

Taking wide-area throughput measurements over a GENI WiMAX deployment

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GEC12

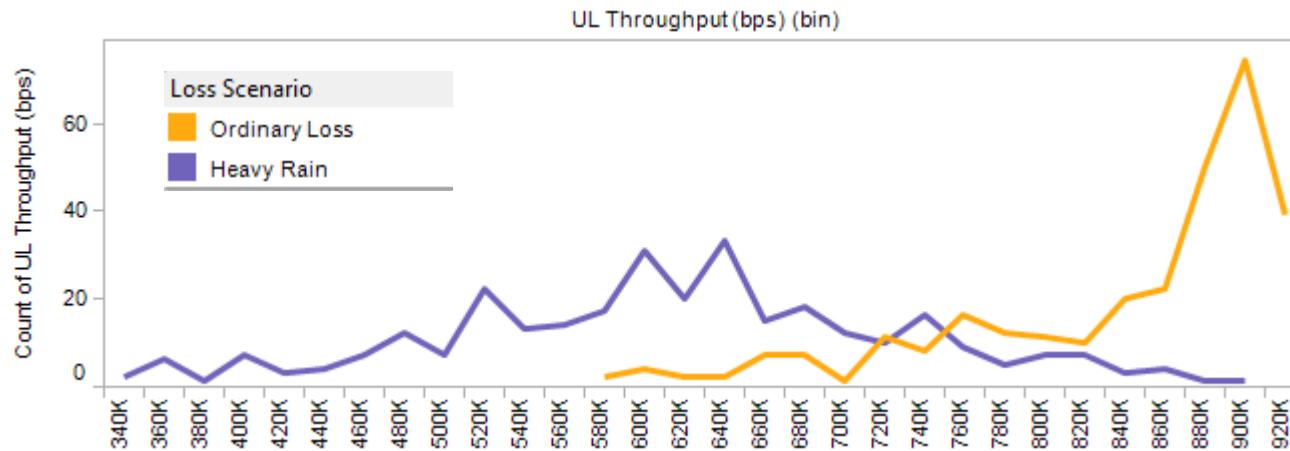
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geni
Exploring Networks
of the Future

