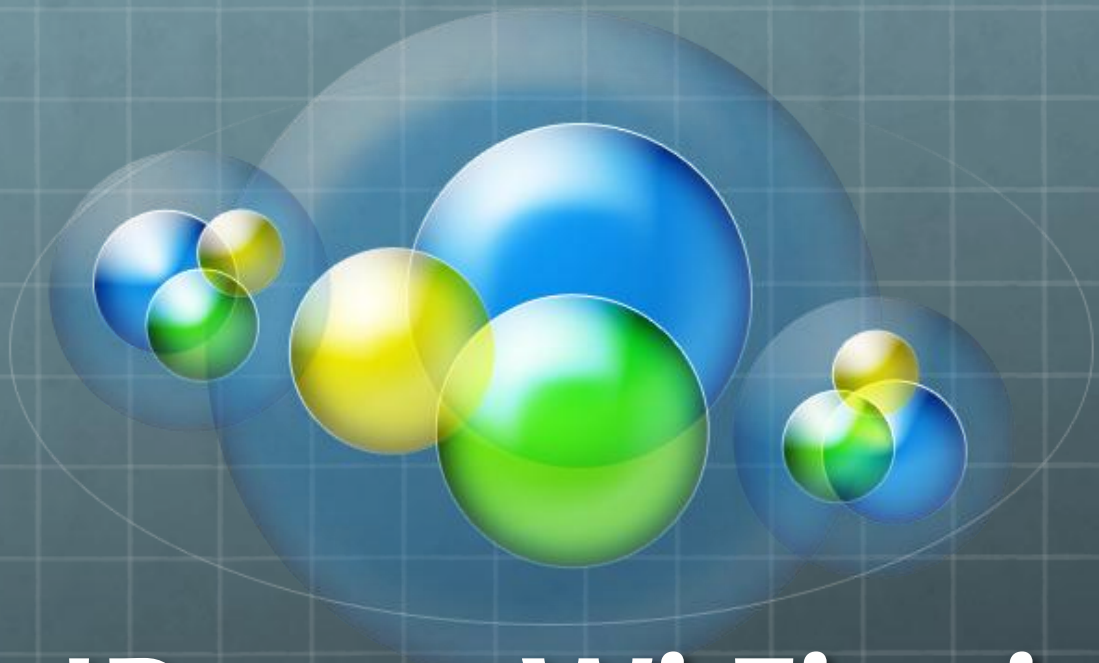

VoIP over Wi-Fi using Riverbed Simulation

ENSC 427: Communication Networks Spring 2015
Team 10
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Road Map

- Introduction (motivation of this project, wifi and riverbed details)
- Voice over WiFi implemented in Riverbed
- Discuss and analyze MOS factors
- Performance of G.711 and G.729a
- Summary

