The demand for user convenience and the inexpense of 802.11g/n Wi-Fi™ and 3G mobile hardware has stimulated the rapid increase of Wireless Network use in the homes of the Internet users across the world. With the introduction of further wireless technologies such as the 4G candidates WiMAX and LTE (Long Term Evolution) this is likely to be a continuing trend. As is seen clearly in the above graph TCP does not show a high degree of stability on Wireless Networks where it is unable to distinguish network congestion from transmission errors (802.11g link, ~35ms RTT).

TCP is ineffctive over wireless networks, as it was never designed to be used in such a unique networking environment. TCP is very quick to throttle the rate at which it sends data in the event of Packet Loss where it assumes that packet loss is a sign of network congestion and that it should slow down. TCP is also Round Trip Time (RTT) biased. This is bad in the case of wireless networks where there is a need for retransmission at the data link layer and this causes an unpredictable variance in latency depending on network conditions.

As is seen clearly in the above graph TCP does not show a high degree of stability on Wireless Links where it is unable to distinguish network congestion from transmission errors (802.11g link, ~25ms RTT)

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Our hypothesis was that the most time efficient implementation solution was to develop UDP based, application level protocol design to support efficient packet transmission over Wireless Networks. An alternative would be to implement an improvement in the kernel space as is done with TCP. This is not time effective as regards the implementation and limits the portability of the protocol.

The Architecture of Axon from a developers’ perspective. Far left shows where Axon is placed when being accessed by a potential application. Above shows the Software Architecture. Solid lines infer data flow, dashed control with dotted specially depicting congestion/rate control

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