed. Wherein QoE coding was used as a traffic control mechanism for service level coding, the offered blockage is neglected. Under heterogeneous condition with node mobility, is highly affected. The effect of mobility on the offered quality of service under heterogeneous nodes is developed. The offered quality of service for the communication network, under variant data traffic forwarding condition is observed to be improved.*

Keywords: *Quality of service, wireless network, random mobility, traffic blockage control*

I. Introduction

Communication technology has become constraint for future requirement as the growth of the communication industry is larger and growing complex. Different modes as mobile, wired, wireless, adhoc, supports growth of the communication industry but with certain limits. Mobility plays a vital role in wireless networks, where it is necessary to satisfy the requirements of the modern world. It is now a challenge to provide the seamless flow of information without re-modifying the existing infrastructure. The most challenging aspect is to provide mobility management for real time communication services in wireless networks with demanded quality of service. Various approaches are proposed in earlier to manage the mobility in wireless networks. In [1], the current state of the art for mobility management for next generation IP-based wireless systems with new wireless network architecture for mobility management were introduced. Towards provisioning of quality of service in such network [2] outlines a review for QoS based coding for wireless network. Various quality parameter such as the Mobility Management, Security and Reliability, and Power Consumption etc, were presented. The MAC control operation for mobility constraint was presented. The basic issues involved in handoff management [3] aspect of general mobility management in wireless communication systems is focused. The issue of delay, security and its management is derived. Towards the enhancement in mobility management for current and future communication networks, and the integration of heterogeneous networks for a smooth handoff and better Quality of Service (QoS), in the context of next evolutionary step for wireless communication networks a macro and micro mobility solutions [4].for Mobile IP is presented. In the focus of providing higher network performance in next generation communication, an adaptive resource allocation wrt. Bandwidth allocation [5] was proposed. Towards providing seamless mobility of user with higher degree of mobility an overview of the “off-path” QoS model to supplement PMIPv6 was observed in [6]. With the objective of heterogeneity, in [7] three alternative architectures for an all-IP network integrating different wireless technologies using IP and its associated service models were presented. The first architecture, called ISB, is based on a combination of DiffServ and IntServ models appropriate for low-bandwidth 3G cellular networks with significant resource management capabilities.

The second architecture, called DSB, is purely based on the DiffServ model targeted for high-bandwidth wireless LANs with little resource management capabilities. The last architecture, called AIP, combines ISB and DSB architectures to facilitate the integration of wireless LAN and3G cellular networks towards a uniform architecture for all-IP wireless networks. [8], investigate the integration of RSVP and aRSVP-like flow reservation scheme in wireless LANs, as an end-to-end solution for QoS guarantee in wired-cum-wireless networks. A RSVP-like flow reservation and admission control scheme for IEEE 802.11 wireless LAN. Using WRESV, wired/wireless integration for supporting multicast session, mobility management, and admission control is proposed. A seamless service on practical application such as multimedia and voice transfer were observed in [9, 10 11]. To describe a protocols for mobility management for PLMN-based networks, Mobile IP, wireless ATM, and satellite networks an integration of these networks is discussed in [12,13], in context to next evolutionary step of wireless communications networks. The advantage of the heterogeneous network is outlined in this approach. As heterogeneous networks are more advantageous due to variant offered resources, the traffic overhead is a major issue. Due to the traffic blockage per node, the quality of the service provided is minimized. In this paper, to offer quality of service under dynamic node movement, following heterogeneous condition, a new dual bound control approach is proposed. In the recent development of providing quality of experience (QoE) based coding was outlined in [14]. This approach provides a higher probability of data transmission based on demanded quality of service. The offered approach is simpler and quite robust in variation of traffic conditions. However the control operation was observed to be controlling the upper bound limit of the node buffering. Under the heterogeneous network with node mobile, incoming traffics are not fixed, hence a upper bound controlling of traffic will lead to node failure condition. With this objective in this paper a new dual bound control logic is proposed. The approach presents a new controlling of offered traffic under dynamic variation of node resources due to heterogeneity condition. This suggestive approach present a novel approach of providing a traffic buffering controlling under node dynamicity and mobility dynamicity condition. To present the stated approach, the rest of the paper is organized as follows: section II gives the details about the system model. The details about the earlier QoE-aware framework was given in section III, section IV provides the details about the proposed approach, section V provides simulation analysis and finally section VI concludes the paper. (10)

II. System Model

To develop a wireless network with heterogeneous characteristic a system model is developed. A wireless network considering a topology of randomly distributed nodes, defined by a set of nodes $\mathcal{N}$, with a set of links,$\mathcal{L}$. The source node link$l \in \mathcal{L}$, is defined as $Tx(l)$, and the Destination node as $Rx(l)$. For a link, $\mathcal{L}_{in}(n) \triangleq \{l \in \mathcal{L} | Rx(l) = n\}$ and $\mathcal{L}_{out}(n) \triangleq \{l \in \mathcal{L} | Tx(l) = n\}$ representing sets of edges corresponding to incoming and outgoing links for a node n, a network is defined, assuming to carry a set $\mathcal{T}$ of traffic data, where data '*i*' generated by a source node S_i is sent to the destination node $\mathcal{D}_i$. In general, a source node generates a data *i* traffic, and intermediated node realy to its neighbors following it to the destination node. Let $\mathcal{T}_n \triangleq \{i | n \in S_i\}$ denote the set of packets forwarded by node n, and $\mathcal{T}_n \triangleq \{i | n \notin \mathcal{D}_i\}$ the set of data not forwarded by node n. obviously$\mathcal{T}_n = \mathcal{T}$, for the nodes that are not the sinks of any data. Due to the broadcast nature of the wireless interface, a link whose Destination is in the proximity of an unintended co-channel transmitter is interfered if the corresponding reception and transmission occur simultaneously. Let $\mathcal{N}_{t0}(l)$ be the set of nodes whose transmission interferes with (the reception of) link *l*. Similarly, let $\mathcal{L}_{from}(n)$ denote the set of links that are interfered by the transmission of node n. Note that if $l \in \mathcal{L}_{from}(n)$, then $n \in \mathcal{N}_{t0}(l)$, and vice versa.

