MAC Enhancement to Support Quality of Services (QoS) in Ad Hoc Wireless Networks: EMACA (Enhancement of Multiple Accesses with Collision Avoidance)

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Abstract

An ad hoc wireless network (AWN) is a collection of mobile hosts forming a temporary network on the fly, without using any fixed infrastructure. Characteristics of AWNs such as lack of central coordination, mobility of hosts, dynamically varying network topology, and limited availability of resources make QoS provisioning very challenging in such networks. QoS (Quality of Service) is the idea that transmission rates, error rates, and other characteristics can be measured, improved, and to some extent guaranteed in advance. QoS is of particular concern for the continuous transmission of high bandwidth video and multimedia information. Transmitting this kind of content dependably is difficult in public networks using ordinary "best effort" protocols. Ad hoc wireless networks (AWNs) are zero configurations, self organizing, and highly dynamic networks formed by a set of mobile hosts connected through wireless links. MAC (Medium Access Control) Protocols provides the access control for transmission. The designing issues are Bandwidth efficiency, Quality of service, Synchronization, Hidden and exposed terminal problems, Error-Prone Shared Broadcast Channel, Mobility of Nodes and Distributed Nature/Lack of Central Coordination for Ad Hoc wireless networks. MACA (Multiple accesses with Collision Avoidance) Protocol is a Contention based protocol. MACA does not
solve the Hidden Terminal and Expose Terminal Problems. In Ad Hoc transmitter and receiver are not near all time. Nodes are not guaranteed periodic access to the channel. They can not support real time traffic. MACA Protocol uses the Three way handshaking means that RTS—CTS—Data packet exchange. It is Sender initiated Protocol. It is often too used in network congestion avoidance to help determine the correct sending rate. MACA uses the binary exponential back off (BEB) Algorithm to select this retransmission time. If a packet transmitted by a node is lost, the node uses the binary exponential back-off (BEB) algorithm to back off a random interval of time before retrying. MACA Protocol provides the facility of RTS—CTS carrier information about the duration of time for neighbors nodes. In this paper, my proposal work, EMACA (Enhancement of Multiple accesses with Collision Avoidance) Protocol is a best protocol as compare to the MACA Protocol. An EMACA is based on MACA Protocol. EMACA uses the four new control packets i.e. ACK (Acknowledgement), DSSI (Data Sending for Synchronization Information), DSSI-ACK and RRTS (Request for Request to Send). EMACA might not behave normally in multicasting. EMACA uses the modified binary exponential back off (BEB) Algorithm to select this retransmission time. If a packet transmitted by a node is lost, the node uses the modified binary exponential back-off (BEB) algorithm to back off a random interval of time before retrying. EMACA Protocol provides the facility of RTS—CTS carrier information about the duration of time for neighbors nodes.

Reference


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**Index Terms**

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**Key words**

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Quality of service

Real-time traffic

QoS routing

MACA Protocol