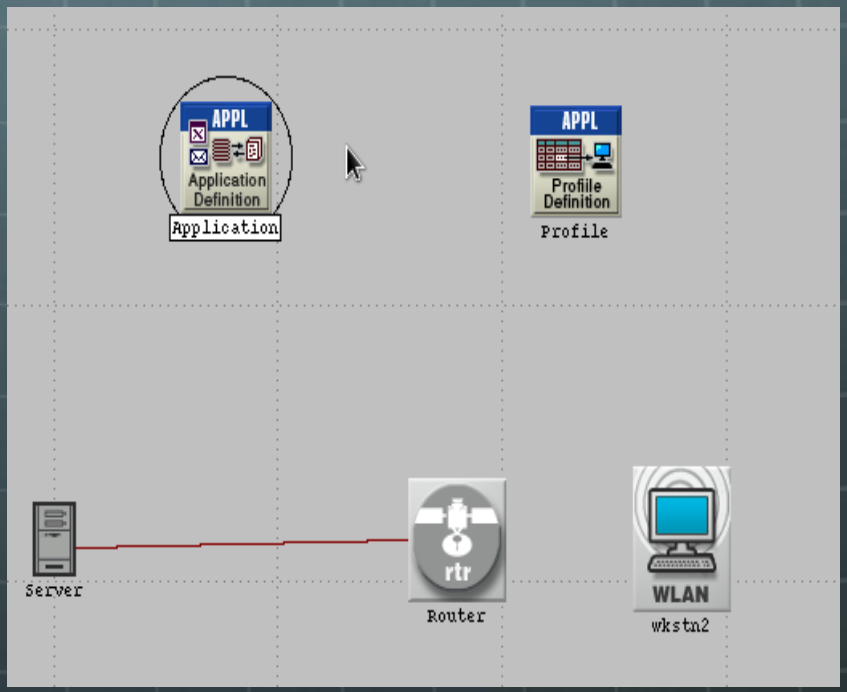
Introduction

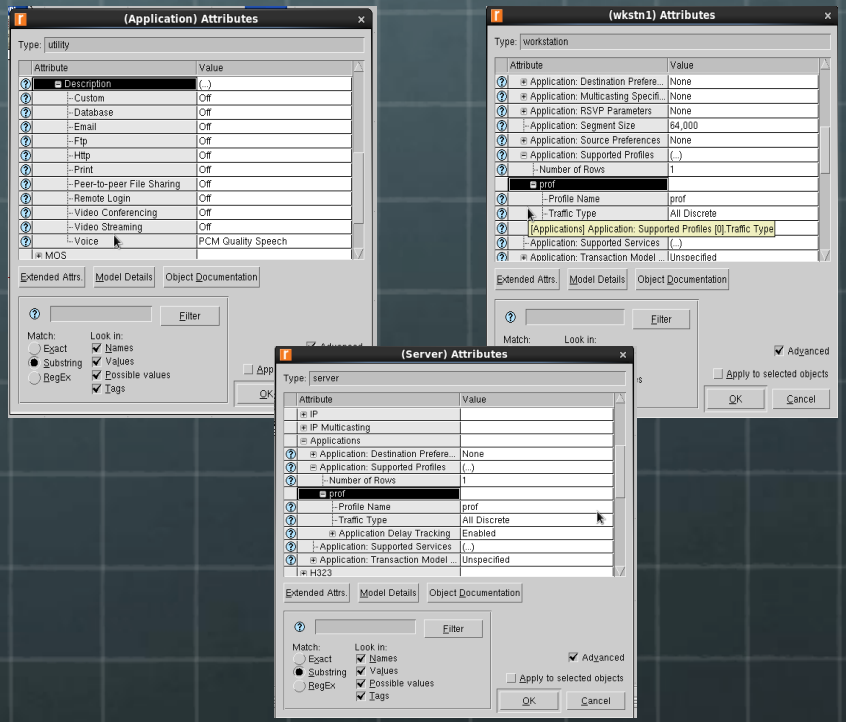
- **WiFi-** Wireless Fidelity
  - Local area wireless technology, support electronic devices to participate in computer networking
- **Riverbed Technology**
  - Popular tool, lots companies(Ericsson) => benefit students
- **VoIP-** delivery of voice communication over Internet Protocol
  - Important app, expected to carry more and more voice traffic over TCP/IP network, Viber, Skype….
- **In this project, we simulate them in an office environment**

VoIP over WiFi- Setup

- 1 Application, 1 Profile, 1 Ethernet Server, 1 Router, 1000BaseX

users at different distances





VoIP over WiFi – MOS Values

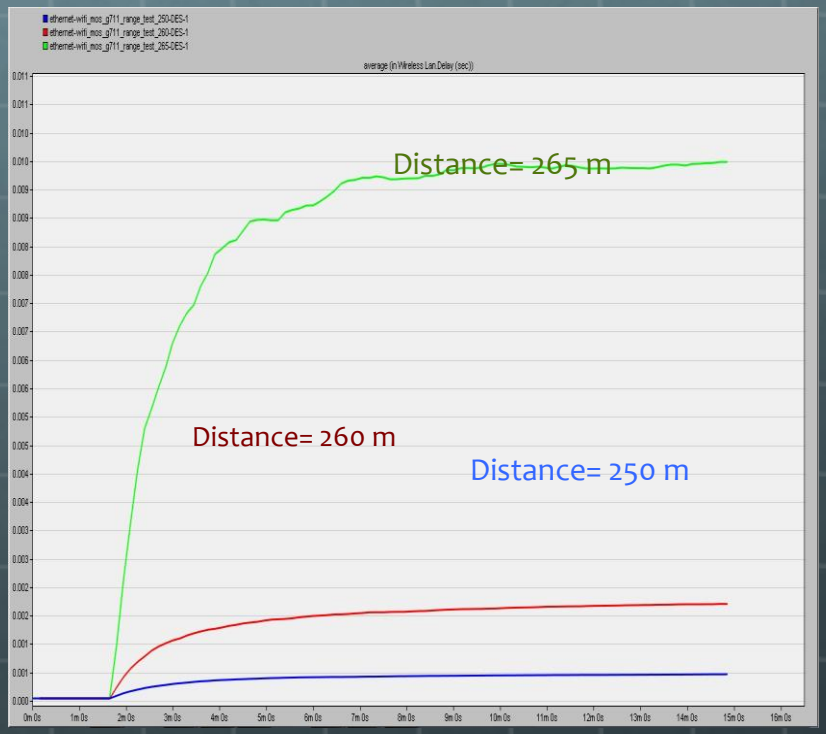
- MOS stands for mean opinion score
- Obtains the user's view of the audio quality of the network
- The score range is 1 to 5, 1 being the lowest quality
- MOS > 4.3 (Very Good) Range: 30- 250 meters
- 3.5< MOS < 4.3 (Good) Range: 250 - 260 meters
- 3 < MOS < 3.5 (Mediocre) Range: 260-270 meters
- MOS < 2 (Bad) Range : more than 270 meters