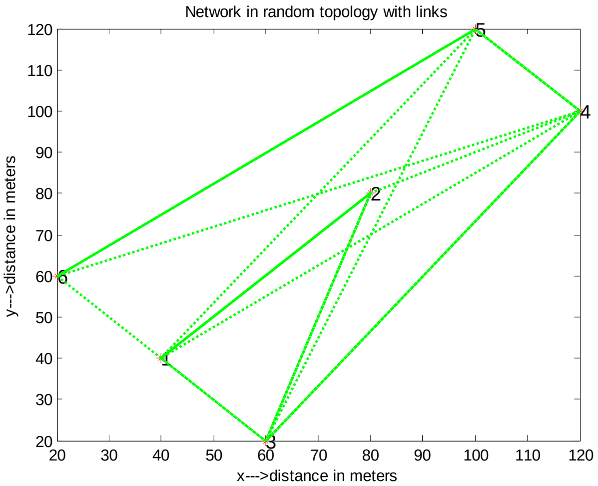


Fig.1. Network topology with probabilities of data flow.

For the given network in figure 1, with a network consisting of six nodes, with all links working in bidirectional mode, the communication and the interference distances are assumed to be random. The interference model is considered to be $\mathcal{L}_{from}(n) = \{(1,3),(2,3),(4,3),(5,3),(6,3)\}$, and $\mathcal{N}_{t0}(3,1) = \{1,2\}$. It is also assumed that the channel between any pair of nodes is quasi-static which is observed in the case of mobility scenario. Thus, the interference relations are time-invariant, and packet drops are entirely due to collisions at the MAC layer and buffering over head at the link node. With a persistence probability π_n of node n; that is, node n transmits with probability of π_n, with packets buffering in its queue. For a given node n, the probability of forwarding a packet through link$l \in \mathcal{L}_{out}(n)$, is denoted by q_l where $\sum_l l \in \mathcal{L}_{out}(n)q_l = 1$. Thus, the access probability of link *l* is given by $p_l = q_l\pi_n$with $\sum_l l \in \mathcal{L}_{out}(n)p_l = \sum_l l \in \mathcal{L}_{out}(n)q_l = 1$. Considering the mobility of each node at a rate of r from its direct neighbor, this buffering overhead q_l is dynamic. Over such communication model, with a source with link l and mobility factor *Rm* a QoS based communication is focused.

III. QoS Communication Framework

It is required to achieve the demanded quality of service for each communication in a wireless network. To achieve the objective of quality of service in wireless network, various resource control operations were developed in past. Whereas in heterogeneous network each node is offered with a dynamic forwarding rate, resource scheduler were used to control the available resources. The goal for a packet scheduler, which runs at every node, is to maximize the overall achievable user perceived QoE and fairness among competing flows under given resource constraints. The scheduler minimizes a cost function which denotes the impact of packet drop decisions on the QoE of individual flows. Such packet drop decisions will be triggered by an active queue management algorithm in case it is required to achieve the demanded quality of service for each communication in a wireless network. To achieve the objective of quality of service in wireless network, various resource control operations were developed in past. Wherein in heterogeneous network each node is offered with a dynamic forwarding rate, resource scheduler were used to control the available resources. The goal for a packet scheduler, which runs at every node, is to maximize the overall achievable user perceived QoE and fairness among competing flows under given resource constraints. The scheduler minimizes a cost function which denotes the impact of packet drop decisions on the QoE of individual flows. Such packet drop decisions will be triggered by an active queue management algorithm in case resource limitations are discovered (e.g., once the buffer utilization reaches a pre-defined threshold), and they are triggered when the buffers at each node reach a certain threshold. The scheduler then determines, based on the out-going data rate and buffer fill rate, how many packets need to be dropped and the combination that minimizes the QoE impact on each flow. Under the constraint of mobility, these factors are scheduled with respect to the node deviation from its location which variate the traffic flow offered over each node.

A. Operation overview

For the communication of forwarded data with dynamic resource constraints, Fig.2 illustrates a packet scheduling strategy. The scheduler calculates all packet drop combinations that would satisfy the required buffer reduction. For each of these combinations, an estimation of the QoE reduction for each flow is calculated. To obtain these QoE estimates, each node keeps local statistics of the packet drop rate and experienced delay at the buffer, and makes use of the QoS-related metrics sent by its neighbors according to the mechanism described in [14]. The scheduler then drops the packets whose combination results in the smallest total QoE decrease. In order to provide fairness without dropping packets from some flows excessively, we add an additional constraint using the standard deviations of QoE decrease resulting from the drop operations. Thus, the scheduler favors packet drop combinations that contribute to the smallest variation of QoE changes across the various flows.

