Building a mobile wireless testbed for analysis of wireless layer effects

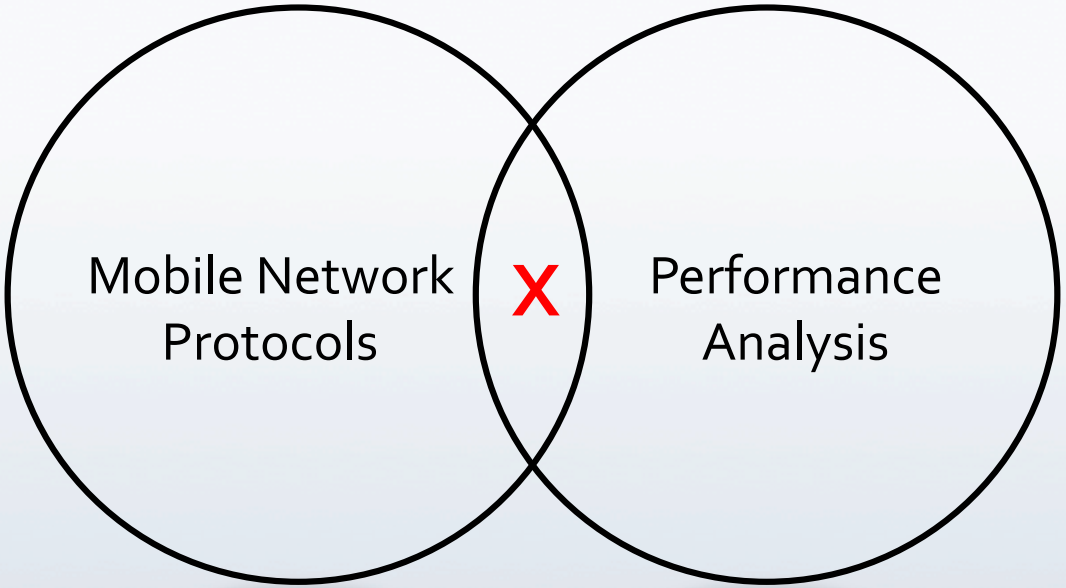
Devan Rehunathan

dr@cs.st-andrews.ac.uk
http://blogs.cs.st-andrews.ac.uk/devan/

Supervised By: Saleem Bhatti

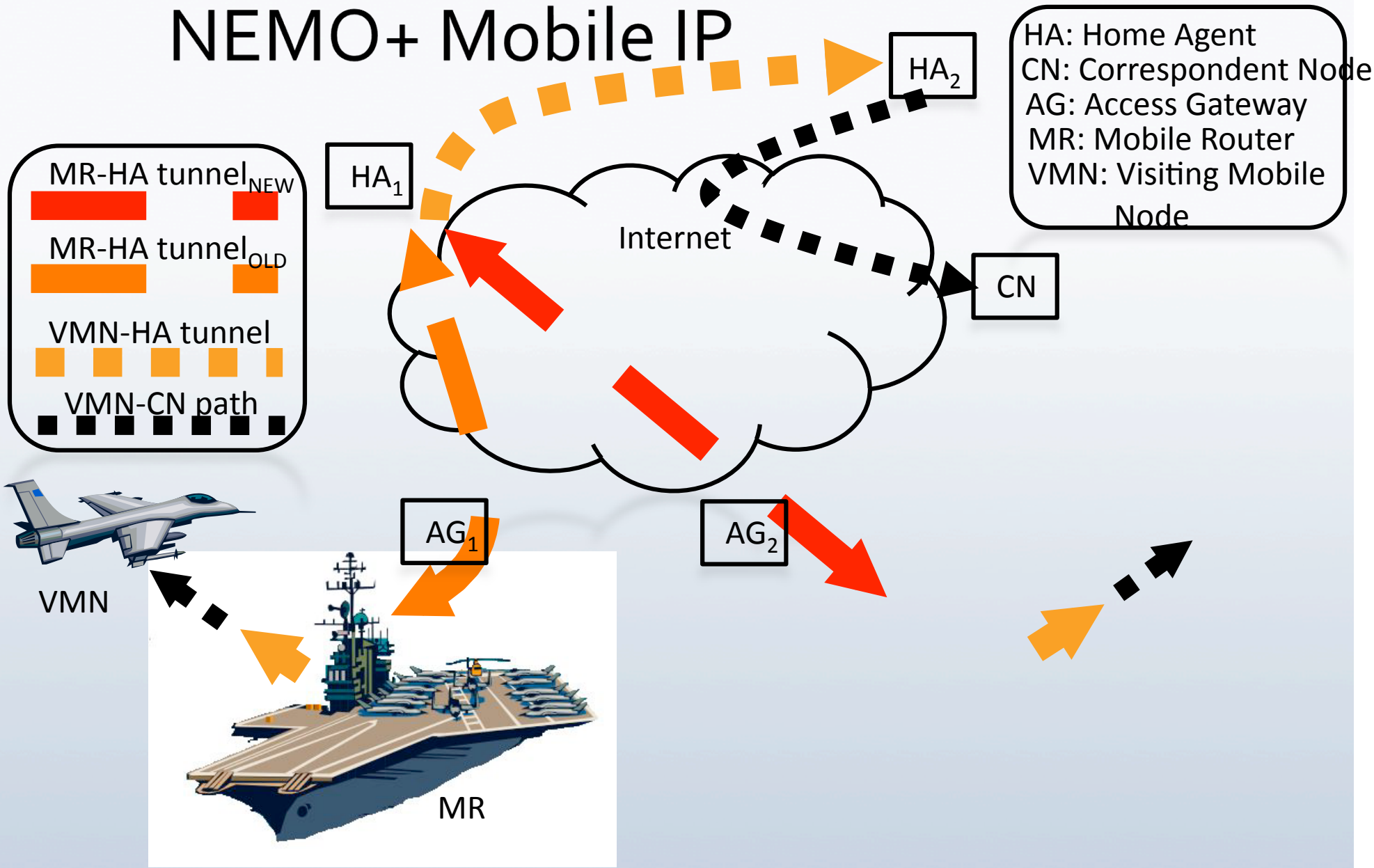
Multi-Service Networks 2010

My Research Interests



