Lab #1: Data Transmission Over 802.11b Wireless LAN

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Observation

The main goal of this lab was to see how a difference in environment and type of connection would affect the transmission of data over an 802.11b wireless LAN. Packets were sent between a client and server over a UDP and a TCP connection. The client was moved to a variety of different locations/distances and the resulting changes in signal strength, data rate and noise were recorded. The TCP and UDP connections were also tested with the introduction of microwave interference at various levels of strength.

It was observed that the UDP connection generally had a faster data rate than that of the TCP connection. It was also observed that the further the client was away from the server, the lower the signal to noise ratio was. Additionally, data throughput for both the TCP and UDP connection had an inverse relationship with the signal to noise ratio. It can be concluded from the second part of the experiment the power level of microwave interference also had an inverse relationship with data throughput.

While TCP had a slower data rate, it was generally a more reliable connection. UDP would often receive one datagram out of order, and in one case failed to connect on the first try. There was only one trial in which TCP received a datagram out of order, and the connection never failed to establish itself.

Goals and Results		
#	**Goals**	**Results**
1	To give students the basic knowledge of various factors affecting data throughput in a wireless channel	This lab helped to quantify the relationship between factors on a wireless channel. It was found that distance, interference and signal strength all had significant effects on things like data rate and connection reliability.
2	To expose students to the effect of sporadic losses on TCP throughput	It was observed that different factors could affect TCP throughput. At times, the connection would vary significantly if a connection was made under the same condition multiple times.
3	To familiarize students with basic performance measurement tools in computer networks	This lab led to a familiarity with tools like iperf, and the creation and connection of both a UDP and TCP server.
4	Measure effect of communication distance on data transmission	It was noted that larger distances tended to have a negative effect on data transmission rates.