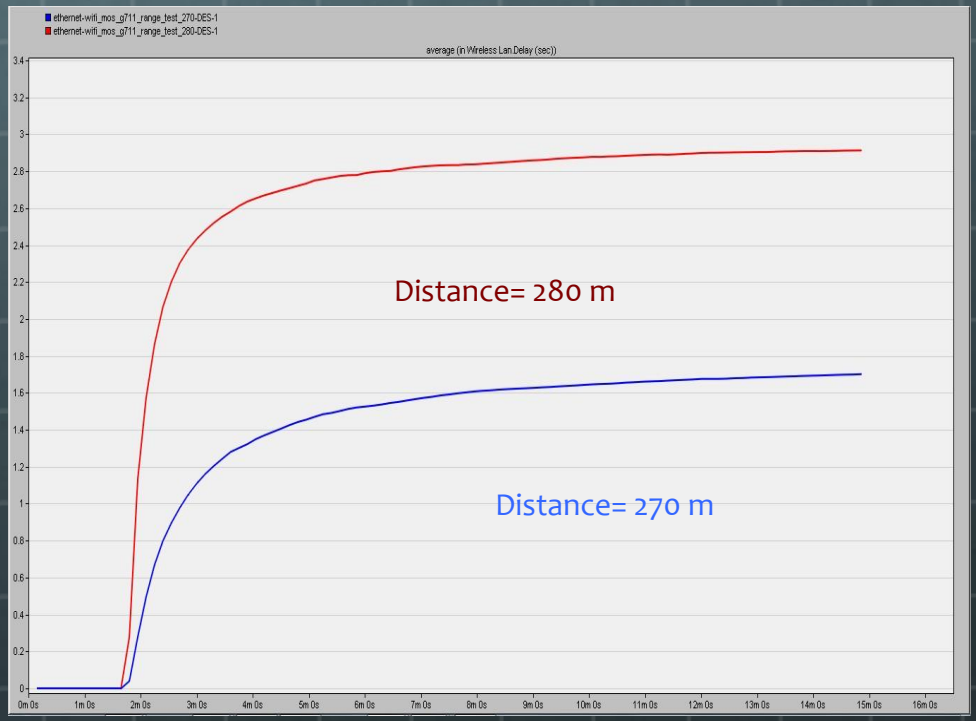
Factors Affecting MOS

- Jitter
- Delay
- Packet Loss

Delay results for different distances

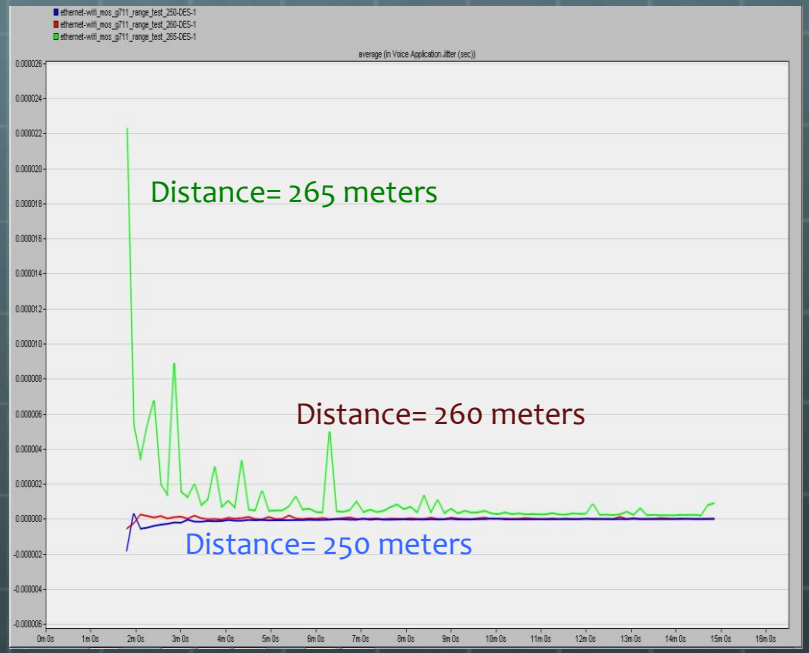
- Five distances: 250m,260m,265m,270m and 280m