- "Enable Mobile Networks through Secure Naming" (MILCOM 2009)
- "Application of Virtual Mobile Networking to Real-Time Patient Monitoring" (In submission)

NEMO+ Mobile IP



Benefits

- Aggregation
- Mobility

Applications

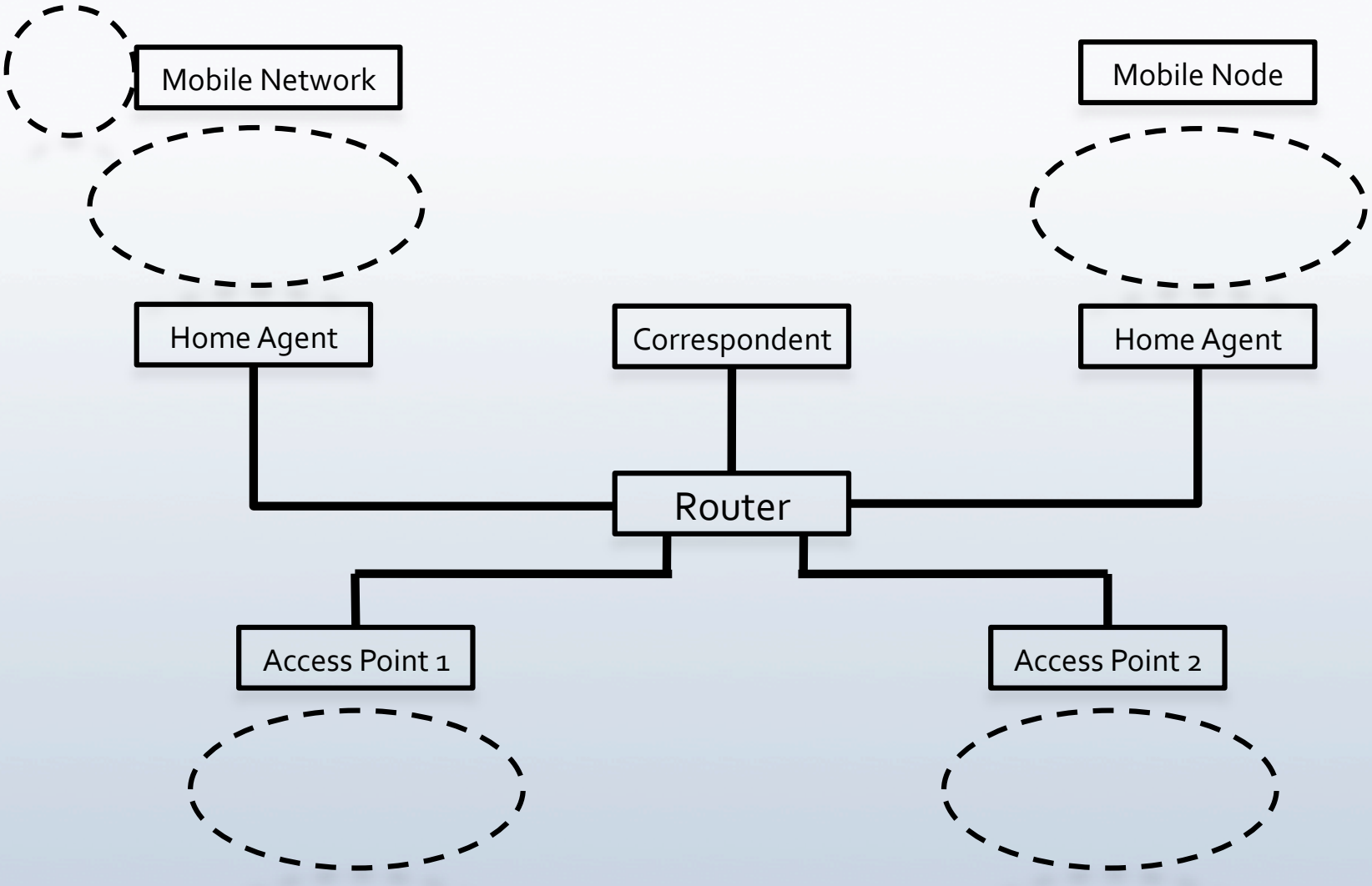
- Network Provision (possibly for in-train wifi)
- Vehicular Ad-Hoc Networks
- Personal Area Networks

