

CLUSTERING BASED ROUTING FOR DELAY-TOLERANT NETWORKS

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ABSTRACT

Delay-tolerant networking (DTN) is an approach to computer network architecture that seeks to address the technical issues in heterogeneous networks that may lack continuous network connectivity. Due to the lack of continuous communications among mobile nodes and possible errors in the estimation of region contact probability, convergence and stability become major challenges in distributed clustering in DTN. Clustering significantly reduces the energy consumption of a cluster. In this paper, a cluster based routing protocol for Delay-Tolerant Mobile Networks (DTMNs) is used. Exponentially weighted moving average (EWMA) scheme is employed for on-line updating region contact probability, with its mean proven to converge to the true contact probability. The gateway nodes exchange network information and perform routing. It uses clustering's structure to decrease overhead, average end-to-end delay and improve the average packet delivery ratio.

KEYWORDS: Delay Tolerant Mobile Network (DTMN), Exponential Weighted Moving Average (EWMA).

I INTRODUCTION

Delay tolerant networks(DTNs) is an excited research topic nowadays has been introduced to mobile communications technology[1],[2] that does not guarantee the existence of path between a source and destination. When the two nodes move with each other's transmission region between a periods of time they can meet each other. When it move out of transmission region the connection is lost between the hosts. The message to be delivered by carrying from source to destination can be appearing or forecast. The networks must tolerate the delay of the message in such networks routing is hugely based on root contact probabilities. The key representative DTN's include, Sensor based networks that use how to effectively maintain, update and utilize such probabilities, most DTN's routing poses unique challenges compared to social wireless networks. In this article it addresses one of the most essential issues of multicast routing mechanisms in mobile networks. The fundamental study of research according to [3]-[10]. In the existing they compare the mechanisms of the CBRP (Cluster based routing protocol) for DTN's. In CBRP a CTN hierarchical routing (DHR) protocol to improve routing scalability using distributed clustering and cluster based routing protocols

for delay tolerant mobile networks(DTMNs).Which results show it achieves (HDR) Higher delivery ratio and significantly lower overhead and end-to-end delay compared with its non-clustering counterpart.

II LITERATURE SURVEY

The lot of work is to evaluate the Performance of distributed clustering routing protocols in delay tolerant networks. In view of need to evaluate the performance of DTMNs with other common routing protocols use nowadays. Simulation based experiment were performed by evaluating the protocol for evaluation of the message delivery ratio, the average message end-to-end delay and the average number of control message for a successful delivered data message. Many researchers have evaluated multicast routing performance under varying nodes. Clusters are formed based on their nodal contact probabilities the probability of nodes meeting each other. Based on their nodal contact probability the threshold probability will be calculated, using which the clusters are formed and the gateways nodes are selected to route data from one cluster to another[1][2].

In [9] capacity and delay trade off mechanism, the capacity of the cell partitioned networks and analysis the delay of the capacity achieving relay algorithm. The packet are transmitted and routed according to the timeslot assign to each node without violating the physical constrains of the partitioned cell. The capacity region depends only on the steady-state user location distributaries. Hence, any markovian model of the user mobility which in steady state distribute users independently and the network yields uniformly over the same expression for mobile nodes.

III EXPERIMENTAL SETUP

Evaluation of the performance of different clustering and routing such as OECP, Fractional clusters, inconsistent cluster membership and gateway selection, clustering meta information, distributed clustering algorithms are carried out through simulation using the NS2 to evaluate the message delivery ratio, end-to-end delay and the average number of control message for a successful delivered data message.

3.1 Performance Metrics

The goal of DTMNs (EWMA) Exponentially Weighted Moving Average which evaluate the efficiency of cluster based routing protocol which yields much higher overall delivery ratio and high delivery ratio which data generate rate the clustering threshold and the gateway threshold which varies from 20 to 200 during the simulation are indicated in the figure 1 which make to study the impact of parameters that is very close to the optimal value observed in the simulations.