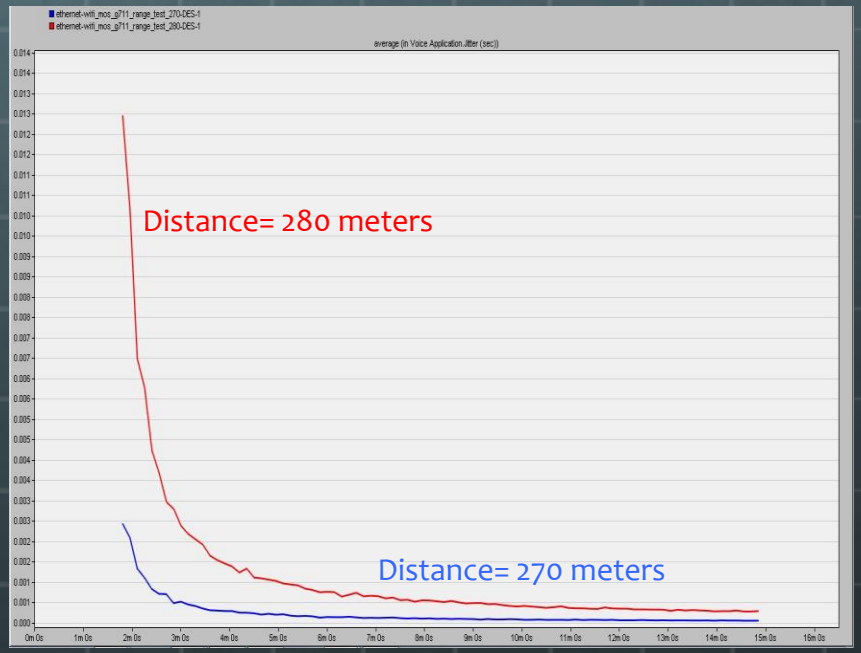




Jitter results for different distances

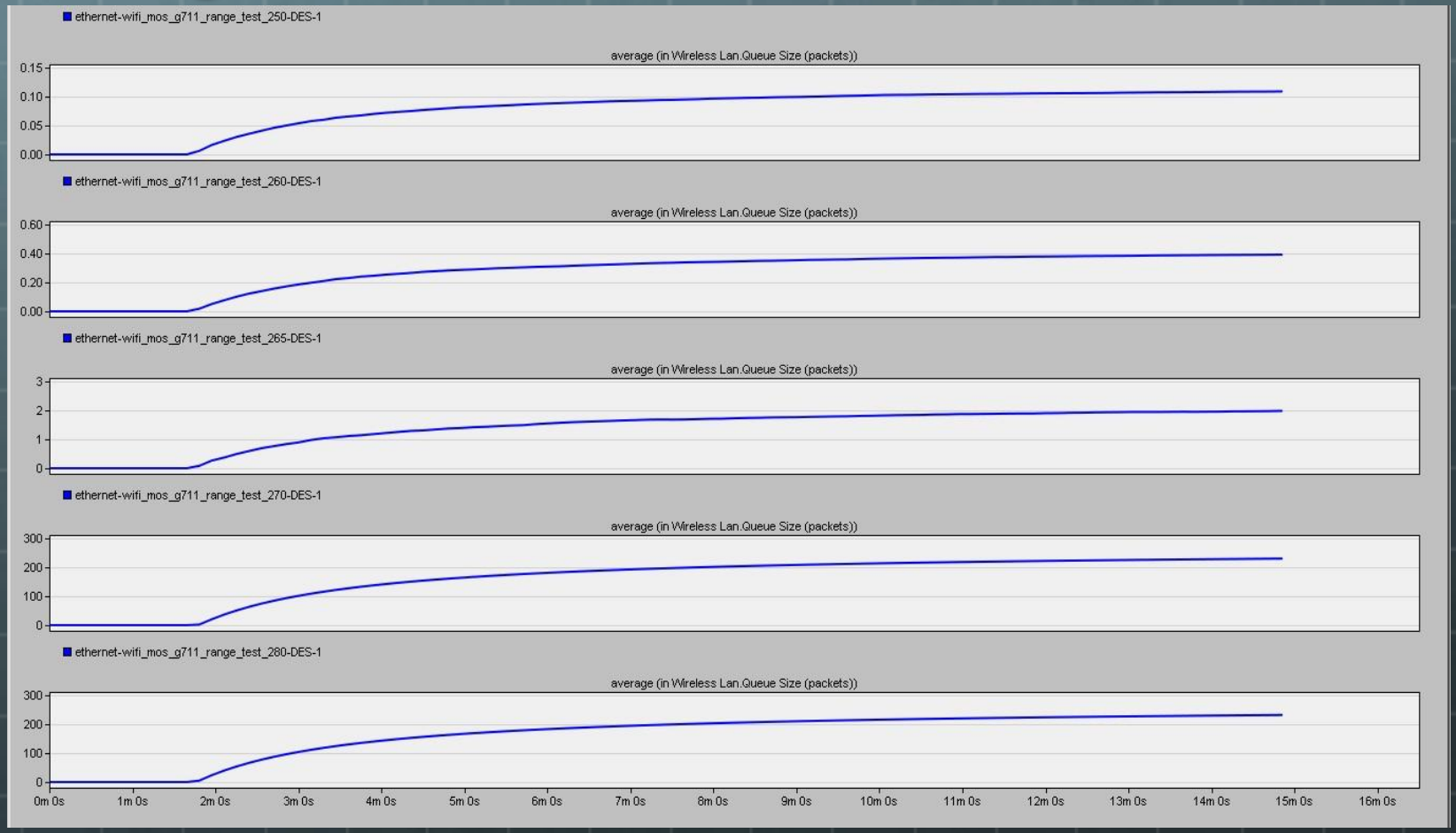
- Jitter is variance of times between packets arriving