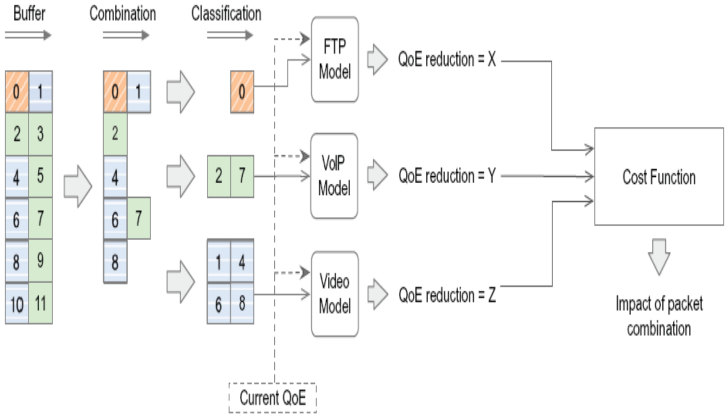


Fig.2.Impact of a packet combination in the buffer of a node.

B. *QoE-aware cost function*

In order to obtain a set of suitable packet drop combinations from the buffer, an amount of *B* bits were defined to be dropped from the queue based on the buffer fill rate R_{buff}, the outgoing data rate R_{tx}, and the buffer fullness,

$$\lambda_{buff}:B = \left(R_{buff} - R_{tx}\right).\lambda_{buff} \qquad (1)$$

For a given range of $[C_{min}.B, C_{max}.B]$ bits, a set *Si* of i packets is selected, with the constraint following,

$$C_{min}.B =< \sum_{i\in S} size(S_i) < C_{max}.B, \qquad (2)$$

i.e., the total size of all packets in a set must be within a range of C_{min} and C_{max} around *B*. The optimal packet drop combination can be found by minimizing a ccost function, *Q*(*p*), calculated for each packet drop combination *p*. Specifically, for *n* flows, *Q*(*p*) is given by,

$$Q(p) = \sum_{i=1}^{n} k_i.\Delta QoE_p^i - \lambda.\sum_{i=1}^{n} \Delta R_i^p + \mu.\eta.\sigma(\Delta QoE) \qquad (3)$$

Where ΔQoE_p^i is the QoE reduction for flow *I* due to the dropping of *p*, and k_i is a weighting coefficient for preferential packet dropping from specific flows. Through k_i, the scheduler can be configured to drop more packets from certain classes of traffic, such as data streams. Furthermore, ΔR_i^p is the rate reduction of flow *I* due to the dropping of *p*, while λ is a weighting factor that control show aggressively the scheduler drops packets. Finally, $\sigma(\Delta QoE)$ is the standard deviation of the QoE reduction over all flows, while μ determines the weight of the standard deviation in expression (3). The generic model in expression (3) can be applied directly to all packets present in the buffer. However, to reduce the processing time, a pre-selection of packet combinations can be done based on a target buffer size. The rate reduction component $\lambda.\sum_{i=1}^{n} \Delta R_i^p$ is thus unnecessary, resulting in the following minimization function,

$$Q'(p) = \sum_{i=1}^{n} k_i.\Delta QoE_p^i + \mu.\eta.\sigma(\Delta QoE) \qquad (4)$$

C. *Scheduling scheme*

To achieve the objective of quality of service under this queue constraint a queue management algorithm was developed to activate the operation in the case of the following two events: (i) the buffer size exceeds a defined threshold; (ii) a packet is to be dropped due to in sufficient buffer space. Once the queue management algorithm is invoked, it first begins by profiling the packets in the buffer, to determine their size, the distortion impact to f video packets (quantifying how much they will affect the perceived QoE), and to make a list of which flows are traversing the node. Then, expression (1) is applied to determine the amount of bytes that need to be dropped from the buffer. Next, the scheduler determines those packet combinations that satisfy expression (2). The number of combinations, in a full-lookup method, is equal to 2*n*, where *n* is the number of packets in the buffer. With the list of packet drop combinations satisfying expression (2), the QoE reduction per combination is calculated for each flow using the QoE expressions described in [14]. To this end, the algorithm gathers all packets that belong to each flow, and computes the new flow parameters that would result from dropping those packets (e.g., the new packet loss or the new total distortion). With these new parameters, the QoE of that flow is updated, and ΔQoE is determined as the difference between the old and new flow's QoE values. The overall total and mean reduction in QoE is then calculated from these QoE values, as well as their standard deviation (σ). Expression (4) is applied to find the packet combination with the lowest impact on QoE. The scheduler then drops this combination from the buffer. Wherein this approach of packet scheduling in observed to provide higher degree of quality of service in wireless network, the mobility of network node in the network, impacts the offered traffic per node. Hence, to incorporate a mobility constrain to the offered QoE in provision to quality of service in wireless network, a mobility constraint QoE is proposed.