Problem

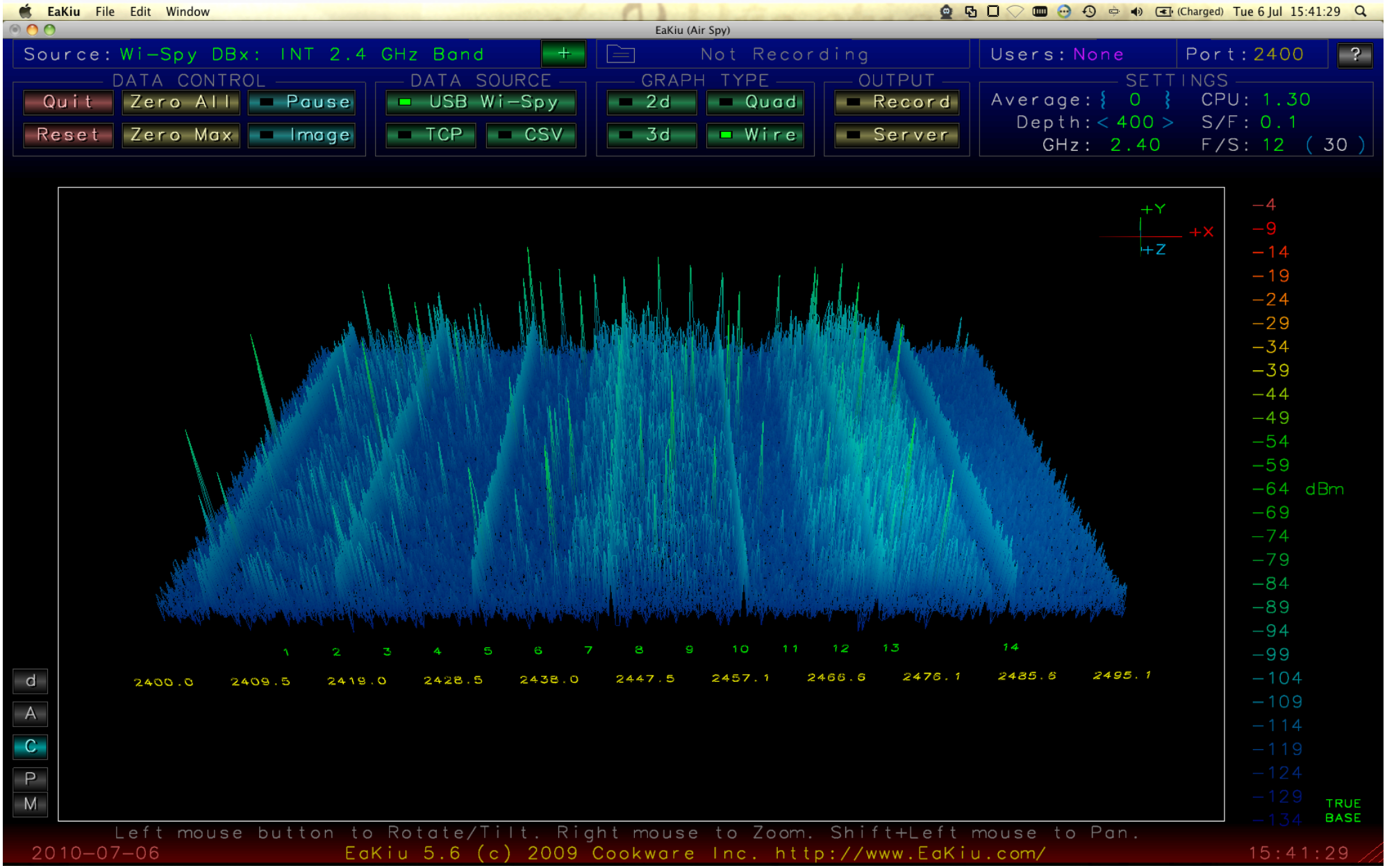
- Studying mobile network protocols is challenging
- How to compare mobile network protocols in a generic way

