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VANETs QoS-based routing protocols based on multi-constrained ability to support ITS infotainment services

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Abstract

Vehicular ad hoc networks (VANETs) present an intriguing platform for several applications on e.g., intelligent transportation system (ITS) and infotainment applications aspire to be the main pattern of communication among vehicles while travelling. This can significantly impact on the amount of data exchanged by vehicles, increasing the contention on communication links and thus, degrading the quality of service of these applications. So, discrimination of data becomes imperative and forwarding critical information on suitable routes becomes decisive. Hence, a quality of service (QoS)-driven mechanism is needed to handle and assign network resources according to the stringent application data traffic demands. But, VANETs high node mobility and frequent link failure, stuck a big challenge in implementing an effective policy to meet and enforce these QoS requirements. A promising way to tackle this issue is to enforce QoS at the network layer, since it is the crucial point in VANETs' communication. So, over the years, many QoS-aware routing protocols were specifically conceived for VANETs. In this paper, we present a comprehensive survey of QoS-aware routing protocols in VANETs' literature. We examined the protocols based on their ability to support ITS infotainment services, their multi-constraint path problem (MCP), protocol's functionality and weakness, objectives and design challenges. This way, we outline future directions for VANETs QoS-aware protocol research.

Keywords ITS · QoS metrics · Quality of service · Routing protocol · VANETs

1 Introduction

Due to the wide varieties of services vehicular ad hoc network (VANETs) can provide and the proliferation of related applications, recently many research works focused on how to create a reliable, scalable, and effective environment for VANETs technology and services. VANET is a multi-hop ad hoc network that uses wireless technologies such as IEEE 802, General Packet Radio Services (GPRS), and Dedicated Short-Range Communications (DSRC) [1, 2], to communicate with neighboring vehicles with no or insufficient infrastructural support. As an ad hoc network, nodes in VANETs can act as sources, receivers and as transit routers that can relay traffic to other nodes in the network [3]. Research has shown that if deployed VANETs will be able to turn vehicles into productive equipment

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