IV. Proposed Approach

In the approach of traffic management, each node routes the packet based on the offered link l and the allocated data rate R. wherein in the conventional model of QoE based communication for quality provisioning, it is observed that for each node buffer status *B*, the forwarding rate is defined by the current buffer level of each node defined by *Bcurr*. The traffic rate is allocated based on state of this buffer level. However with the node in heterogeneous characteristic and mobility allocation of rate is not effective for such approach. Hence in this proposed work a probabilistic based rate allocation approach is proposed to constraint the quality of service in wireless network. In the process of rate controlled traffic controlling approach, the flow control is derived by referring to the back pressure at a given node defined by the QoEBp-signal as,

$$\begin{cases} \text{QoEBp} = 1,\ if\ queue\ constraint\ match. \\ \qquad\qquad \text{QoEBp} = 0,\quad else. \end{cases} \tag{5}$$

Based on the QoEBp status, the allocated data rate is then set as,

$$R_i(t) = \begin{cases} R_i(t) + \Delta r & if\ R_i(t) < R_u, \text{QoEBp} = 0 \\ R_i(t) & if\ R_i(t) = R_u, \text{QoEBp} = 0 \\ \frac{R_i(t)}{2} & if\ \text{QoEBp} = 1 \end{cases} \tag{6}$$

In this approach QoEBp is set as '1' if traffic blockage is observed. A packet dropping is observed when the buffer queue length has reached to higher limit value i.e. $L_{current} \cong L_{max}$. When the stated condition satisfies the control operation is activated in accordance to QoEBp value set. However the status signal is set high at the upper bounding limit of the traffic blockage. Once the traffic blockage level reaching to $L_{max.}$ This approach, hence give a higher probability of total node blockage in the network. This blockage rate would be very high under mobility scenario as nodes with different offered traffic enter into the node communication range. Hence to avoid such node failure probability, an adaptive rate controlling approach based on the computed probability of traffic blockage at buffer, rather to direct queue length correlation is proposed. To develop the proposed probabilistic rate allocation a probability on traffic blockage is computed over the two limiting values of $L_{min}$and L_{max}, with the node mobility rate *Rm*. As in consideration to two factors for traffic control, the buffering value and the mobility factor we call this as dual bound control approach. The approach of dual tolerance limit reduces the traffic blockage probability, and provides an initialization of traffic blockage controlling at an lower stage of data buffering rather to upper limit as in conventional case. In such a coding approach the data rate for the flow of data from the buffer is R_u. Considering the node mobility at *Rm* from the neighbor node, two cases arises, a) Node entering to a neighbor node

b) Node moving away from a neighboring node

The incoming data are buffered into the buffer till the lower limit L_{imn} is reached. Once the lower limit L_{imn} is reached the allocated data rate is controlled on the probability of traffic blockage at the buffer logic. The average level of probability of traffic blockage at the node level is defined by,

$$P_{queue} = \frac{P_{Blk}}{1-P_{pkt}} \tag{7}$$

Where,

$P_{pkt} -\ no.of\ packets\ been\ transfered$

$P_{Blk} -\ blockage\ rate$

The blockage rate for the buffer logic is defined as,

$$P_{Blk} = B_{current} - \left(\frac{R_{alloc}}{R_{max}-R_{alloc}}\right) \tag{8}$$

Where,

$B_{current} - current\ blockage\ rate$

$R_{alloc} - allocated\ data\ rate$

The current blockage at the buffer level is computed as,

$$B_{current} = \frac{L - L_{current}}{L} = 1 - \left(\frac{L_{current}}{L}\right) \quad (9)$$

Where,

L – Total Buffer length and,

$L_{current} - current\ queue\ length\ measured$

For such buffer control operation the traffic blockage control signal QoEBp is defined into three logical values rather to two values as stated in [15]. The QoEBp signal is assigned with, QoEBp=(-1, 0, 1), eqn. (5) then becomes,

QoEBp=0 indicates no mobility.

QoEBp= 1 indicates node moving away from node (10)

QoEBp=-1 indicates node moving towards the node.

In this case the allocated rate updated by the probability of traffic blockage and eqn.(6) is then updated as;

$$R_i(t) = \begin{cases} R_i(t) + \Delta r & if\ R_i(t) < R_{u,}\ \text{QoEBp} = 0 \\ R_i(t) + (\Delta r - P_{cong}) & if\ R_i(t) < R_{u,}\ \text{QoEBp} = -1 \\ R_i(t) & if\ R_i(t) = R_{u,}\ \text{QoEBp} = 0 \\ R_i(t) - \dfrac{R_i(t)}{P_{cong}} & if\ R_i(t) = R_{u,}\ \text{QoEBp} = -1 \\ \dfrac{R_i(t)}{P_{cong}} & if\ R_i(t) = R_{u,}\ \text{QoEBp} = 1 \end{cases} \quad (11)$$

The data rate allocated for traffic blockage control based on probability of traffic blockage, leads to minimization of node overhead. Due to initiation of traffic blockage controlling under node moving into the neighboring node offer a higher rate of traffic flow under high traffic condition as well. The buffer queuing is reduced, which results in higher traffic flow through each node. This improvises the overall network throughput, and intern improves the network performance. An evaluation for the network performance based on the suggested control mechanism is carried out and obtained observations are outlined in following section.

V. Simulation Results

To evaluate the operational efficiency of the proposed approach, a randomly distributed wireless sensor network is simulated with control mechanism of rate control approach [15] and the proposed probabilistic control approach. A network is defined with the following network parameter under consideration;

Network parameter	***Values***
Node placement	*Random*
Mobility	*Random*
MAC protocol	*IEEE 802.11*
Power allocation	*Random*
Transmission range	*40 units*
Network area	*200 x 200*
Number of nodes	*50-1000*
Memory size / node, (M)	*3M*
L_{min}	*0.15xM*
L_{max}	*0.75xM*
Initial blockage probability	*0.1*

The simulation of the developed approach is iterated for three runs with the source moving and all other nodes been kept constant. The impact of source mobility over the offered quality parameters were evaluated.