Theoretical Analysis | Simulation | Emulation | Empirical Analysis

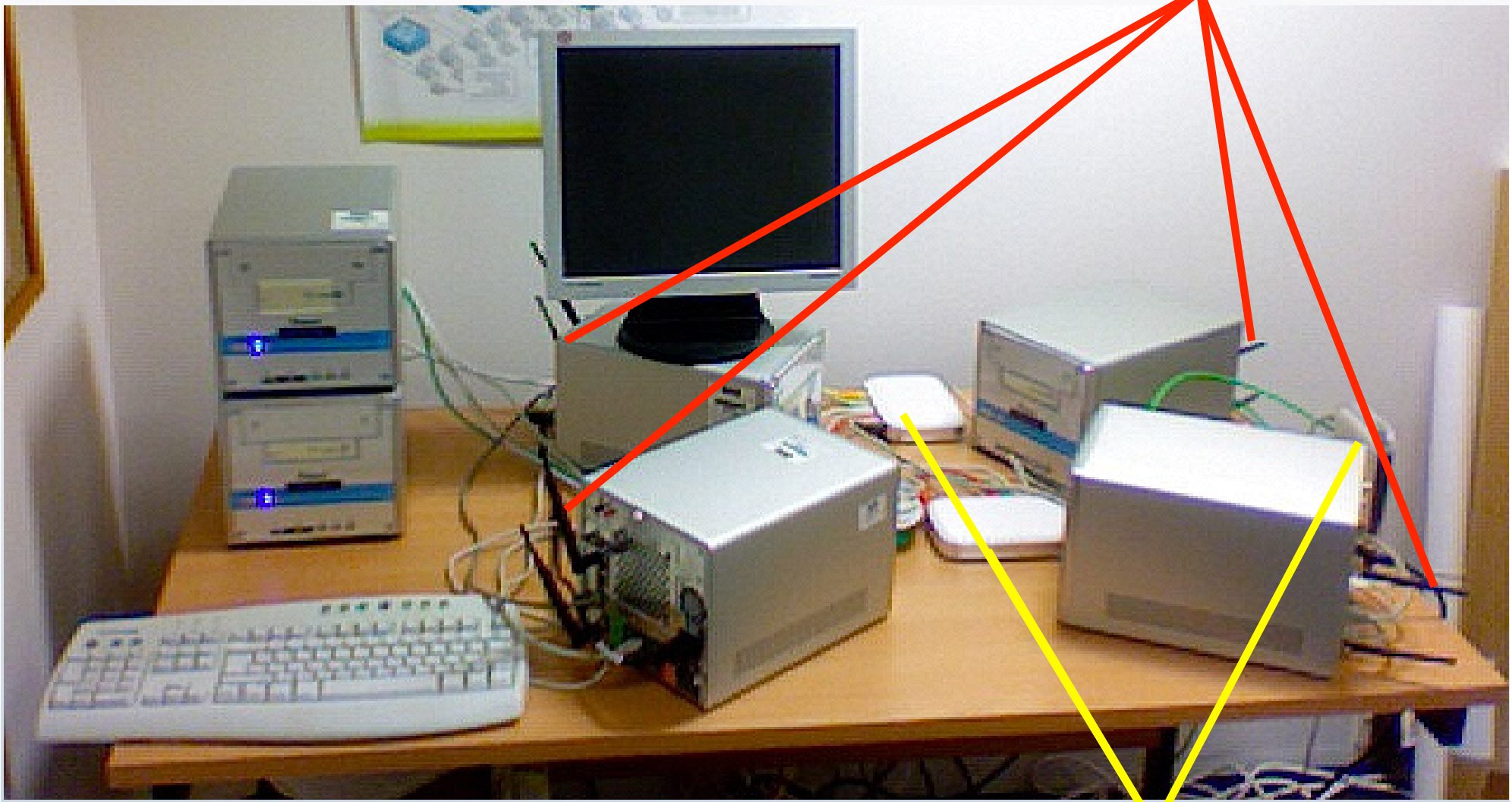
Experiment Design



Choosing 802.11?