NYU·poly

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

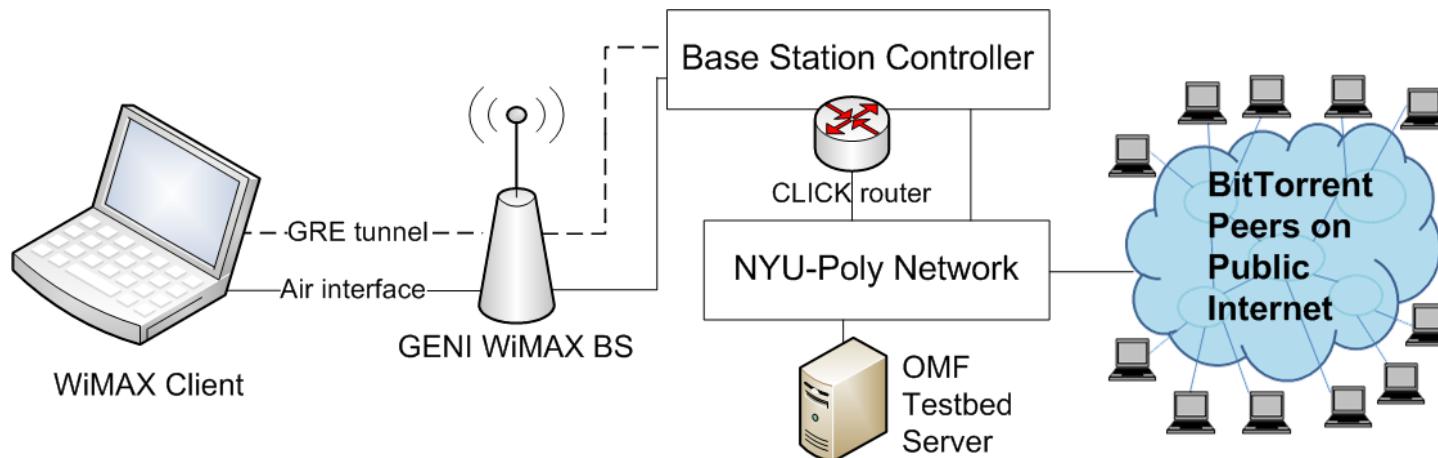


Solution: BitTorrent Network Measurement Tool

- 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

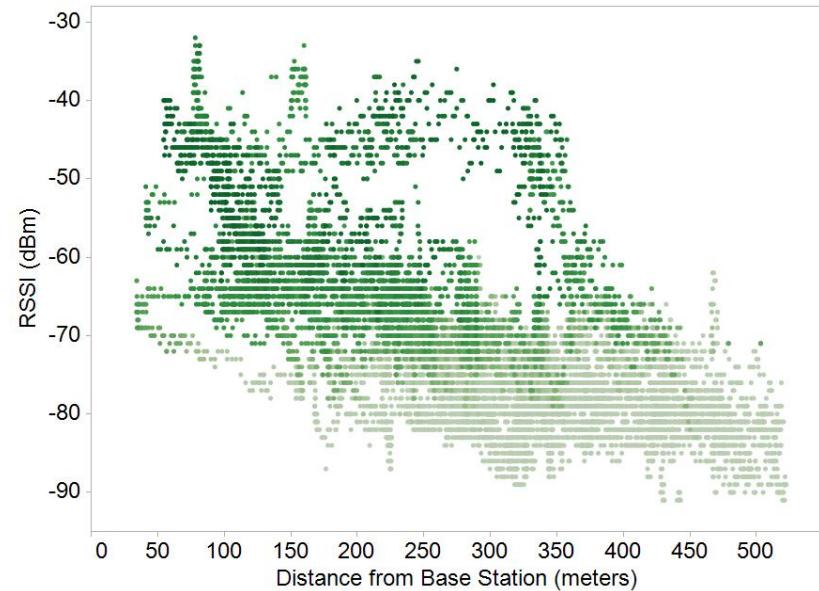
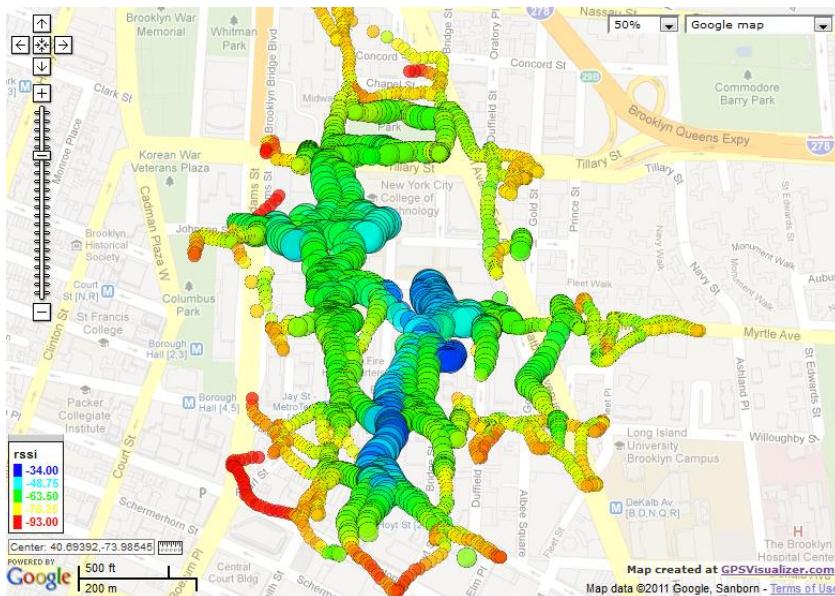
OML measurement application we developed gathers:

- 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)



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).



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.

The screenshot shows the WITest website interface. At the top, there is a navigation bar with links for Login, Register, HOME, WIRELESS TESTBEDS, WiMAX, DATASETS, RESEARCH, PEOPLE, CONTACT US, and RESERVATIONS. The RESERVATIONS link is highlighted in blue. Below the navigation bar, there is a section titled "MAKE A RESERVATION". It displays a message indicating that several reservations have already been made for January 1, 2012. The table below lists these reservations:

Reservation ID	Begin Time	End Time
11498	2012-01-01 01:00:00	2012-01-01 03:00:00
11499	2012-01-01 03:00:00	2012-01-01 05:00:00
11500	2012-01-01 05:00:00	2012-01-01 06:00:00

Below the table, there is a form for selecting a reservation time. It includes fields for Date (set to 1/1/2012), Start Time (00:00), End Time (00:00), and a "Place Reservation" button.