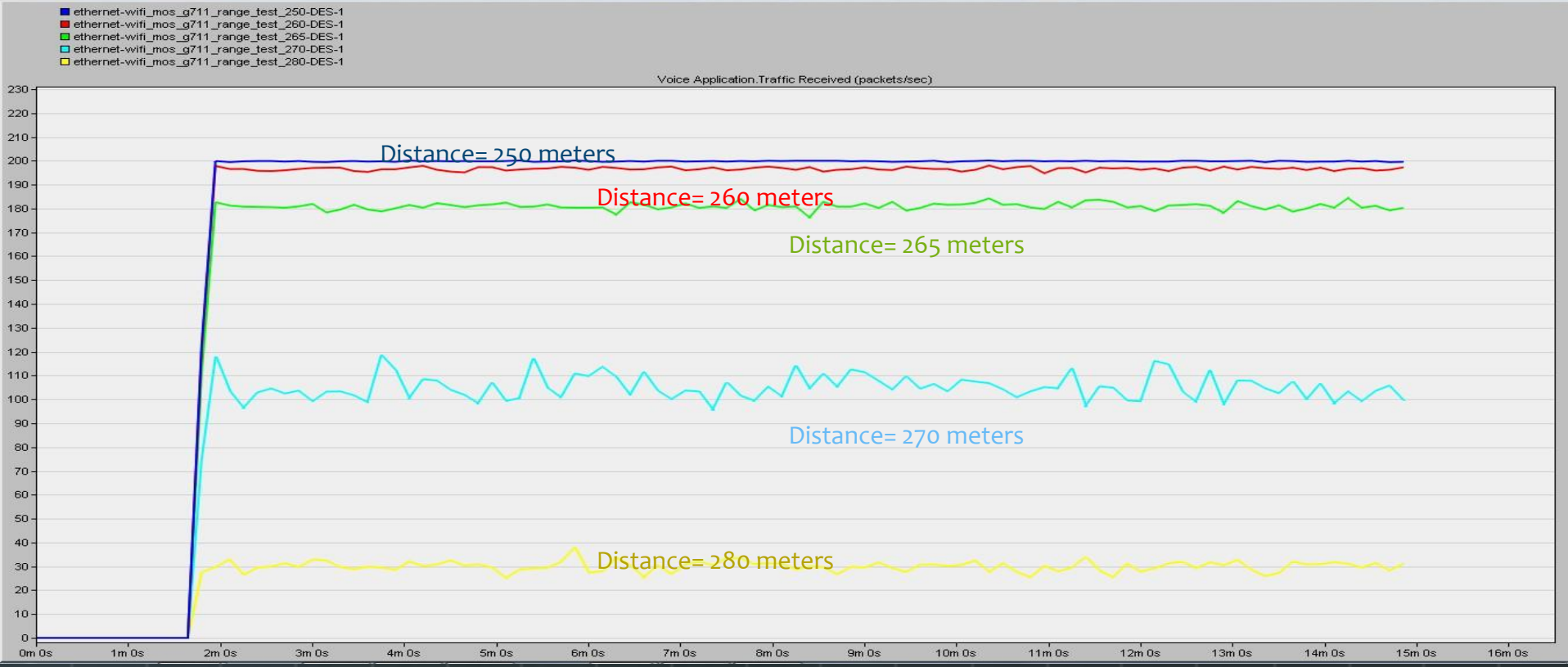
Jitter- Queue size relationship

- Jitter is directly related to how severe the traffic congestion which is determined by the queue size



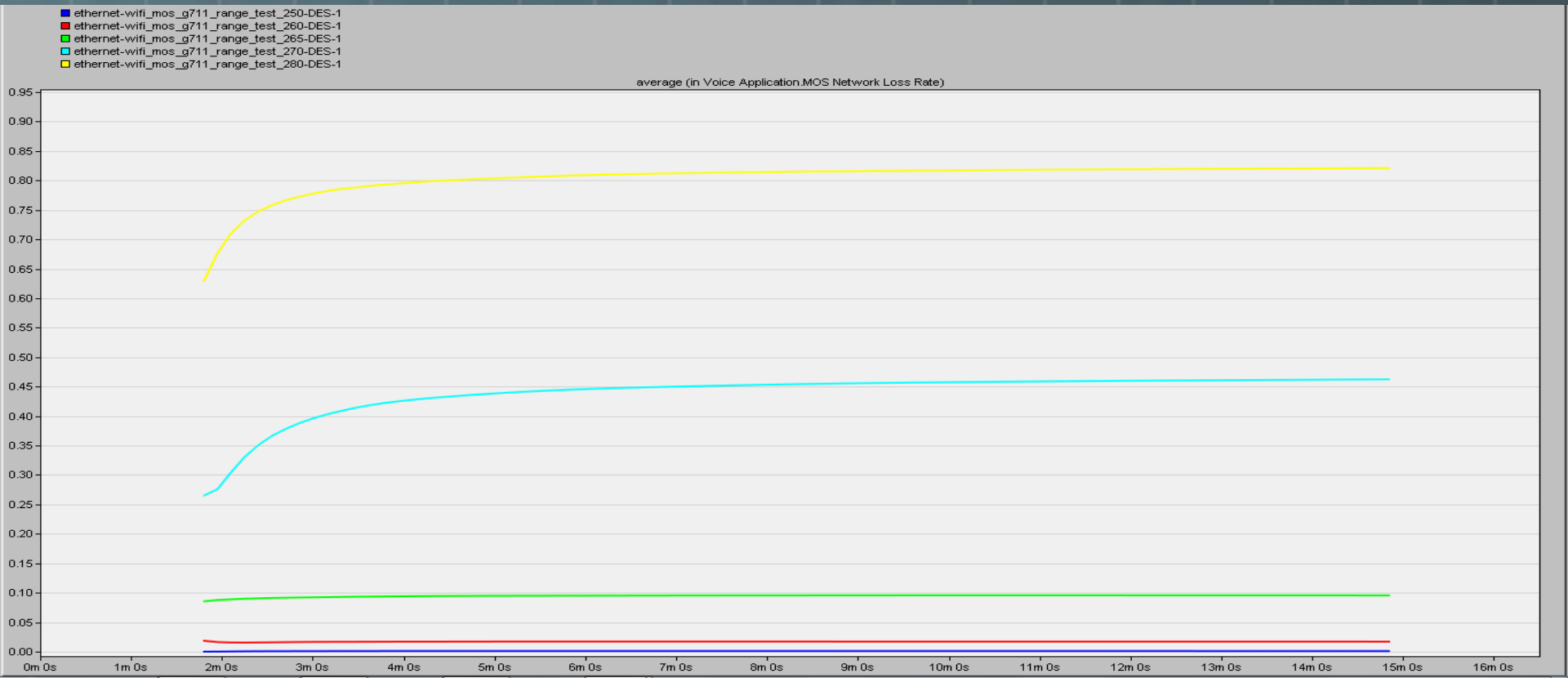
Voice Packet Loss results for different distances

- Traffic received is reduced as distance increases and more and more packets are dropped



