

ENSC 427: COMMUNICATION NETWORKS  
FINAL PROJECT DEMO  
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# Performance evaluation of Voice Over IP on WiMAX and Wi-Fi based networks

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# Roadmap

- ▶ Introduction
- ▶ Implementation Details
- ▶ Discussion of Results
- ▶ Conclusion and Ideas for Future Work

# Introduction

- ▶ Project Idea
  - Is wireless Internet telephony a viable replacement for cellular phones?
- ▶ Exploring Three Technologies
  - VoIP: Voice Over IP
  - WiMAX: Worldwide Interoperability for Microwave Access
  - Wi-Fi
- ▶ Key Issues
  - Call Quality – “Quality of Experience”
  - Packet Loss
  - Delay and Jitter
  - Power and Range

# Implementation Details

- ▶ Approach
  - Simulate a VoIP call being made between two wireless users
  - Two pairs of calls
    - One close to the base station, the other far away
- ▶ Voice Application traffic model in OPNET
  - G.729a encoding - 100 packets/sec (every 10 ms)
- ▶ Three OPNET Scenarios
  - Ethernet (Baseline)
  - Wi-Fi
  - WiMAX
- ▶ All users are making a 30 second call

# Conclusions

- ▶ Biggest issues are with packet loss
  - Not possible to retransmit voice packets, but 10% loss can be managed with the right encoding schemes
- ▶ Delay and jitter are low enough to not cause loss in quality
- ▶ WiMAX gives a significant distance advantage over Wi-Fi, but need to consider transmit power
- ▶ Both Wi-Fi and WiMAX perform well enough to make VoIP usage feasible when user is close to the base station
  - Each has their own place in the market. Wi-Fi a good choice for an indoor setting, but WiMAX needed if we want to replace cellular phones
- ▶ Other considerations include cost and availability

# Future Work

- ▶ Larger network with multiple base stations
- ▶ Network load handling of large number of callers
- ▶ Mobile callers