IV THE EXPERIMENTAL RESULTS

The demonstration the effectiveness of clustering in DTN routing makes for evaluation and comparison include the message delivery ratio, end-to- end delay and the average number of control message for a successful delivered data message assume packet loss of 10% due to the interference in wireless channel.

4.1 Packet Delivery Ratio

It is defined to be the percentage of the ratio of number of packets received to the number of packets sent.

$$PDR = \frac{\text{Number of packets received}}{\text{Number of packets sent}} \times 100\%$$

Number of packets sent

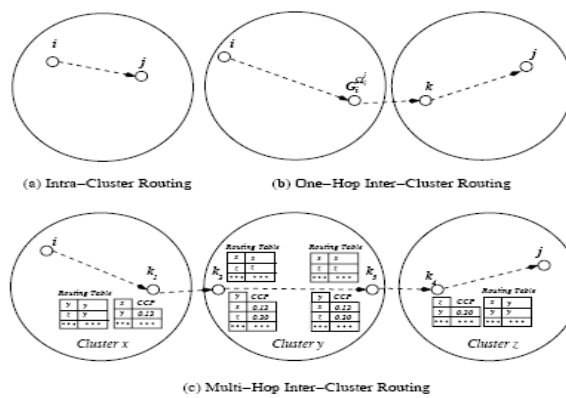


Fig 1.Cluster Based Routing Protocol

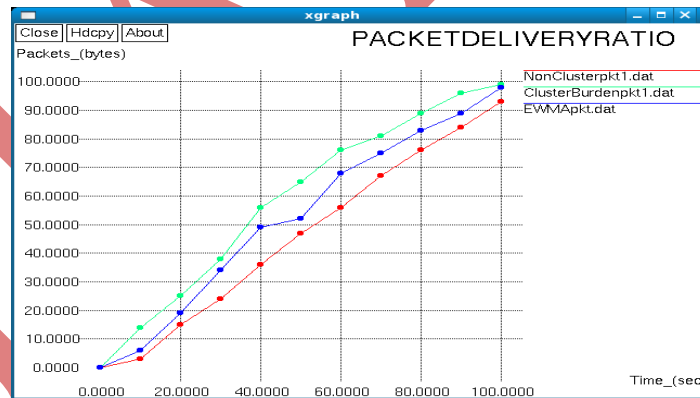


Fig2. Performance Comparison Using Packet Delivery Ratio

4.2 End To End Delay

The time interval between the first packet and second packet. Here the total delay takes 1.3 in non-cluster method and 0.9 in EWMA and power balanced communication have 0.4. The end-to-end delay of a message is increasing the queue size which cluster based routing protocol gives shorter delay and the increment is slower with longer queue size.

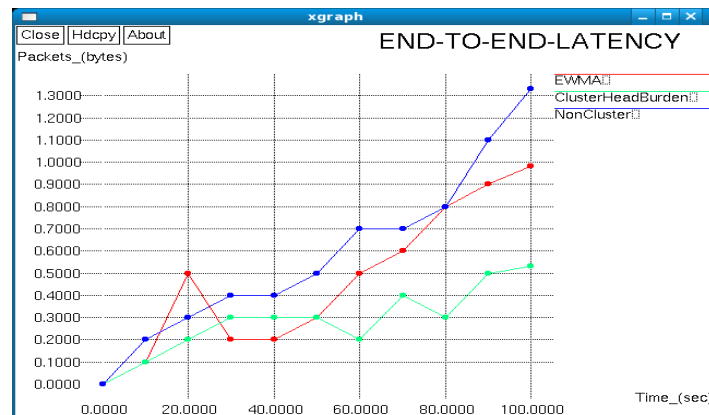


Fig3. Performance Comparison Using End To End Latency

V CONCLUSIONS

Performance of the clustering based routing in DTN such as DTMN, HDR are evaluated in this study. The following conclusions were drawn using EWMA -Exponentially weighted moving average can be carried out to evaluate the efficiency of the proposed cluster based routing protocol to achieves higher delivery results to delivery ratio and end-to-end delay, compared with non-EWMA.

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