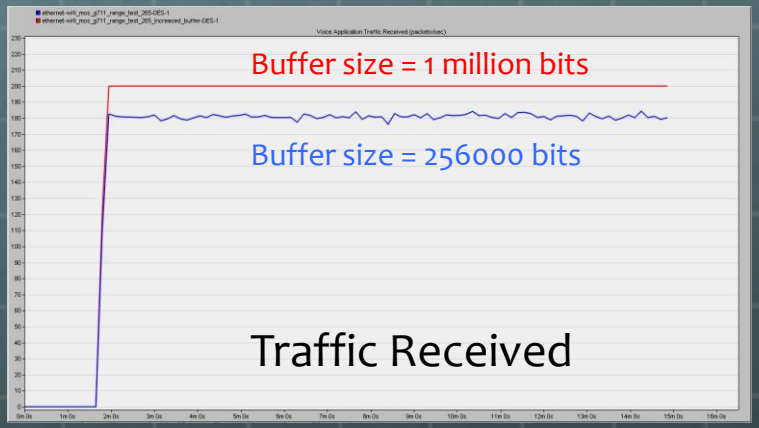
Voice Packet Loss results for different distances

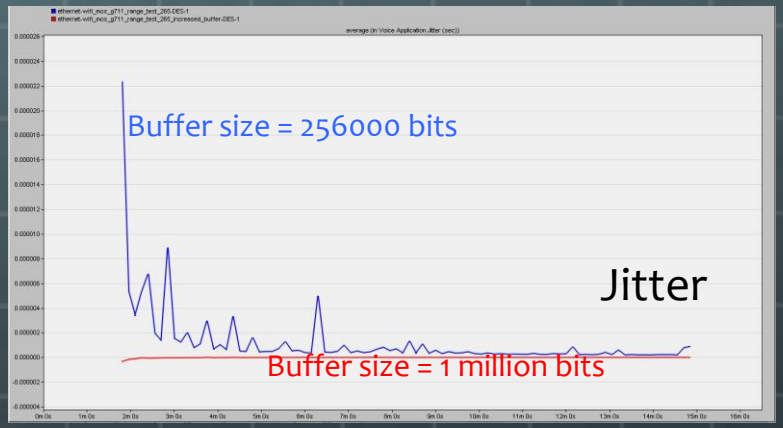
- Reason for Packet Loss? MOS Network Loss Rate
- MOS Network Loss Rate = ratio of packets lost due to network factors to the total number of packets

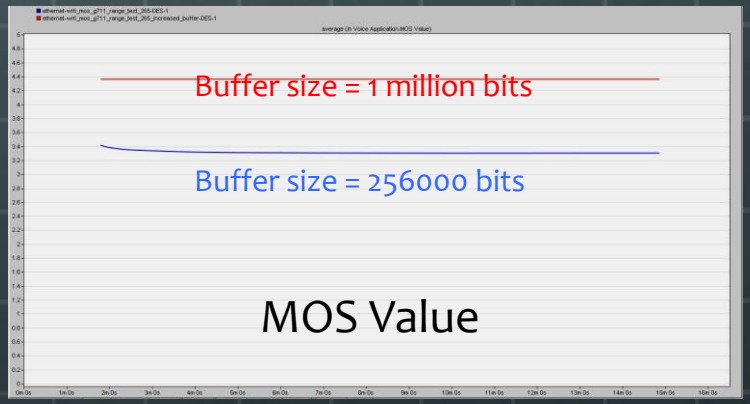


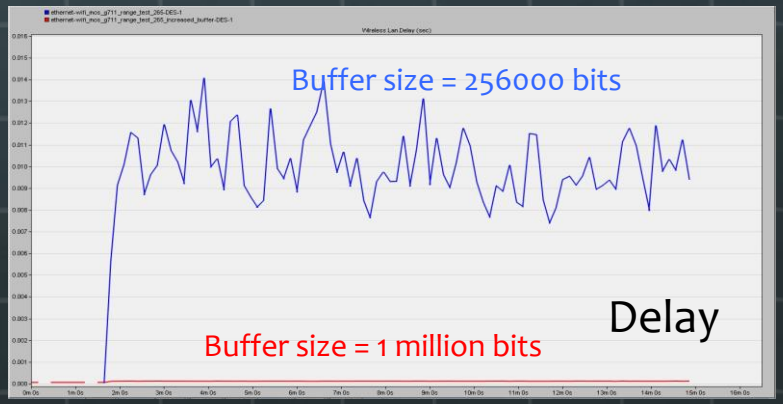
Packet loss due to buffer size

- As buffer size increases, lower packet loss and less congestion
- However too large of a buffer will introduce queuing delay



