ENSC-835 Communication Networks

Final Project Demo - Spring 2008
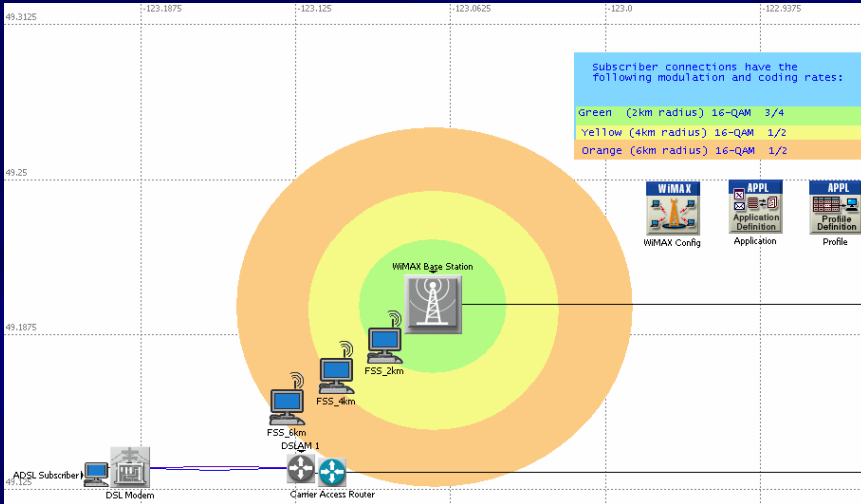
Streaming Video Content Over WiMAX Broadband Access

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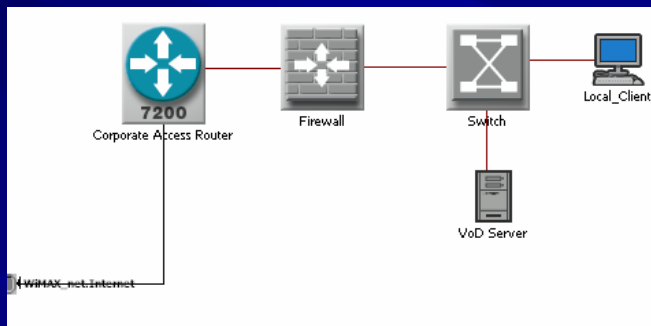(whrudey@sfu.ca)

Roadmap

- Introduction

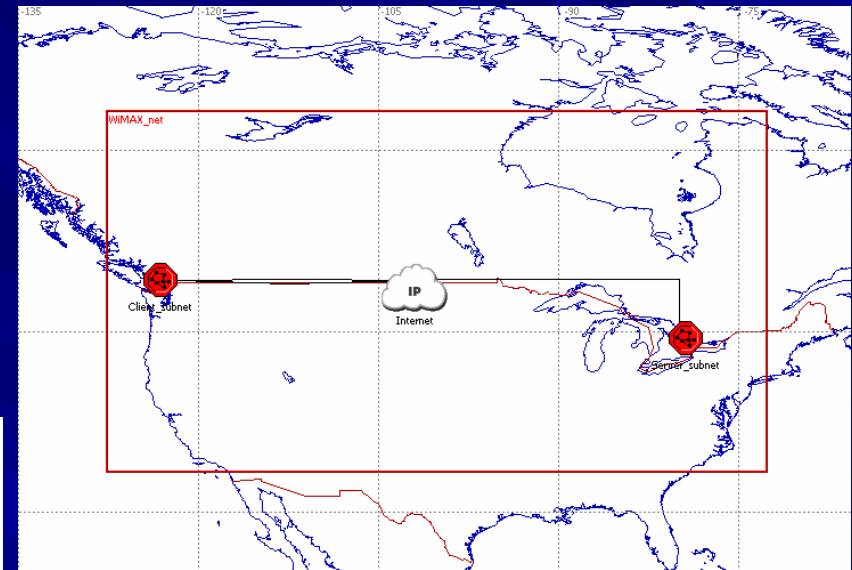- Design / Implementation

- Validation / Analysis

- Summary

Introduction

Video Client subnet

Video Services subnet

Global Topology

Can WiMAX deliver comparable network performance to
ADSL broadband access for streaming video applications?

3

Design / Implementation

Scenario: **Stream a 2 hour MPEG-4 movie to the video clients**

- Application and profile configuration
  - MPEG-4 frame distribution
  - Application deployment

- WiMAX Configuration (service classes, flows, modulation / coding)
  - WiMAX_config / base station / subscriber station

- Wireline Links
  - WAN / LAN / DSL

- Internet
  - Packet discard ratio: 0.001%   /   packet latency: 0.001s

- Background traffic growth
  - 10% every 30 min

- Statistics – selection and promotion

Validation / Analysis

- **Scenarios**
  - Simulation time / actual time – 2 hours / up to 8 hours

  - Validation
    - Separate incoming / outgoing scenarios using 128x120 @ 1 fps
    - Background traffic on LAN & WAN links
    - Background traffic with incremental growth

  - MPEG-4 stream
    - Varied simulation durations and base station buffering

- **Results: video streaming performance metrics**
  - Video packet loss
  - End-to-end video packet delay
  - Video packet jitter
  - Throughput

Summary

- Challenges
  - Model instability led to inconsistent results (bugs)
    - OPNET response: upgrade to Modeler 14.5

- Future Work
  - Develop more comprehensive simulations and analysis
  - Research and refine video performance metrics
  - Model audio traffic and encapsulate A / V traffic in RTP
  - Incorporate WiMAX mobility and shadowing

- Conclusion
  - Dependant on specific deployment parameters
  - WiMAX can provide comparable network performance to ADSL for streaming video applications