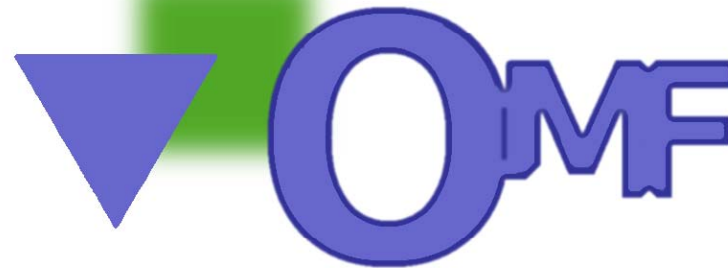# Control, Measurement, and Resource Management Framework for Heterogeneous and Mobile Wireless Testbeds

Spiral 2 Year-end Project Review

Rutgers University, NICTA

PI: Marco Gruteser, Max Ott

Staff: Ivan Seskar, Thierry Rakotoarivelo
Students: Janani Chandrasekharan, Tong Jin

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Project Summary

- This project is developing OMF, an integrated control, resource management, and measurement framework grown out of ORBIT, to support heterogeneous federated testbeds and in particular mobile testbeds

- Key YR 1 accomplishments were
  - enabled support for multiple testbeds
  - enabled support for disconnected operation on mobile nodes (control and measurement)
  - Provide VLAN connections from our testbeds to backbone

- Key YR 2 goals
  - Develop context-based mobile experiment control mechanisms and validate mobile and multi-testbed functions through experiments
  - Prepare OMF for use in and support integration into winmax cluster

Milestone & QSR Status

ID	Milestone	Status	On Time?	On Wiki?	GPO signoff?
a	Cluster plan for VLANs between testbeds.	Plan completed for GEC6. Further execution of plan dependent on I2 ION.	On time		
b	Extend OMF for experiments with multiple testbeds	Integration of OMF with PlanetLab Europe demoed at GEC 7. Implemented first stage of an assertion-based authentication mechanism.	On Time/ >2mo late		
c	Extend OMF for experimentation driven by context	Completed and demoed at GEC 7.	On Time		
d	Federate cluster testbeds	Continuing support, new virtualization functions in OMF 5.3	On Time		
e	Demo VLAN connection to backbone	Demoed with BBN	Early		
f	Support integration of latest OMF code into cluster testbeds	Support is being provided on a continuing basis.			
g	Demo experiments with mutiple testbeds and context	Demoed using Planetlab and ParkNet	On Time		
h	Federated testbeds available to GENI users	Prelim support in OMF 5.2 released in Jan. Full support in OMF 5.3, released 8/27	early / <2 mo late		
i	GMOC access to operating data	Data provided in 2009, no further requests received			
l	Outreach	Underrepresented students, educational platform, ParkNet media coverage	Early		
	Status reports	Annual Report covering all quarters submitted			

Accomplishments 1:
Advancing GENI Spiral 2 Goals

- Milestones:
  - L2 connectivity between NICTA and Rutgers (D.1a & D.3d)
    - Demonstrated in March 2010
  - Extension of OMF control tools for federated experiments (D.2b)
    - OMF experiment tools integrated with PlanetLab Europe (joint work with INRIA)
  - Design support to Rutgers for WiMAX integration with OMF (D.4e)
    - Demonstrated at GEC7 and GEC8

- Accomplishments:
  - Release of OMF 5.3 (August 2010, http://mytestbed.net/wiki/omf)
  - Release of OML 2.3.9 (August 2010, http://mytestbed.net/wiki/oml)
  - Release of IREEL v2.0 (http://ireel.npc.nicta.com.au)
    - Used by +100 students in networking class at University of New South Wales
  - 2 articles at TRIDENTCOM (Instrumentation & Education with OMF)

- Supported full-scale ParkNet research project using OMF features and ORBIT vehicular testbed
    - Goal: Low-cost collection of road-side parking availability
    - Uses GPS and ultrasonic rangefinders (42 kHz, 20 samples/s, 15cm resolution, up to 6.5m distance)
    - Preliminary results show 90% accuracy with threshold detection algorithm

- Month long data collection with 2 vehicles

- Guided development of location-based experiment control and provided feedback on OMF disconnected mode

- Well-received research results:
    - ACM MobiSys best paper award
    - Media coverage in MIT Technology Review, CBC Online

Sensor car driving by

Parked car   Vacant spot   Parked car
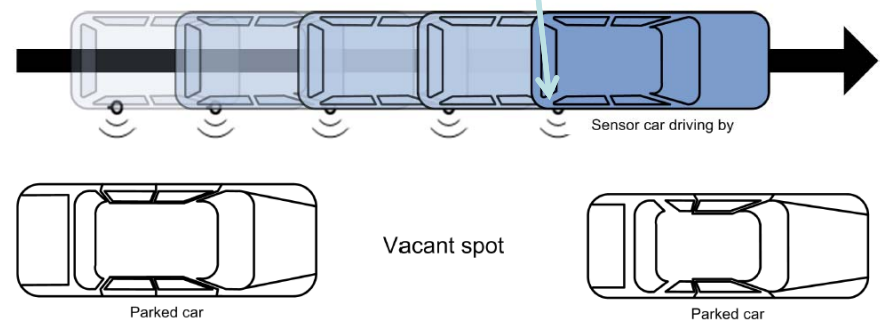
- Execution of VLAN plan dependent on I2 ION

- The GPO is starting to formulate goals for Spiral 3. What are your thoughts regarding potential Spiral 3 work?

    – Using ParkNet as an application level showcase and validation experiment at multiple Wimax sites (e.g., Rutgers-New Brunswick, Brooklyn?, Wisconsin?)