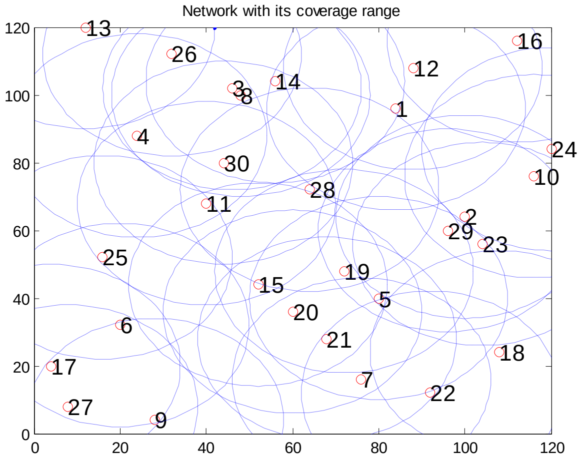


Fig.4 Network with its coverage range

The coverage region for each node is illustrated in figure 4. The bounded region for each node is computed by the possible range coverage of each node. The communication range of 30 units is defined for each node, and the nodes in this coverage range are used for the computation of a 1-hop neighbor.

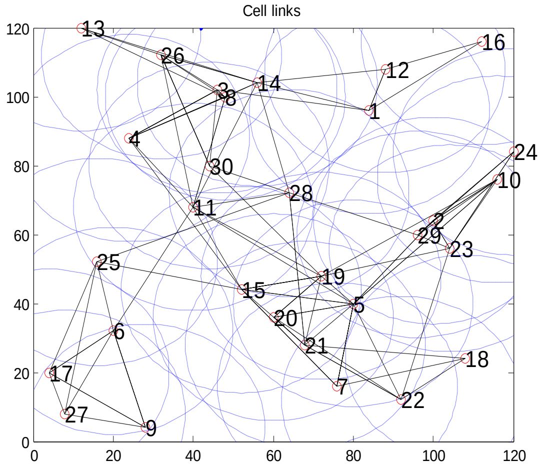


Fig.5 cellular links

The network with 1-hop neighbor is illustrated in figure 5. Each node computes the distance of node with all other nodes and distance below the communication range in defined as a 1-hop neighbor for the refereeing node. In the process of neighbor discovery, the Nodes distance falling below to communication range are declared as direct neighbor, and each node exchange their one hop neighbor details to formulate a link network.

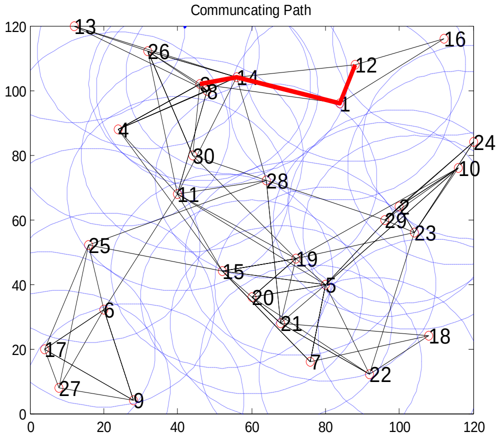


Fig.6 Communication Path

With the one hop neighbor list, an routing protocol is developed to evaluate the route from a given source to the destination. The routes are generated via the data exchange from source to destination in a broadcasting manner. A forward and backward tracing method is applied to obtain the route parameters used for forwarding packets. Among generated routes, path with minimum hops (i.e. shortest path) is selected for communication. The selected path for the developed network is as illustrated in figure 6.

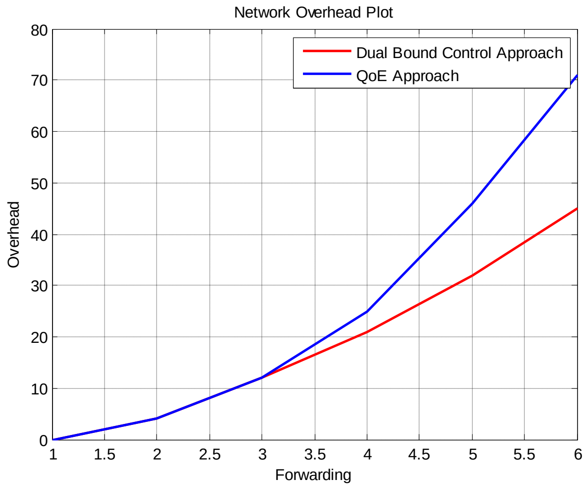


Fig.7 Network Overhead Plot

On the process of communication, data are forward for the path selected from source to destination via intermediated nodes. During the process of data exchange the packets are buffered and based on the computed traffic blockage level, packets are forwarded. To transfer the packets per node forwarding data rate is computed and based on the traffic blockage level and allocated data rate packets are released or queued up in the node. The queued up packets intern builds a overhead in the network. This overhead is defined as the number of packets queued up for processing at each node. With the forwarding of packets from source to destination, at each intermediate node, packets are buffered; the overhead hence observed is presented in figure 7. Due to probabilistic coding, the traffic blockage is controlled over a limit of buffering as in contrast to buffering to a higher level of buffer queue. Due to early controlling and probabilistic estimation, the overhead to such network is observed to be minimized with the forwarding of packet.

