Taking wide-area throughput measurements over a GENI WiMAX deployment

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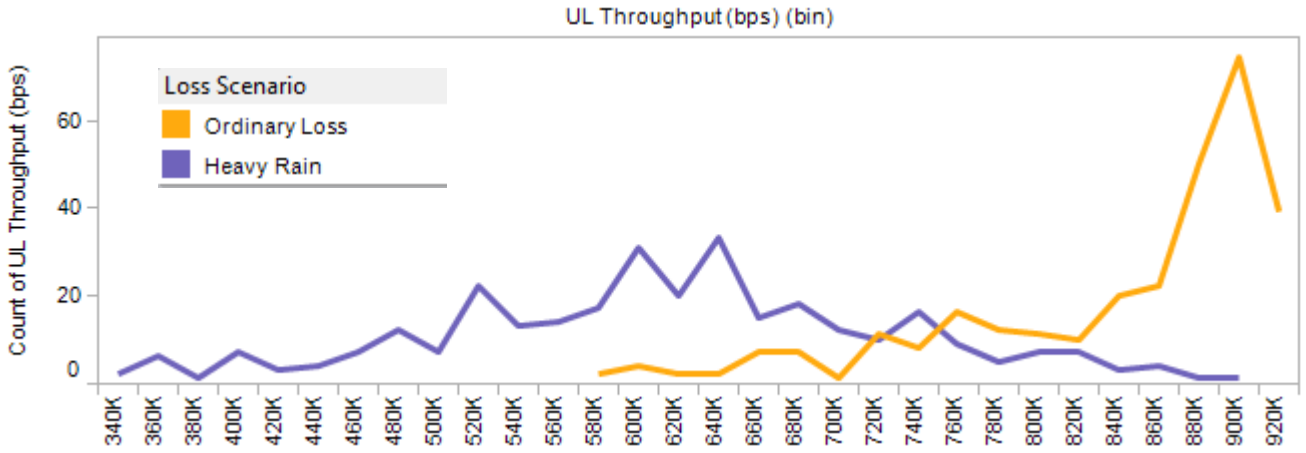
Traditional Approach to Throughput Measurements



Typical measurement procedure involves selecting a set of points on a map and taking measurements at each point with tools like *iperf*.

Not ideal for taking dense wide-area measurements:

- Lots of variability (see figure)
  - Sensitive to link conditions
- Each measurement point takes a long time to collect
  - Need a long *iperf* connection for each measurement point, and multiple points at each location
- *Iperf* doesn't utilize full link – measurements don't show full network capacity

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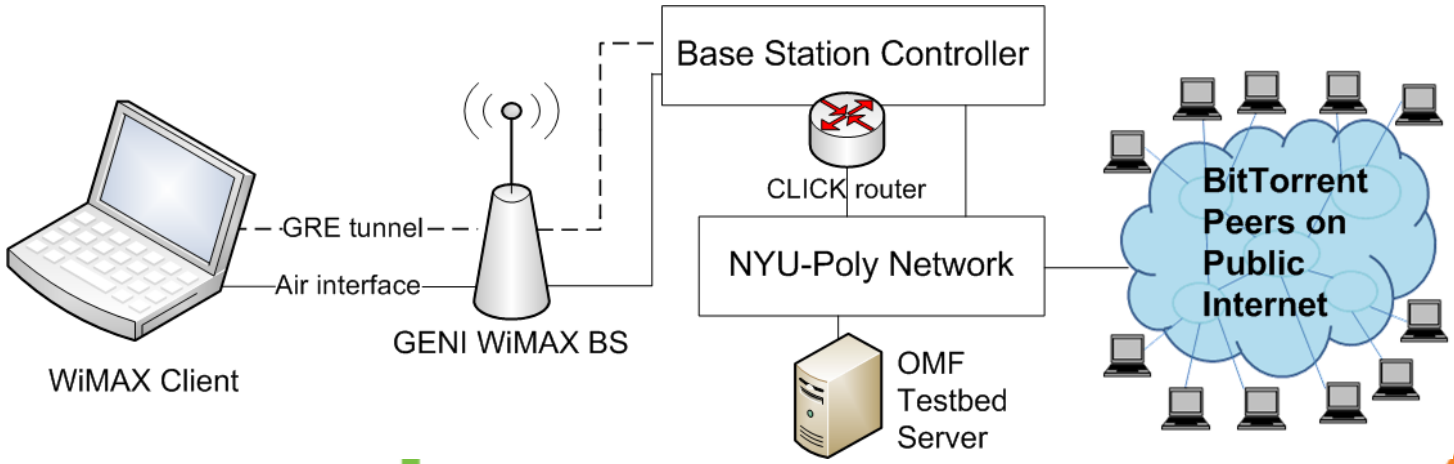
Solution: BitTorrent Network Measurement Tool

- Multiple parallel TCP connections to maximize link usage, resiliency to loss
- Scales network usage
- Adapts quickly to dynamic network conditions
- Can take measurements “on the go” while moving at walking speeds throughout coverage area, since we don’t need a lengthy connection or multiple measurement points at each spot

OML measurement application we developed gathers:

- BitTorrent upload and download rates (including protocol overhead), number of connected peers
- WiMAX signal information (RSSI and CINR)
- GPS location data (including estimate of error)



