Experimental Study on Routing Overhead by using

DTN/MANET Hybrid Terminals

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1   Introduction

In this paper, we focus on a hybrid network which enables to freely change its communication mode between DTN and MANET. The difference of each communication method is so important to consider the mode changing method in this network. Through an experiment using some devices which enable to communicate in each mode, we confirm a difference in overhead caused by their routing methods.

2   Experiment overview

In MANET, nodes build a temporary network through cooperation with nodes by exchanging some topology control packets, and they send messages to the destination by using end-to-end path. On the other hand, in DTN, nodes transfer replicas of messages by use of their mobility without building the paths to other nodes. From the above, MANET may consume much energy to control their topology, and in DTN, distributing the replicas of messages leads to the same problem. Therefore, we need to consider these two elements in order to decide their proper communication mode.

In this experiment, we only focus on the influence concerning the routing methods in the static environment where nodes send no message with the exception of packets related to the routing. We place some devices on one meter by one meter area and leave them for 10 minute. At this time, we used OLSR[1] as the routing method in MANET, and Epidemic Routing[2] as that in DTN. To evaluate the influence of topology controlling, we change the number of devices between 2 and 10, and measure the overhead ratio, which represents the overhead growth of MANET compared with DTN and it is calculated by considering the number of topology control packets, in each mode. With the increasing of this value, it means the overhead of MANET is larger than DTN.

3   Experiment result

The result is shown in Fig.1. From this, we confirm the overhead ratio is bigger as increasing of the number of nodes. This shows that the gap of overhead between MANET and DTN becomes larger. The reason why this result is caused is the difference in routing protocols. In OLSR, nodes exchange some type of
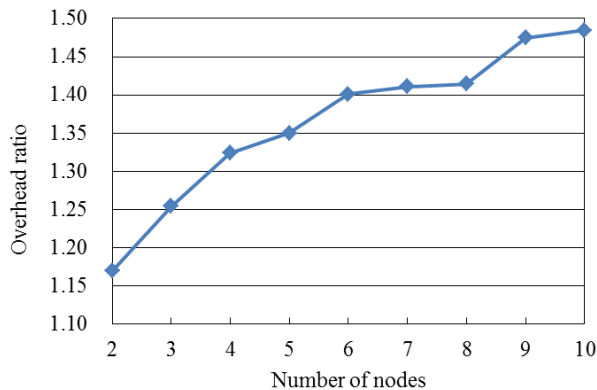

Fig. 1   Experiment result

topology control messages among nodes joined in the network at regular intervals, and build the topology. On the other hand, in Epidemic Routing, each node needs to get only information that which nodes are in its transmission range. Therefore, in MANET, nodes need to exchange the large amount of date between nodes more than DTN, and it leads much overhead of routing method.

4   Conclusion

In this paper, we conduct a experiment which confirm a difference between MANET and DTN in terms of routing method. Through the experiment that using devices which enable to change its communication mode, we show that MANET causes the large overhead than DTN in static environment, as the increasing of the number of nodes.

Reference

[1] T. Clausen and P. Jacquet, "Optimized Link State Routing Protocol (OLSR)," IETF, RFC 3626, Oct. 2003

[2] A. Vahdat and D.Becker, "Epidemic Routing for Partially-Connected Ad-Hoc Networks," *Technical Report CS-2000-06*, Apr. 2000.