DELAY AND PACKET DELIVERY RATIO ANALYSIS OF MAC PROTOCOLS OF UNDERWATER SENSOR NETWORK

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Abstract: Underwater Sensor Network (UWSN) can be employed in a vast range of applications, retrieving accurate and up-to-date information from underneath the ocean's surface. Although widely used by terrestrial sensor networks, radio frequencies (RF) do not propagate well underwater. Acoustic channels are therefore employed as an alternative to support long distance and low-power communication in UWSN even though acoustic signals suffer from long propagation delay, high bit error rate and a very limited bandwidth. In this paper, we have analysis the average N-to-N delay, average queuing delay and packet delivery ratio of three MAC protocols named as R-MAC, Broadcast MAC and T-MAC. Among these three, R-MAC and Broadcast MAC is solely designed for the underwater network whereas T-MAC was designed for the terrestrial network has been modified to use it in the previous environment. Different from the previous models that have focused on throughput and delay all together, we are considering the delay and packet delivery ratio (PDR) which is a prominent pair along with throughput. Though energy efficiency is being one of the prominent performance matrices but from the real time applications point of view we have given more stress to the delay of packets. Moreover, by considering the fact that a packet may be dropped after a finite number of retrials or may collide with the other packet, we distinguish two different cases of packet delay. Simulation study was performed on Aqua-Sim, an NS-2 based simulator for underwater sensor networks. The simulation result shows the effectiveness of the protocols for delay sensitive applications.

***Keywords*:** Underwater Sensor Network, Packet delivery ratio, N-to-N delay, Queuing delay, MAC.