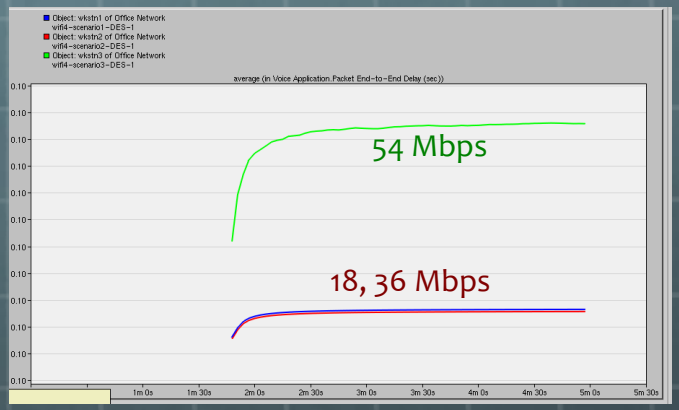


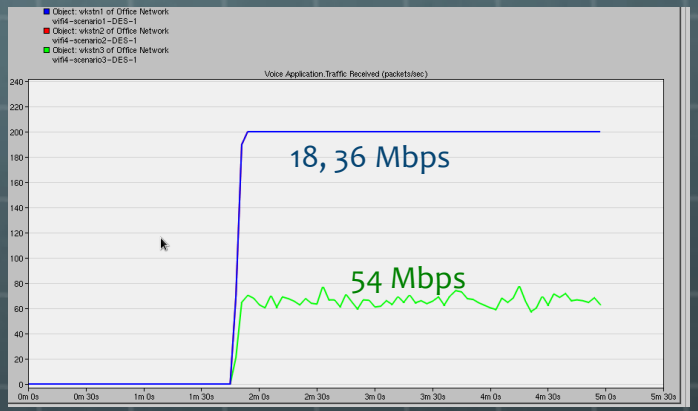


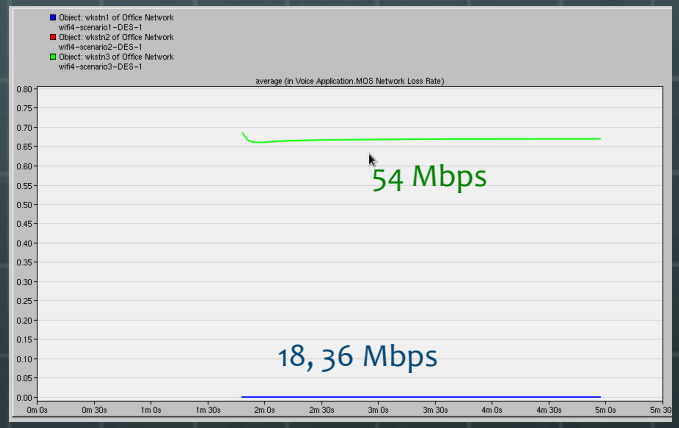


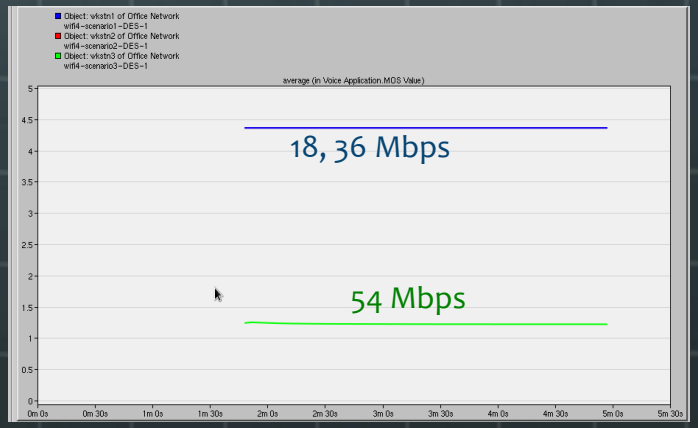
Packet loss due to Data Rate

- fixed distance 265 meters, user data rate = 24Mbps
- A high LAN router data rate will overrun the receiver buffer







