Study of Temple University WiMAX performance

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Project Objective

❖Monitor Temple University WiMax System .
❖Empirical measurement and prediction of TU-WiMax link performance.

Why WiMax?

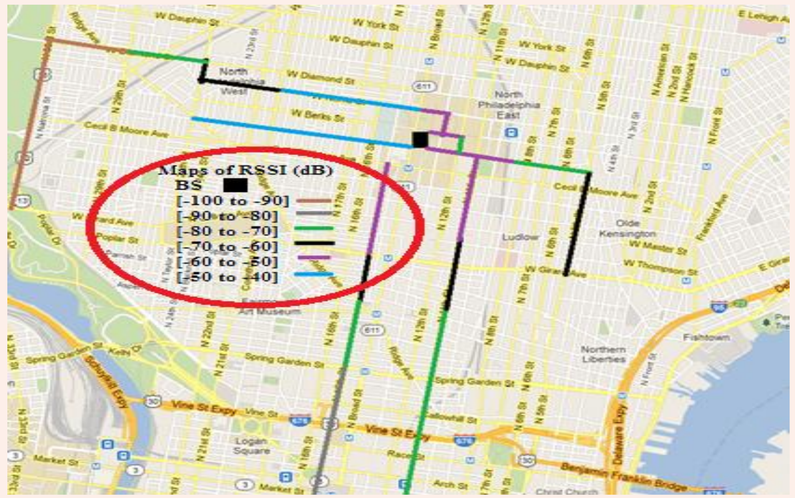
WiMax is more cost-effective at both district and state level, is faster and has much greater range. It allows students and families to access to all the required educational resources anytime and anywhere

Experimental Methodology

❖Two laptops running Windows 7
❖Kannon: Platform that provides solutions for WiMax links monitoring (RSSI, CINR, frequency)
❖ Jperf: Network tool measuring maximum TCP & UDP bandwidth, delay jitter, latency and datagram loss
❖Focused link performance : bandwidth, Receive Signal Strength Indicator, and Carrier to interference plus Noise Ratio

Results

❖Service range: from Temple University to Center city of Philadelphia
❖High signal strength and link quality
❖-70 decibels average RSSI
❖20 decibels average CINR
❖Map of RSSI where signal level distribution is depicted



Analysis

❖High correlation between RSSI and distance
❖Moderate correlation between CINR and distance
❖Antenna coverage range is about 4 km
❖CINR ultimately determines the achievable performance of the network

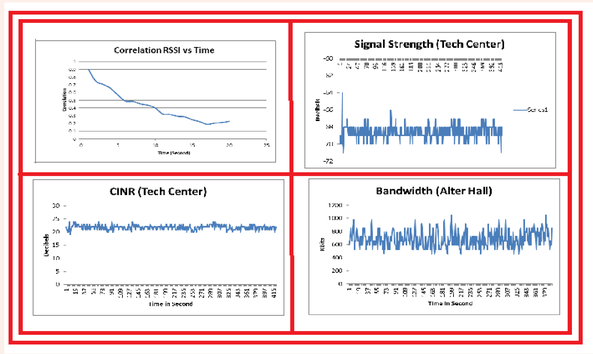
Prediction of link quality

❖Auto-correlation statistical method for time series analysis of CINR
❖CINR not only takes into account signal strength, but also the amount of noise in the signal
❖Propose periodic pattern for predicting future link quality
❖Having a precise view on the future

Auto-correlation

❖easures the correlation of two values in the same data set at different time steps
❖Tool to find repeating pattern

$$R(s,t) = \frac{E[(X_t - u_t)(X_s - u_s)]}{\sigma_t * \sigma_s}$$



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