

ELECTRICAL ENGINEER

ACTIVE QUEUE MANAGEMENT MECHANISMS FOR REAL-TIME TRAFFIC IN MANETS

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This thesis develops active queue management mechanisms for real-time traffic for MANETs. Providing QoS for real-time applications is still an open issue as stated in RFC 2309. The proposed packet-dropping algorithm called Selective Early Discard (SED) selectively drops packets in order to spread the packet losses in a queue. Two variations of SED are also examined: one adds priority in order to provide service differentiation and the other utilizes timestamps to enable the intermediate nodes to drop packets that are likely to be unusable by the receiver due to excessive delay. Another scheme that drops bits instead of packets is also investigated.

Using simulation, the new queuing schemes are evaluated in a MANET environment, and their performance is compared with other existing QoS schemes, such as Random Early Discard (RED) and First In First Out (FIFO). Results indicate that SED minimizes the burst errors due to buffer overflow, thereby improving the performance for real-time traffic. SED is also capable of providing service differentiation; additional performance improvement can be realized by utilizing timestamps. Bit-dropping techniques can provide further performance improvements by spreading the error at the bit level (versus spreading the error at the packet level as in SED).

KEYWORDS: Joint Tactical Radio System, Network Simulator 2, Dynamic Source Routing, Quality of Service, Differentiated Services, Mobile Ad-Hoc Network, Real-Time Traffic, Packet Dropping, Bit Dropping, Voice Over IP