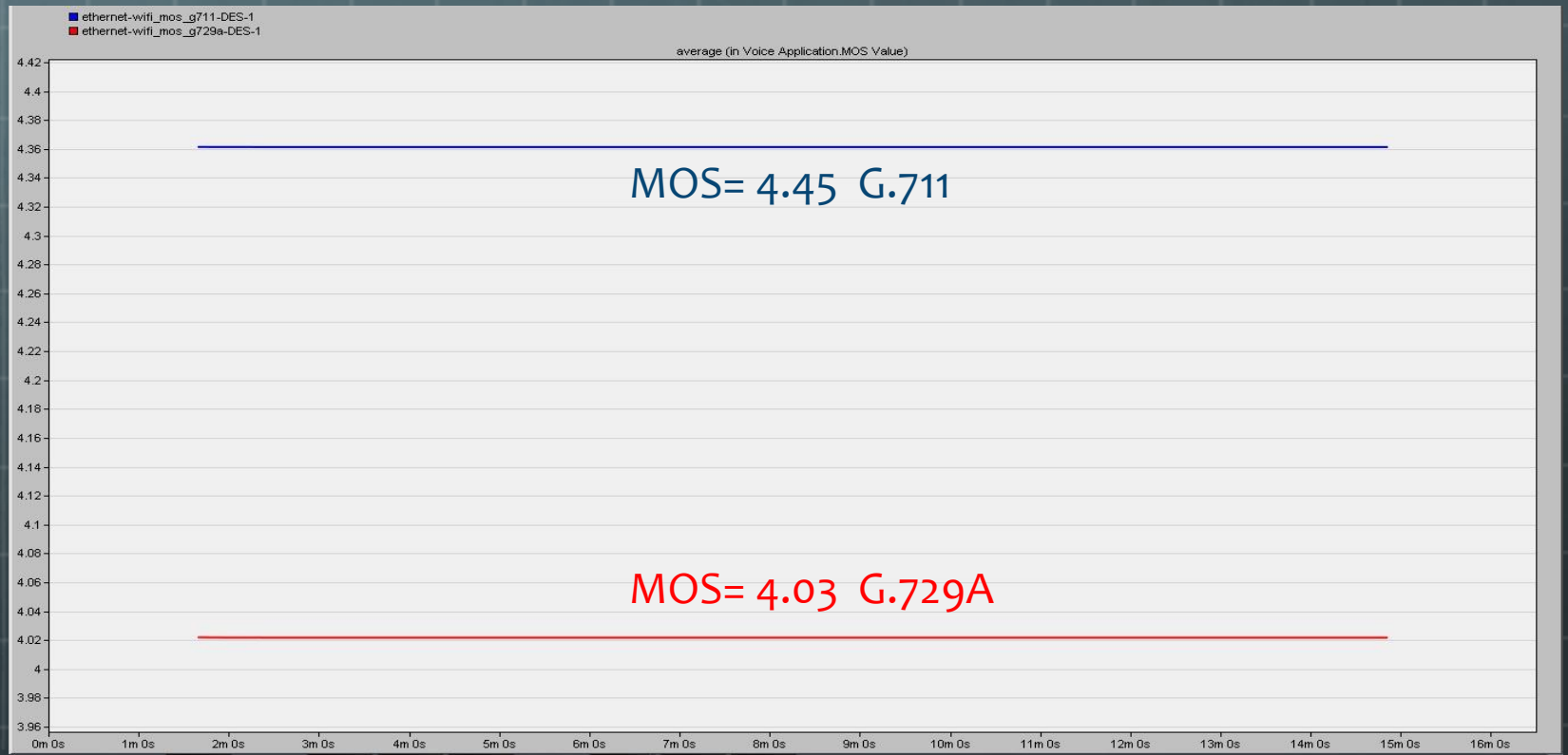


MOS values over different distances

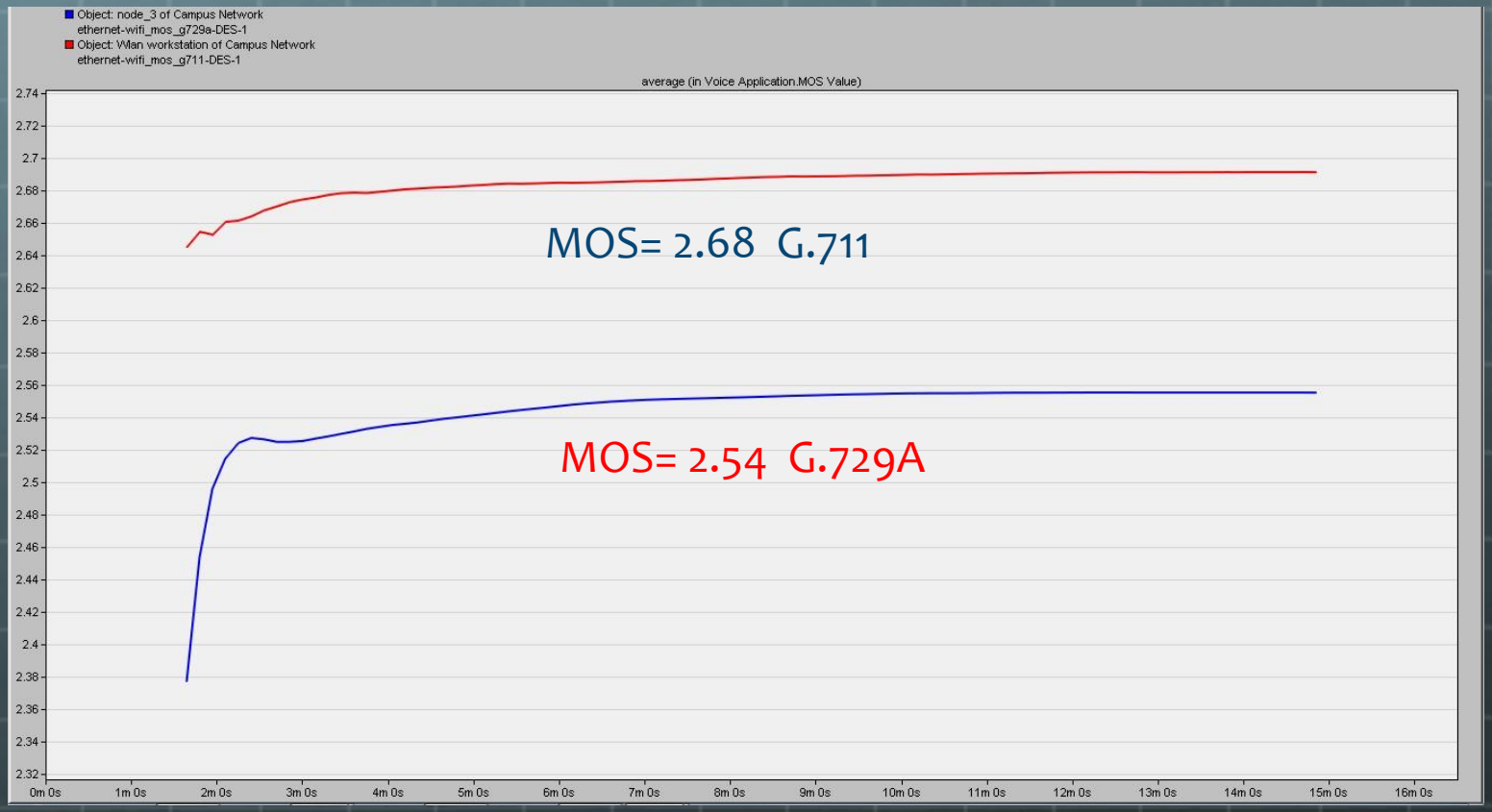
- A high MOS score requires low jitter, low delay, and minimal packet loss

WiFi MOS for G.711 and G.729A

- Fixed distance = 200 meters
- Our MOS Result is similar to PSQM testing result 4.03 for G.729A and 4.45 for G.711 under ideal condition



G.711 vs. G.729A



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Questions??