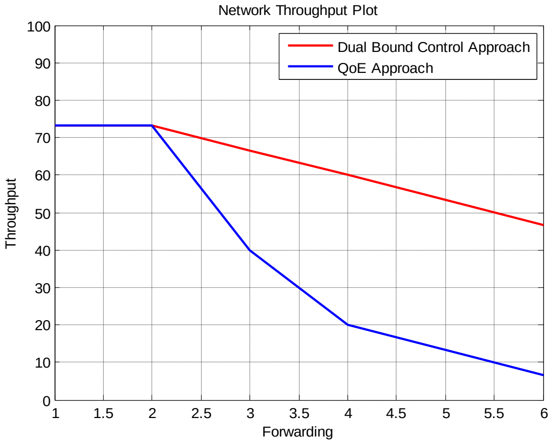


Fig.8 Network Throughput Plot

The network throughout for the developed network is illustrated in figure 8. Due to higher data rate of packet forwarding in the proposed approach, it is observed that more number of packets are received and hence resulting in higher throughout tit e network. The throughput of these simulated systems is defined as the number of packets generated over packets received for a observing communication time period. The thorug0ut is observed to be same for the first 1-hop forwarding and as in such case the buffering is observed to be minimized and hence allocated data rate is improved. However as the number of packet forwarding increases the traffic blockage level increased resulting in decrement of throughout, which is maintained to be higher and linear in case of probabilistic coding.

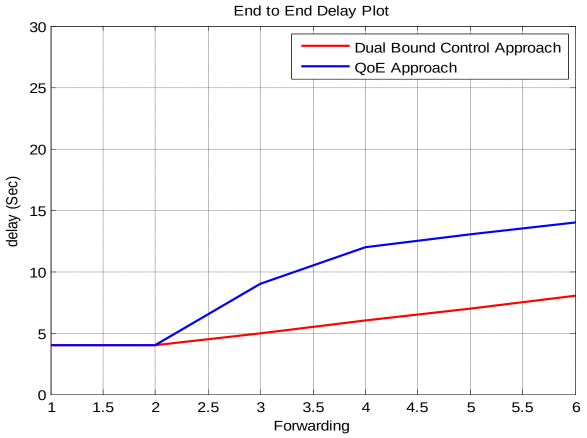


Fig.9 End to End Delay Plot

The observed end-end delay factor for the developed system is presented in figure 9. The delay for the rate control approach is higher than the probabilistic coding, as the buffering of data at each node is minimized at the node level the packets are released faster. The traffic blockage level in such coding is developed in a probabilistic manner, wherein packets buffered in queue based on rate control approach, which builds the forwarding delay for each node.

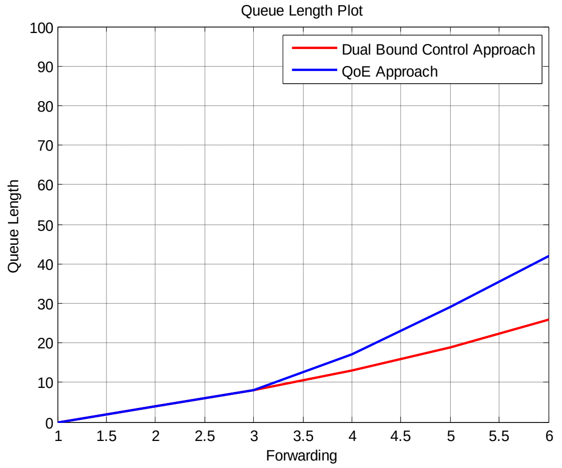


Fig.10 Queue Length Plot

The buffered Q length for such system is presented in figure 10. The Q lengths are measured as the volume of data packets buffered with increase in forwarding of data packets. It is observed that, the Q length of buffering is reduced for probabilistic coding due to increment in the data rate. The queuing is however observed to be equal in the initial communication phase and gradually increased with forwarding of packets.

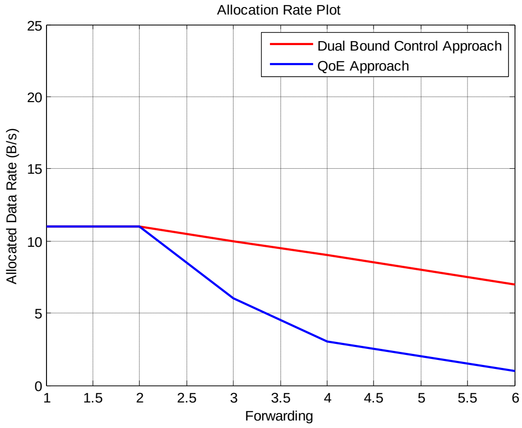


Fig.11 Allocation Rate Plot

The allocated data rate for the developed method over the simulating network is as outlined in figure 11. The nodes are communicated for the given data packet and each level of buffering these nodes compute the allocable data rate for forwarding. This forwarding results in proper control of traffic blockage and hence results in efficient network performance. The simulation is then iterated for two node positions as shown in following figures

