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Effect of Performance in Heterogeneous Traffic in Opportunistic Networks

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ABSTRACT

In Opportunistic networks or also called as Delay Tolerant Networks (DTN), the nodes communicate directly by connecting to their cellular networks or through Wi-Fi. These communication happens when the nodes has to share the set of services to each other. The mobility patterns and the impact of these patterns in opportunistic networks have been studied extensively. When we look into the communication traffic patterns, implicitly or explicitly it is assumed that homogenous data is being transferred and hence traffic is homogenous. This assumption is false, as the nodes are mobile and their social and spatial characteristics may have an impact on the performance of end-to-end traffic between the two nodes. So, in this proposed system we going to explore the effect of both communication traffic patterns as well as node's mobility on the performance of forwarding mechanisms. It is being shown through simulations. Wherefore, heterogeneity gives an advantage of using extra relays more/less useful. . Furthermore, we assure that an increasing amount of heterogeneity bridges the performance gap between different forwarding techniques, making peer-to-peer routing more challenging in some cases, or less necessary in others.

Keywords:- Delay Tolerant Networks(DTNS),Social Characteristics, Mobility Patterns, Communication Traffic.

I. INTRODUCTION

Oppotunistic Networks are used when the future is expected to support communication during environments which are really challenging, when the intermediate nodes are absent (Example: critical situations after disaster).Opportunistic Networks require nodes which are mobile in nature. These nodes communicate only when they come into direct communication. Most of the users make use of Bluetooth for transferring the data files. But the range of Bluetooth is limited compared to Wi-Fi range of transmission. Hence the communication within the nodes are not continuous and difficult to maintain end to end paths as well. Switching onto Wi-Fi networks from the user based cellular networks and also giving a chance for novel said applications. As the range of transmission is major factor for communicating, passing data to the destination is tough and it will not be continuous, managing becomes difficult and problematic. In order to provide secure data an original copy of the data is stored in source and carried over network and reaches the intermediate node which has no option to modify, further the packet is forwarded to the sink node when the intermediate node encounters the sink node. Here its easier for exchanging files, documents from source to destination. Because destination can travel nearer to source node.

II. RELATED WORK

It's difficult to understand human mobility for the simulations of mobile devices in a wireless network, but the present mobility models do not have reflection of real user movement position. The purpose we use computation of mobiles and communication [1] is to allow people interact with other people while moving and exchange information's, files, data's, documents to nearby people. Anyone who are involved in designing a system or network to provide services for the people they should have idea about them the people how they move. Whenever there is no intermediate nodes to communicate with the destination node these DTNs come into picture.

These networks are mostly used in the networking technology. It follows three procedure first it stores itself a copy of packet and then carry along a network and then reach intermediate node[2] and then forwards to the destination node. In this model herds of animals are used as message passers. We use a routing protocol that applies knowledge to predict the behaviour of each message. In order to select correct message for carrying data from [3] source to sink nodes by assuming that the cattle of sheep in the farmyard and flock of sheep in the garden area. In order to send heterogeneous data we use distributed learning algorithm. This algorithm first separates the data based on the type of data and allocates a channel. Then the nodes use a function that tests the [4] channel like

which channel is good and which channel is poor. If a channel outcome is success then that node uses the channel to transfer the data else it uses the other channel. If a channel outcome is poor then the node uses other channel to transfer the data. The query is how do we create an opportunistic network[6]? By using epidemic routing protocol and PROPHET protocols we can create these networks. Here each of the nodes reserves two channels one is to store the messages from their neighbour nodes and the other its own messages. Whenever the intermediate node goes nearer to the destination node at that point of time this transfers the messages stored in them.

III. EXISTING SYSTEM

The studies are made using mobile ad Hoc networks. For these networks there is an option of nodes which can be either standalone or wireless.

The first assumption was making use of standalone and transferring the data. If the destination node are far then utilizing mobile nodes and transfer. In this metho0dology it was taking long time to reach the message or data to the destination node. The delay rate was high and couldn't improve performance rate.

Hence they came up with another assumption that making use of mobility feature and make nodes wireless so that performance may decrease to some extent and delay may decrease to some extent. Till now we assume that implicitly or explicitly could send or transfer only homogenous data. So only homogenous traffic is created. But when we want to send a mixture of data like files, documents, audio, video files it never supports. Bur it will start sending but has to wait in the queue or buffer. It will be delivered one after the other consuming a lot of time. Hence the traffic is always homogenous.

