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Publication 1: Survey of various routing approaches based on quality-of-service (QoS) criteria in MANET.

Survey of various routing approaches based on quality-of-service (QoS) criteria in MANET

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Abstract: Nowadays, Mobile Adhoc Networks (MANET) gained a lot of popularity in the research community. People realized that there is a commercial value in MANET, with the successful solutions of the most basic but important problems in network layer. Most all the applications that attracted interest in traditional wired networks (e.g. Audio/Video Transfer, Video Conferencing, Watching Online Movies/Sports, Camera-enabled Messenger, Online Gaming etc.) would attract interest for MANETs as well. Since real-time multimedia communications will be common in MANETs, there has been an increasing motivation on the introduction of QoS in such networks. But, many characteristics of MANETs make QoS provisioning a difficult problem. In MANETs, providing QoS guarantees is very difficult and challenging than in traditional wired networks, mainly due to multihop communications, contention for channel access, node mobility and a lack of central coordination. However, in the last few years, much research attention has focused on providing QoS guarantees in MANET routing protocols. QoS routing protocol/mechanism is key issue in provision of QoS in MANETs. There are number of QoS routing approaches have been proposed in literature, focusing on different QoS metrics but no particular protocol/mechanism provides overall solution. There are some major open research issues in this area such as QoS metric, selection and qos function design, Multi-class traffic, Scheduling mechanism at source, Packet prioritization for control messages, QoS routing that allows preemption, and QoS in Heterogeneous networks. There are still many open questions that must be solved to improve the performance of QoS-aware routing protocols such as bandwidth/delay estimation, route discovery, resource reservation, route maintenance and upgrade designs, energy consumption, multicast QoS routing etc.

Keywords: Cross-layer Design, Quality-of-Service, MANETs, routing, QoS routing, QoS framework, multicast QoS

I. Introduction

Routing in MANET is one of the core problems for data exchange between nodes in networks. In recent years, both the areas of providing quality-of-service and routing in mobile ad-hoc networks have massively increased in importance. Many routing protocols for wireless networks, e.g. AODV or DSR, use best-effort routing, where all nodes within range compete for the shared medium. No guarantees or predictions can be given here on when a node is allowed to send. For quality-of-service (QoS) routing, it is not sufficient to only find a route from a source to one or multiple destinations. This route also has to satisfy one or more QoS constraints. To guarantee these constraints after a route was found, resource reservations on the participating nodes are made.

When MANET development started, QoS provision did not attract much attention and thereby most routing protocols operated on a best effort model. However, with the growing popularity of time-sensitive applications, QoS support becomes much more important than it was, leading to a shift of research interest from best effort routing to QoS provision routing. However, providing QoS guarantees in MANETs is quite challenging due to the dynamic topology, limited bandwidth and energy constraint.

Due to the significant difference in MANETs, the mechanisms for wired networks cannot be mapped to MANETs directly. QoS provision in MANETs is quite challenging and it involves actions in different layers within which the network layer plays a crucial role. The routing protocol in the network layer not only has to find a path, if any, that can satisfy QoS requirements at the beginning of a session but also needs to react to mobility induced route breakages.

Efforts have been made to find a best metric for QoS routing using cross-layer designs but still good generally accepted solution is not achieved. So there is a very good scope of doing research in this area for finding a best metric using cross-layer designs, multi-constraints routing metric, multicast QoS routing etc.

II. QoS In Manet

Mobile Adhoc Networks (MANETs) has gained a lot of attention in the research community in recent years. Most applications that attract interest for use in current wired networks would attract interest for...
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Evaluating Performance of OLSR Routing Protocol for Multimedia Traffic in MANET using NS2

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Abstract—MANET is a set of wireless mobile stations which creates a short-term network without any backbone or centralized infrastructure. In today’s world, large portion of traffic on the Internet carries TCP traffic due to real-time and non-real time multimedia traffic. Internet traffic has completely different properties than that of CBR (constant bit rate) traffic, which is the most generally evaluated traffic in MANET. In this work, we compared and evaluated performance of four MANET routing protocols under various CBR and TCP traffic patterns in NS2. We found that there is a significant performance differences between various routing protocols due to differences in its internal mechanisms. The performance is evaluated on the basis of metrics like Delivery Rate, End-to-end Delay and Throughput. Finally it is concluded that for CBIR traffic, AODV (reactive) protocol performs better than rest of routing protocols while for TCP traffic, OLSR (proactive) protocol performs better that rest of routing protocols. So as far as multimedia-TCP traffic is concerned in MANET which is actually major part of total traffic on internet, OLSR is evaluated as a best routing protocol in all respect and found better suited for transporting TCP traffic.

Keywords—MANET, TCP, CBR, multimedia traffic, NS2, traffic pattern, OLSR, internet traffic

I. INTRODUCTION

MANET has several unique characteristics compared to wired communication. To start with, MANET rely on wireless links to transmit packets and those links are dynamic compared to wire lines since they are subject to time and location dependent signal attenuation, reflection, refraction, diffraction, and interference. Another disadvantage of wireless links is limited bandwidth. Furthermore, the topologies in MANET change dynamically due to the volatile moves of nodes, which can create network separation, while in wired networks the topology changes rarely. As a consequence, protocols in MANET have to cope with movement induced path breakages. A challenge for a routing protocol for MANET is thus the ability to respond quickly to a high degree of topological changes in the network and still maintain routes, while at the same time to not swamp the network with excessive control traffic.

Since real-time and non-real time multimedia communications will be common in MANETs, there has been an increasing motivation on the introduction of TCP traffic in such networks [11]. In MANETs, providing seamless TCP traffic is very difficult and challenging than in traditional wired networks. In the last few years, much research attention has focused on providing seamless TCP traffic in MANET routing protocols. Hence, it is very meaningful to study how well the different routing protocols behave and support TCP traffic.