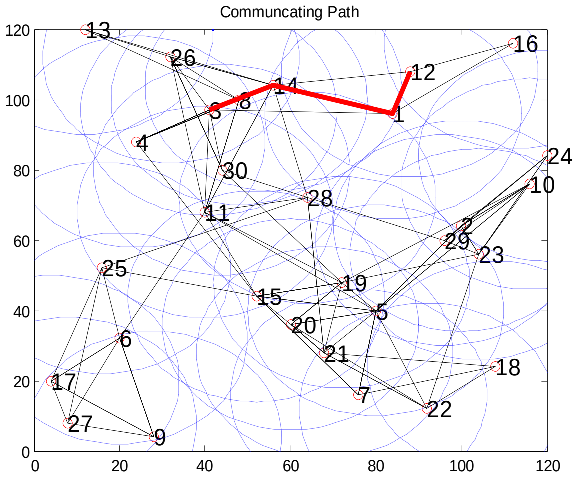
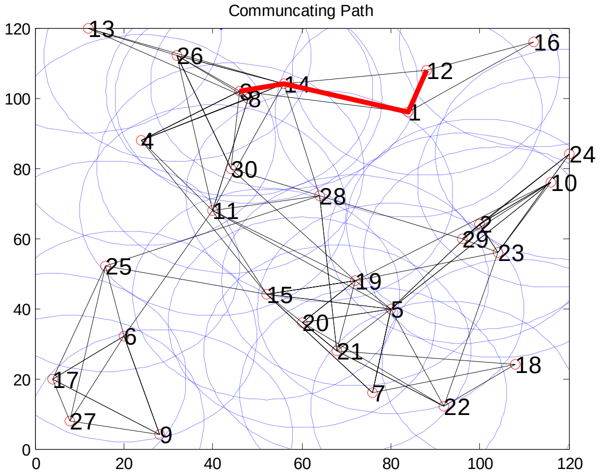


Figure 12 (a)

Node with mobility in a random 1-step



(b) Node with mobility in a random 2- steps

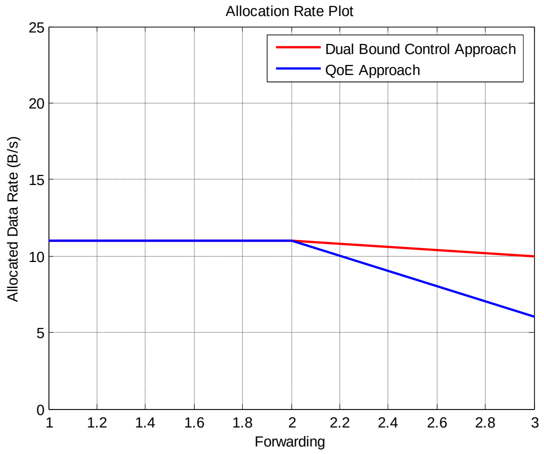


Fig.(a)

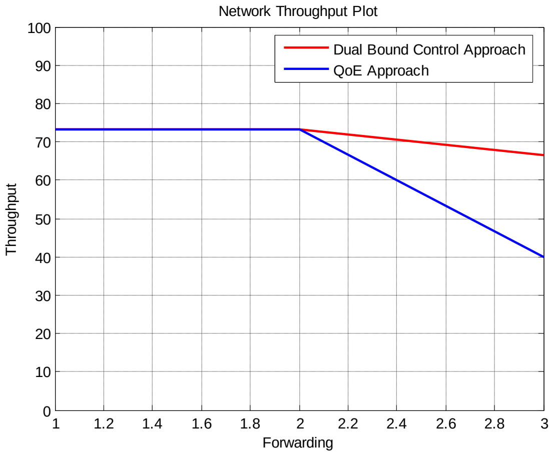


Fig.(b)

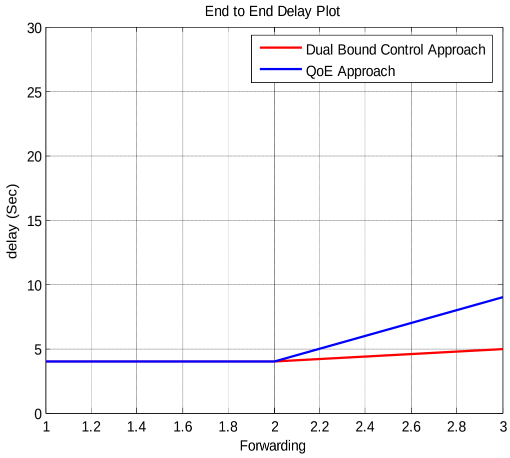


Fig.(c)

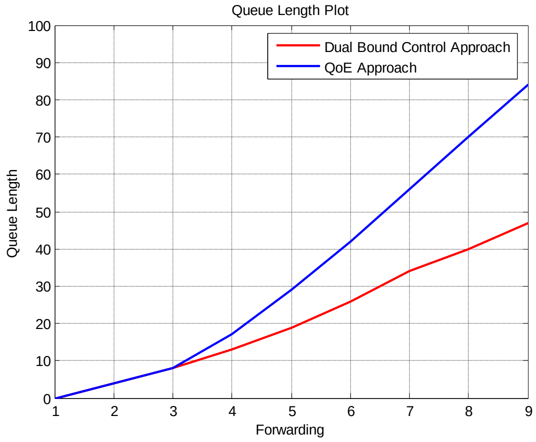


Fig.(d)

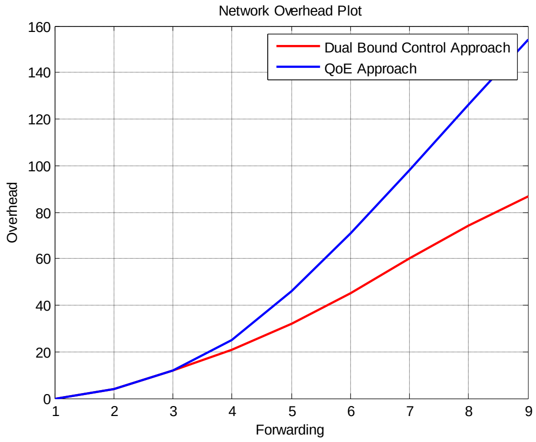


Fig.(e)