IV. PROPOSED SYSTEM

In this paper, our main intension is to provide security for the data. Here we are coming up with a new idea by using opportunistic networks. This allows to use mobile nodes. These mobile nodes communicate when they are in direct contact providing security. Mainly these networks are used when mobile ad Hoc fails to communicate without intermediate nodes. This increases performance as well as decrease delay rate. Inorder to come across many nodes within an area in a network user has to switch onto or upgrade to Wi-Fi networks. So that they can involve in much high speed of file sharing, document exchanging and media sharing at once. The normal form of sharing files in mobile devices like laptops, notebooks and smartphones takes place through Bluetooth. This Bluetooth takes a long time to deliver each message. Hence to overcome this failure we use Wi-Fi device. The range of transmission compared to Bluetooth and cellular networks range of transmission in Wi-Fi devices its high.

The main theme of our project is to increase performance and decrease delay rate in a different way. To differ from the previous studies we introduce our project using different network and a unique protocol. The protocol which we have selected selects a node if it can disseperate a message quicker and faster than the other nodes. We make nodes mobile in nature, this improves in both performance and decreases the waiting time. The network we use is opportunistic network and the protocol is encounter based routing protocol.

V. ARCHITECTURE

Interoperability Considerations In most challenged networks, the network "architecture" consist primarily of a link and media-access control protocol, and are not designed with interoperability (or very large scale) in mind. The reason for this is that in many cases, merely communicating *at all* over some links is still an active area for research, and the desire to use such links in an internetwork has not yet become a primary focus. Thus, these networks tend to be comparatively simple and local in scope, and may fail to provide even the baseline abstractions that are well-matched for supporting layered protocol families (such as Internet). Implementations frequently "cut corners" when targeted for deployment on memory and power-limited devices, mixing together data from various system functional blocks into messages that are difficult to dis-aggregate. They also frequently fail to implement reliability, congestion control, and security.
Security. In challenged networks where communication media is frequently oversubscribed, link capacity is a precious resource and access to the "service" of data forwarding should be protected by some authentication and access control mechanism, at least at critical points in the topology. If multiple classes of service (CoS) are available, some mechanism to control access to them is also likely to be required. In such cases, an approach to security which only involves the endpoints is not very attractive, stemming from two issues. First, end-to-end-only approaches typically require some exchange of challenges or keys, which would be undesirable for high-delay and disconnection-prone networks. Secondly, it is undesirable to carry unwanted traffic all the way to its destination before an authentication and access control

check is performed. The later problem has been (and remains) a problem for the Internet, but in that case the issue is significantly worse because of the desire for small end-to-end delays.

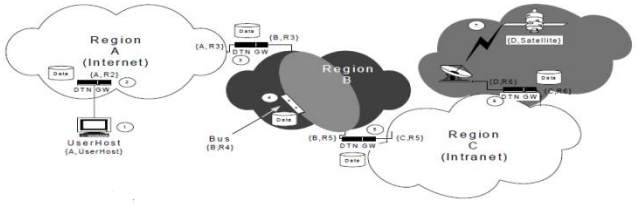

Figure 1 Architecture of Opportunistic Networks

DTN[5],[6] gateways interconnect regions running potentially dissimilar protocol stacks. By operating above the transport protocols in use on the incident networks, they provide virtual message switching, in-network retransmission, and name mapping, allowing globally-interoperable names to be mapped.

VI. DESIGN

Network Module:

We consider a network W, where w nodes move in a network covered in an area. Where the range of transmission is much larger and exceeding. The message exchanging is carried only if there is a direct contact or direct communication between the two mobile nodes. Based on the mobility features and the direct contact or direct communication rates at various points the message is delivered.

Mobility Analysis Module:

In the first module we are going to use a network and induce some mobile nodes.

Here we are going to analyse the model of the network, its performance and the waiting time finally the variations in the delay rate at various contact points. These are carried out step by step. Firstly, we have to assume that m number of messages are produced between different sender and receiver pairs. So, one has to guess the contact point rate between the sender and the receiver of these messages.

Secondly, if a message is produced in same number between any mobile[4] sender receiver node pair, then the contact point rates must be in discrete number among the sender and the receiver mobile nodes.

Thirdly, we now compare the packets among the sender and receiver mobile nodes. If the messages are transferred highly between the 1st sender and receiver mobile node pair then it is declared as the frequent message exchanging pair than compared to other sender and receiver nodes.