II. RELATED WORK

Comparison and evaluation of performance of several MANET routing protocols on CBR traffic have already been done by considering various parameters like pause time, routing load, network load, mobility etc. G. Jayakumar and G. Gopinath et al. [1, 6] evaluated performance of AODV and DSR routing protocol using Manhattan Grid Mobility Model with CBR traffic sources. Authors concluded that AODV performs better than DSR. Nar Suravati Mohamad Usop, Azirol Abdul and Ahmad [2, 6] evaluated the performance of AODV, DSDV and DSR in Grid Environment using CBR traffic. They investigated that AODV and DSDV performed better than DSR. Biradar, S. R. et al. [3] have compared the AODV and DSR protocol using Group Mobility Model and CBR traffic sources. They have also concluded that DSR performs better in high mobility and average delay is better in case of AODV for increased number of groups. Also Rathy, R.K. et al. [4] analyzed AODV and DSR routing protocols under Random Way Point Mobility Model with TCP and CBR traffic sources. Authors concluded that AODV outperforms DSR in high load and/or high mobility scenarios. Thomas Clausen, P.J.et.al. [5] performed comparative study between CBR and TCP traffic and measured performance of various MANET routing protocol. Authors concluded that OLSR achieves a significantly and consistently better normalized routing load, indicating that a MANET with OLSR is better suited for transporting TCP traffic. Suman Kumari, S.M.et.al.[6] performed comparison between AODV, DSDV and OLSR routing protocols and concluded that AODV (reactive) protocol performs better in CBR traffic and in case of real time delivery of packets but at cost of higher routing overhead. But in TCP traffic, proactive routing protocol OLSR gives better result. Overall performance of routing protocols in TCP traffic is much better than CBR traffic[6].

In this work, we have evaluated the performance of AODV (reactive), DSR (reactive), DSDV (proactive) and
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Design and Analysis of QoS Routing Framework integrated with OLSR protocol for Multimedia Traffic in Mobile Adhoc Networks

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QoS frameworks for Multimedia Traffic in Mobile Adhoc Networks: A Comparative Review

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Abstract—MANETs (Mobile Adhoc Networks) has gained an increased interest by the research community. Regular intelligent exchanges of multimedia will be typical in MANET, though the extended motivation on QoS (Quality of Service). However, various properties of the discussed QoS frameworks are proposed for QoS as a challenging concern. Providing QoS provisioning is, to a great degree, challenging in MANETs in view of bouncing correspondences, center point movability and nonattendance of central coordination. Thus, most of the research has focused on giving QoS guarantee in MANETs coordinating traditions. Though huge numbers of QoS coordinating procedures have been proposed in composing, focusing on different QoS estimations yet none of the prescribed or discussed frameworks achieves a universal course of action.

There exist several genuine necessary research areas of focus such as QoS metric assurance and cost limit layout, source level scheduling framework and QoS coordinating. In this paper, working and connecting of various QoS frameworks for MANETs which could have cross-layer advantages, resource reservation, connection admission control, multi-constrained QoS parameters, hard QoS assurance, proactive routing advantages etc.

Keywords—MANET: QoS framework: OLSR: routing protocols; multimedia traffic; admission control; resource reservation

I. INTRODUCTION

The major focus area of research in the field of Mobile Adhoc Networks (MANETs) has been to solve the issues surrounding data exchanges. In recent times, extraordinary extension of two major areas namely MANET routing protocol and QoS have been thoroughly investigated. Various routing methodologies for remote systems, namely DSR (Dynamic Source Routing) and AODV (Adhoc On-demand Distance Vector) use best effort routing. In this technique all the nodes under certain given degree compete for the common medium. No protections or figures can be given here on when a node is allowed to send, this is sufficient to simply find a course from a source to one or different goals of QoS routing. These routes furthermore need to satisfy at least one QoS impediments. To guarantee these restrictions after a course was found, resource reservations on the taking intrigue hubs are made. Initially, when MANET change showed QoS, the first priority that was the reason for best effort routing models become apparent. Gradually, with the development of huge numbers of time-sense applications, QoS has become more basic and thus, prompting to a development of various research excitaments from best effort routing to QoS based routing. Other than the quality parameter in MANET, it also assures a testing mechanism. This mechanism is a direct result of the dynamic topology, limited information exchange limit and essentialness basic. MANETs are of need of a gigantic change in the structure; the frameworks which are used for wired networks cannot be mapped completely to MANET framework. The way has to be found by the routing mechanism which satisfies the QoS parameter at the beginning of a session. And this parameter is required to act according to desired output. However, a universally accepted course of action is yet to be described. For comparisons sake, the best metrics would be using cross-layer arranges, multi-restrictions routing metric whereas multicast routing based on QoS can be also explored for further future researches directions. Through MANET has been making various multimedia exchanges, there exists a vast amount of QoS (Quality of Service) parameters to be considered. Regardless, various characteristics of MANET make QoS provisioning a troublesome issue. As compared to conventional wired networks giving QoS accreditations is incredibly troublesome and testing in MANET, because of multi-hop interchanges, dispute for channel access and several issues such as Node portability. In any case, in the latest several recent years, more research thought has focused on giving QoS guarantees in MANET directing traditions.

II. REVIEW OF QoS ROUTING PROPOSALS

Major and eminent routing algorithms e.g. OLSR (Optimized Link State Routing) [1] and AODV (Adhoc On-demand Distance Vector) protocols have been discussed for QoS provisioning in [4]. This protocol has chief advantages that it detects the accessible situation of the connection. Feasibility to extend the QoS data in protocol form in such a way that the each different hosts thinks about it ahead of time about the nature of the recommended route. Due to the reactive