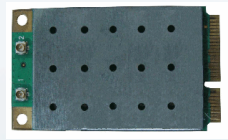


Testbed



Hardware

- COMPEX iWaveport WLM200NX minipci card (802,11N a/b/g/n)
- SparkLAN WPEA-110N Mini PCI-Express Module (802,11N a/b/g/n)
- EeePC 1000H & 900
- ShuttlePC
  - Home Agents: Debian 5, 2.6.32.8 Vanilla Kernel



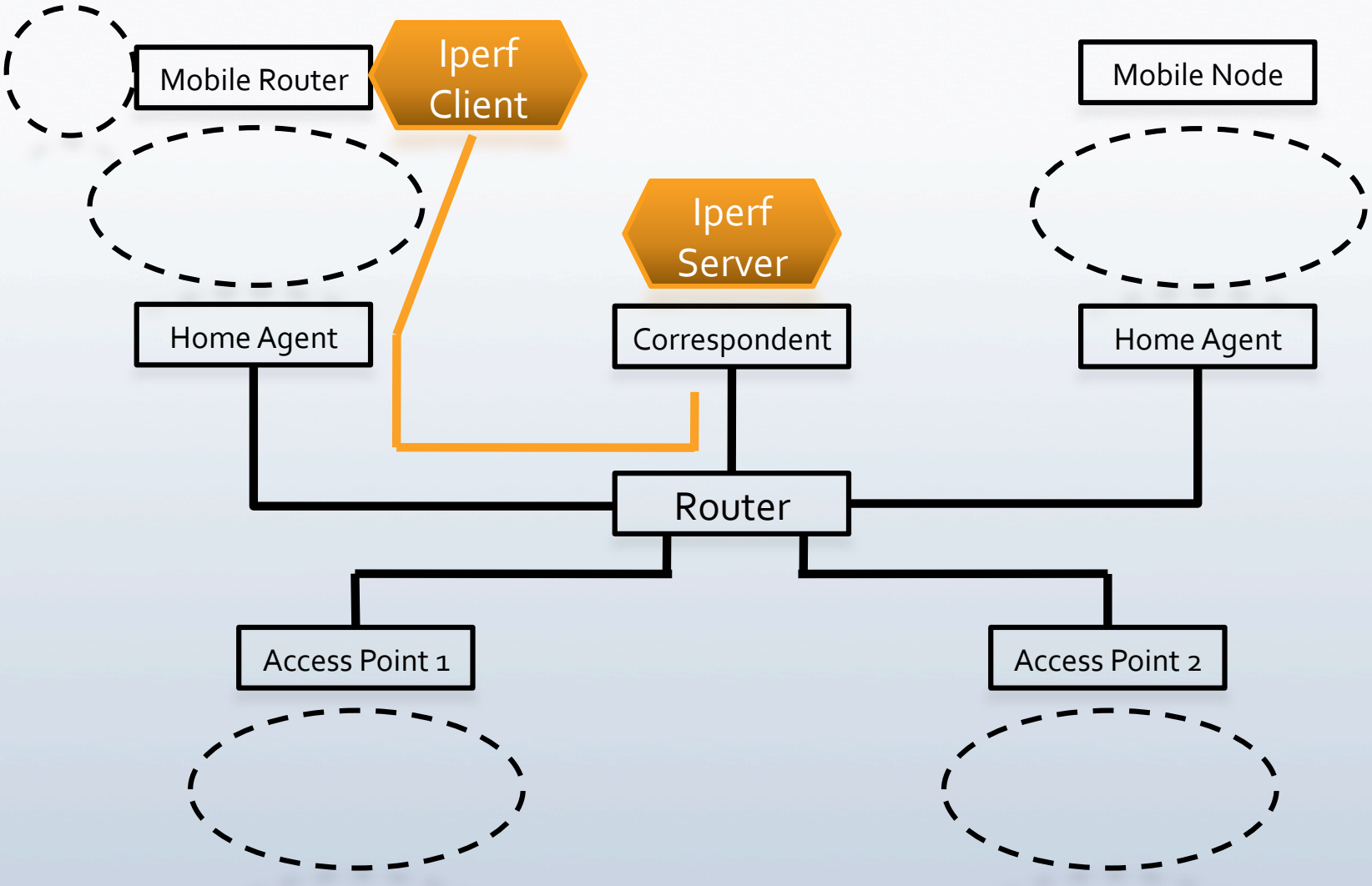
Devan Rehunathan
http://blogs.cs.st-andrews.ac.uk/devan/