Mobility Validation Module:

Here in this module we are going to validate the model developed in this project. The results are drawn as graphs using simulator tool using TCL and oTCL programming languages where one is used as front end and other is used as backend. The algorithm used to improve performance and decrease in delay time is prophet and the mobile aware protocol[2]. The protocol used here is encounter based routing protocol.

VII. RESULTS

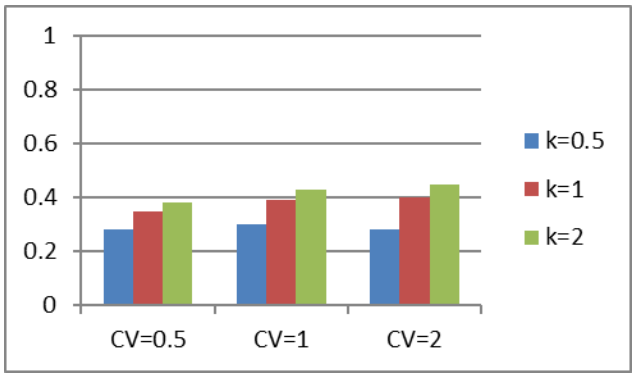

Figure 2: Synthetic Scenarios

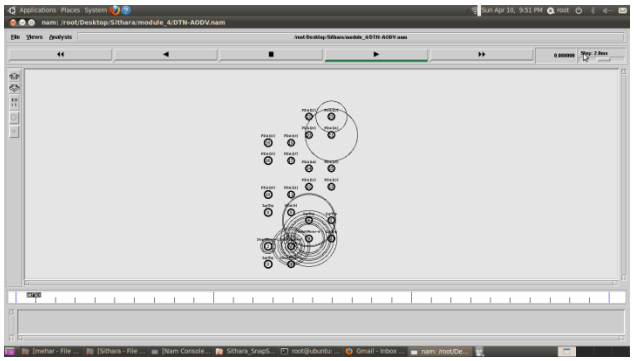

Figure 3: The data delivered to the nodes in other network

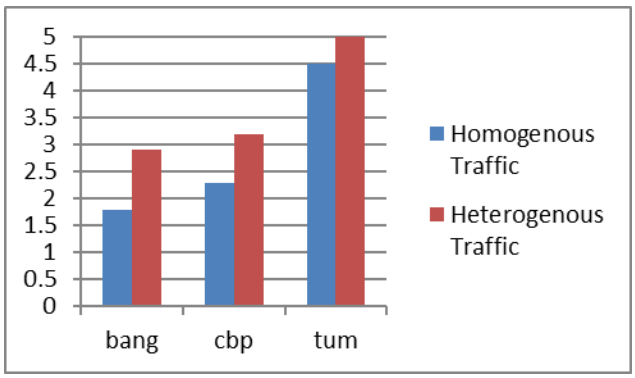

Figure 4: The comparision of homogenous traffic and heterogeneous traffic in the network.

In the figure 2, The synthetic scenarios showing the variation in mobility of the nodes. This mobility is given as CV and the heterogeneous traffic as (k). Here the nodes checks the range of transmission and start sending the data. Suppose if the nodes are in other network then the forwarding mechanism takes place.

In figure 3, the nodes transfer media files from one network to other with increasing in performance and without delay.

In the figure 4, the real networks is shown where implicitly the assumption is made as it can send and receive only homogenous data creating homogenous traffic.

VIII. CONCLUSIONS

I am inspired by the experience of the study made on heterogeneous traffic creating heterogeneous network. The studies made on this heterogeneous traffic in opportunistic networks are in very less percentage. In the earlier studies the data which was heterogeneous created maximum delay time and the waiting time was to the peak. No measures were taken to overcome this delay. The performance ratio was not reaching for the expectation level. We then decided to overcome this delay to the least point and increase the performance. We achieved this by using the protocols and some algorithms. We came up with a model with the nodes which are mobile in nature. They can communicate with any node irrespective of the network. This model is then analysed to check the delay and performance. The performance was increasing randomly with a drastical decrement in the delay time. Our results show that the performance in few areas where the result was tested is incrementing with a less delay time. So it gives a challenging performance when compared with homogenous data. Even though the data is homogenous the delay rate is never decreasing but the nodes here can send heterogeneous data reagardless of the delay time and performance.

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