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The Flooding Time Synchronization Protocol

The Flooding Time Synchronization Protocol (FTSP) takes the work of the previous two papers and further refines the work. In this paper they manage to achieve single microsecond accuracy using a multi-time stamping approach and linear regression.

The paper is based upon research done for a counter-sniper system they developed, where a sniper could be detected and pinpointed based upon the acoustic signature of the rifle fire. For this project they needed very good time synchronization and from that developed FTSP. The broadcast method of time-sync used in this protocol is novel, because the previous two papers were specifically trying to avoid broadcast and built a hierarchical structure. They also introduced a new issue with packet transmission that had previously been ignored called byte alignment. This is also the first paper to use a fairly sophisticated mathematical technique to calculate drift between the nodes called linear regression.

The flood-based protocol in FTSP generates a fairly light amount of traffic, supports multiple hops, and a high degree of accuracy. The paper was well written and seems to be the most comprehensive of the papers on time synchronization.