HowTo

- Preboot eXecution Enviroment (PXE)
- NEMO Kernel[1]
- Modified Ath9k driver with Hostapd
- WiSpy DBx[2]

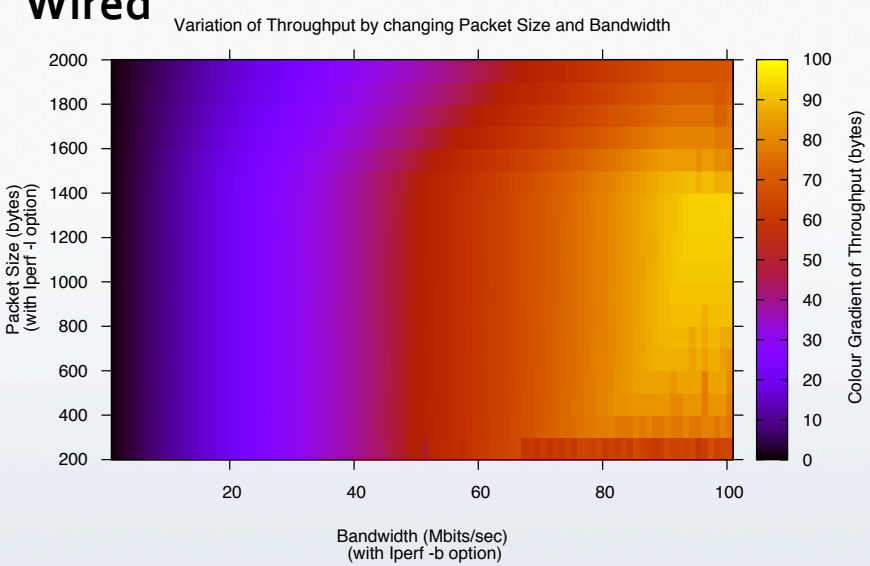
1: http://www.nautilus6.org/doc/nepl-howto/
2:http://www.metageek.net/products/wi-spy-dbx