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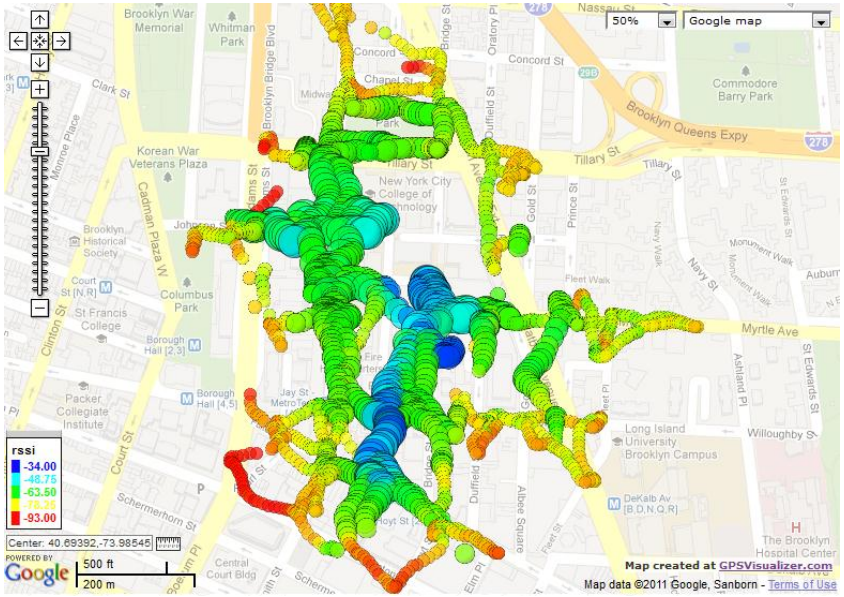
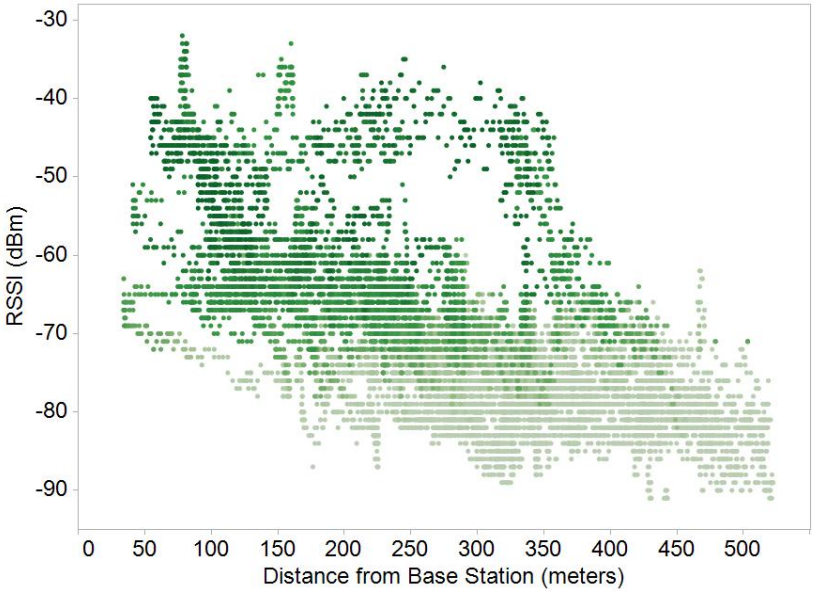
Experiences

- Measurements were efficient to collect (thousands of measurement points in a matter of hours!)
- Dense measurements give us a better understanding of the characteristics of a WiMAX network in an urban environment.
- The measurement points are in a database that is easy to manipulate using standard tools, and can be used as a baseline for further experiments.
- The application may be recycled and the experiment repeated to test changes to the network (i.e. network tuning).





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More Information

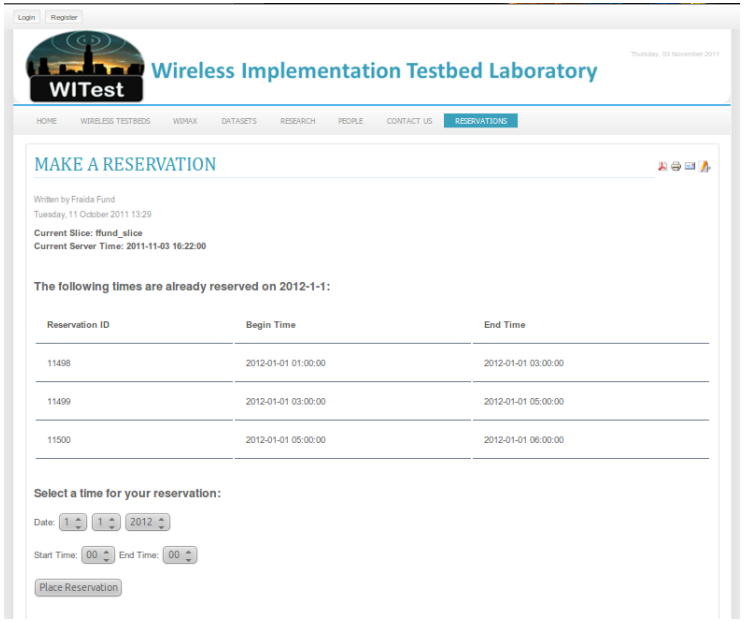
Further details about experiment, application source code:

- http://witestlab.poly.edu/index.php/wimax/field-measurements.html

NYU-Poly's WiMAX testbed is open for public access:

Register at http://witestlab.poly.edu/index.php?option=com_user&task=register

Once registration is approved, you can reserve time on the testbed.



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