Rendezvous Based Routing in Opportunistic Networks

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ABSTRACT

Opportunistic Networking is one of the most extreme evaluation of multi-hop wireless network. In opportunistic networks the node mobility can create contact opportunities among nodes, which enable the mobile nodes to communicate with each other even if a route connecting to them never exists. As a result, nodes can physically carry buffered data while they move around the network area until they meet the forwarding opportunity. However, opportunistic routing requires sufficient amount of mobile nodes in order to satisfy carry-store-forward paradigm. The performance of this challenged protocol decrease when the number of mobile nodes decline. This paper proposes a novel routing technique to facilitate the mobile node routing in extreme sparse network called the rendezvous based routing. This proposed protocol can bridge the gap of space and time domain in opportunistic environment. The result of this paper shows that our proposed technique can increase the efficiency index defined as delivery ratio per average latency of very sparse opportunistic network environment.

KEYWORDS

Network, Routing, MANETs, OppNets, DTNs

1 INTRODUCTION

Opportunistic Network (OppNet) is a dynamic wireless network without fixed infrastructures and does not guarantee the existence of an end-to-end path for forwarding the data packet. OppNet exploits node mobility to create the communication opportunities among mobile nodes. In order to enable end-to-end communication, the opportunistic routing protocol employs asynchronous store-carry-forward for messages exchange [1]. In this scheme, nodes can physically carry stored data while they move around the area until they can get in contact with suitable next-hop node. Within the opportunistic paradigm, a message can be delivered from a source toward a destination even though an end-to-end path never exits by exploiting the sequence of connectivity generated from node mobility [2]. Basically OppNet is consisting of these characteristics: intermittent network contacts, occasional existing end-to-end path and highly variable or extreme link performance. Currently OppNet can be applied to develop numerous applications such as wireless sensor network (WSN), underwater sensor networks (UWSN) pocket switched networks (PSN), people centric network and transportation networks [3].

Even though, this OppNet proposes to overcome the poor performance of traditional end-to-end based Mobile Ad hoc NETworks (MANETs) which suffering from disruption, sparse network density and limited device capacity [4]. Realistically, OppNet requires sufficient amount of nodes to carry the messages along to where they move and forward to other encountered nodes. As a result, traditional opportunistic routing performance suffers under extreme sparse network especially with node with limited resource [5].

This paper proposes a novel scheme called Rendezvous Based Routing, which aims to increase the performance of OppNet in extreme sparse environment. The goal of this research is to bridge the gap of time and space domain in