Figure 13 (a) allocated data rate for node with 1-step mobility (b) throughout for node with 1-step mobility (c) delay for node with 1-step mobility (d) Queue length for node with 1-step mobility (e) Overhead for node with 1-step mobility over variation in forwarding Packets

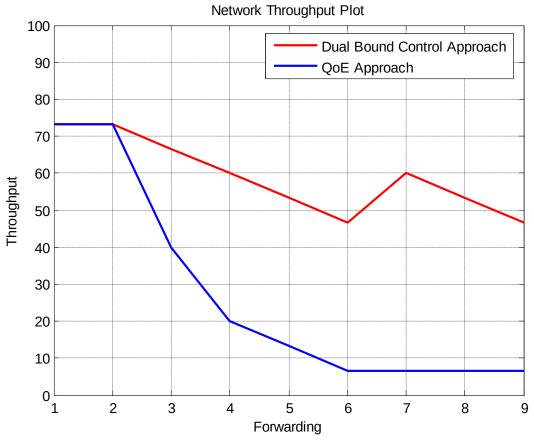


Fig.(a)

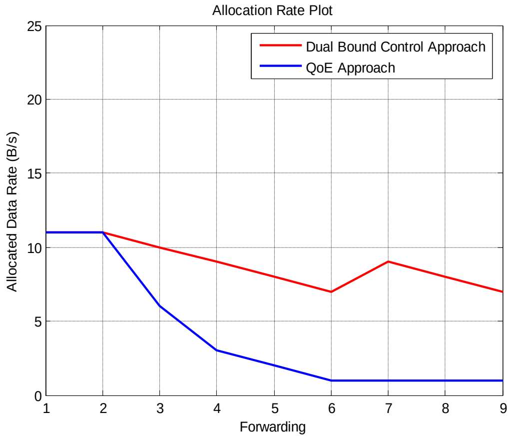


Fig.(d)

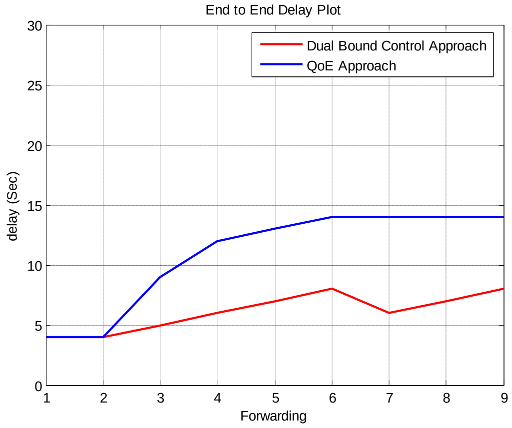


Fig.(b)

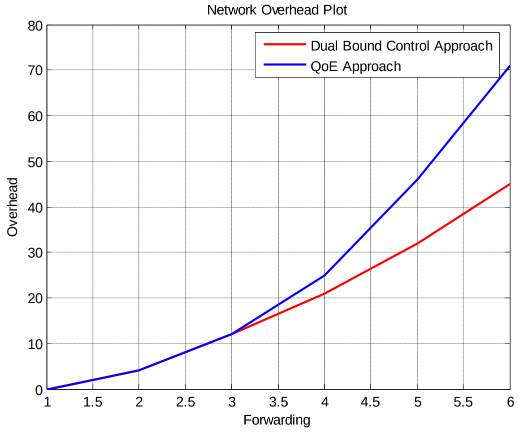


Fig.(e)

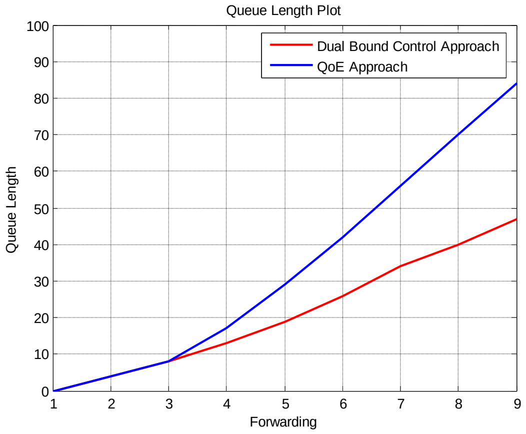


Fig.(c)

Figure 14 (a) Allocated data rate for node with 2-step mobility (b) Throughout for node with 2-step mobility (c) Delay for node with 2-step mobility (d) Queue length for node with 2-step mobility (e) Overhead for node with 2-step mobility over variation in forwarding Packets

The offered throughput and allocated data rate is observed to be higher, when the node moves into the network, it is observed that the number of intermediate hops are reduced. This leads to higher blockage probability as more packets are exchanged over the node, however with the proposed approach, due to faster data exchange, the offered traffic rate is higher, which results in higher throughout. The offered data rate is observed to be over 8% higher than the QoE based coding. However as the node moves out a region the throughput consistence is maintained due to higher offered data traffic rate.

VI. Conclusion

A new dual mode controlling of quality governed communication approach is developed. To control the flow of traffic for demanded service, in this approach a combined model of node blockage rate and mobility factor is considered. Wrt., the node mobility within or out of node, the network is defined for improvement in quality metrics. The probabilistic control of blockage per node is developed, in consideration with node position, to allocate dynamic data rate to achieve least blockage overhead per node. The signaling and data exchange overhead is hence reduced. The suggestive approach, defines the probability of traffic data rate controlling under user mobility in a random order. Further investigation of the suggested approach for the controlled node mobility with node speed and demanded quality of service would be focused.

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