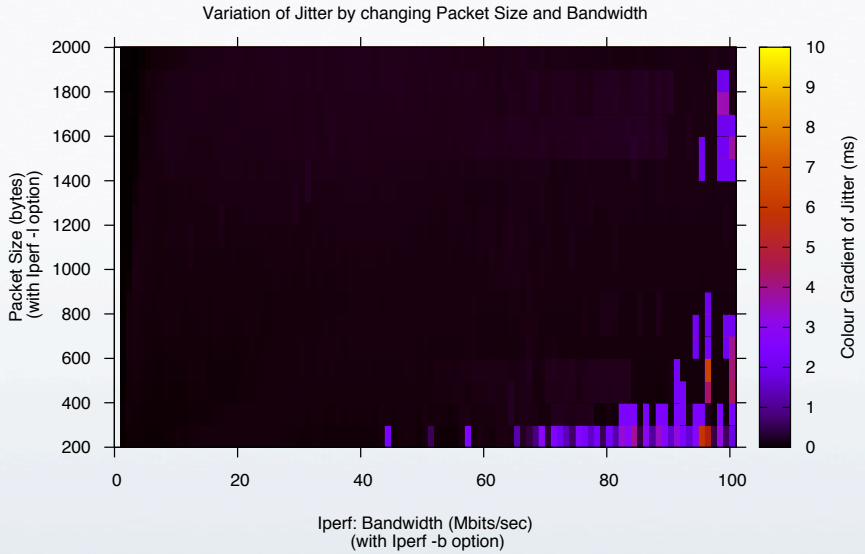
Calibration Setup



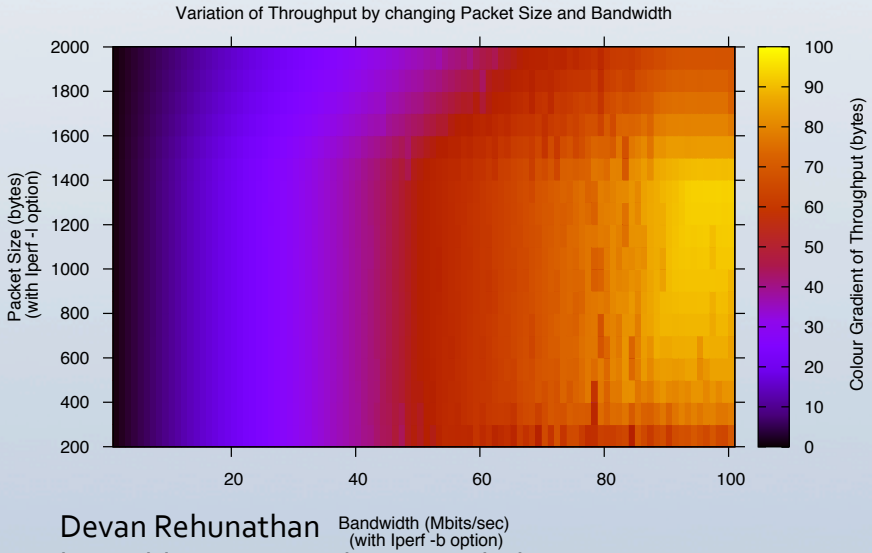
Throughput & Jitter

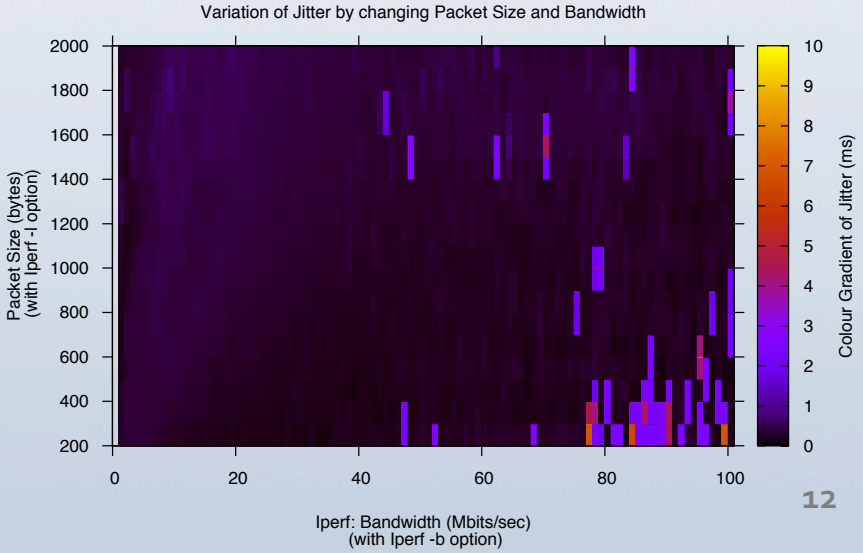
Wired





Wireless

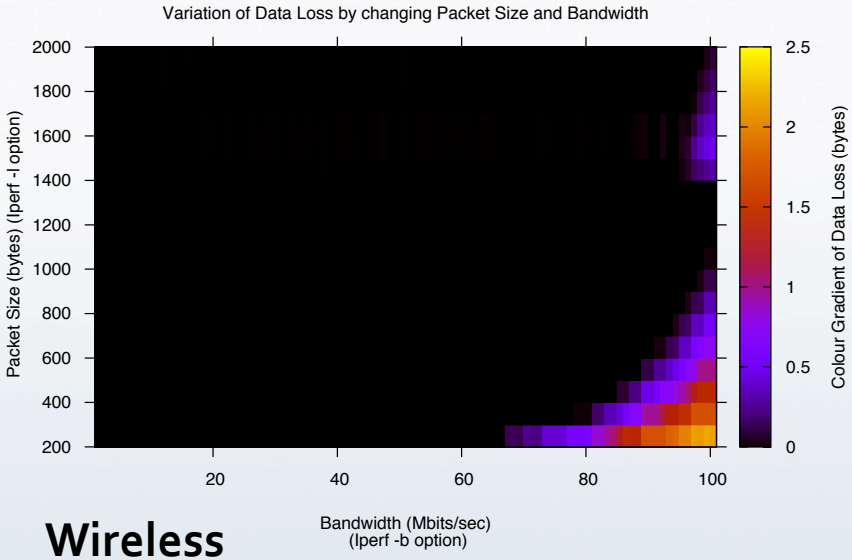


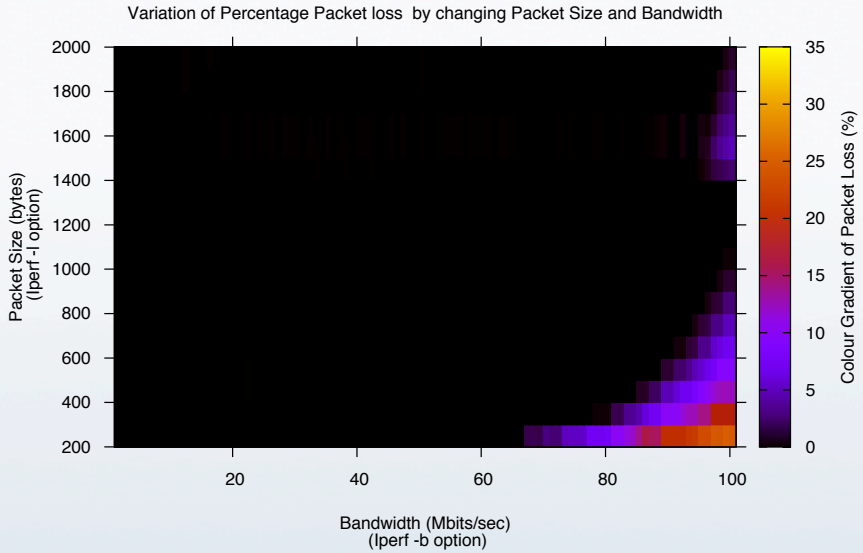


Devan Rehunathan
http://blogs.cs.st-andrews.ac.uk/devan/

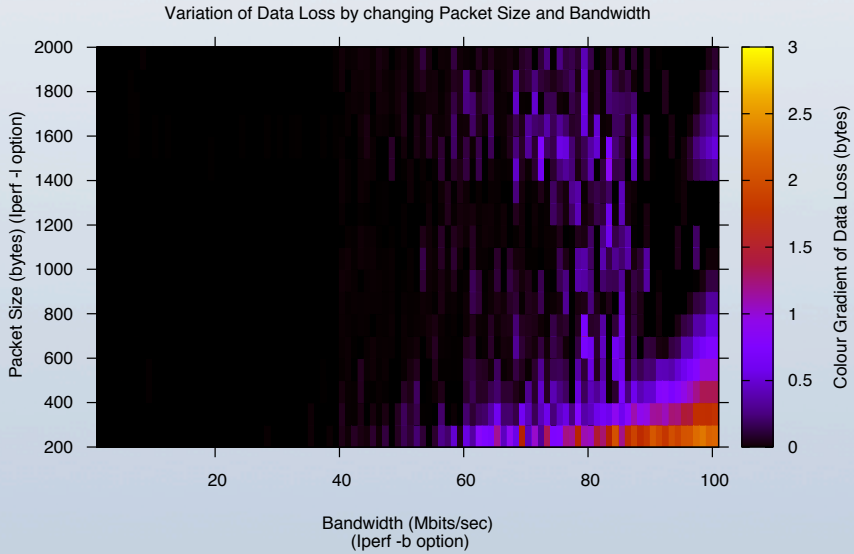
Byte Loss & Packet Loss

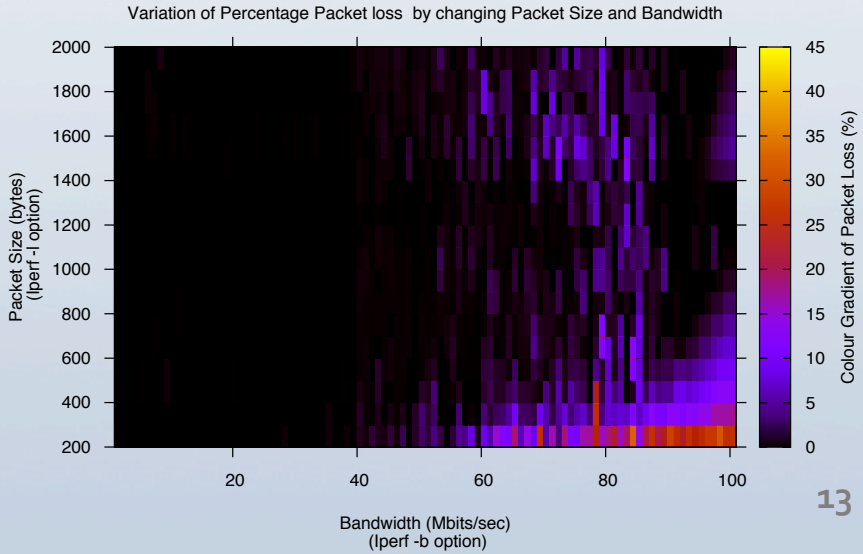
Wired





Wireless





Summary

- Studying mobile networking protocols is complex with different methods
- My current experiment explores this distinction between wired and wireless results
- My approach is to compare performance results of a wired and wireless testbed for identical scenarios to gauge impact of wireless layer
- I have conducted built a 802.11n mobile network testbed. I've concluded my calibration tests and have obtained a baseline performance with 0 mobility.

Building a mobile wireless testbed for analysis of wireless layer effects

Devan Rehunathan

dr@cs.st-andrews.ac.uk
http://blogs.cs.st-andrews.ac.uk/devan/

Supervised By: Saleem Bhatti

Multi-Service Networks 2010