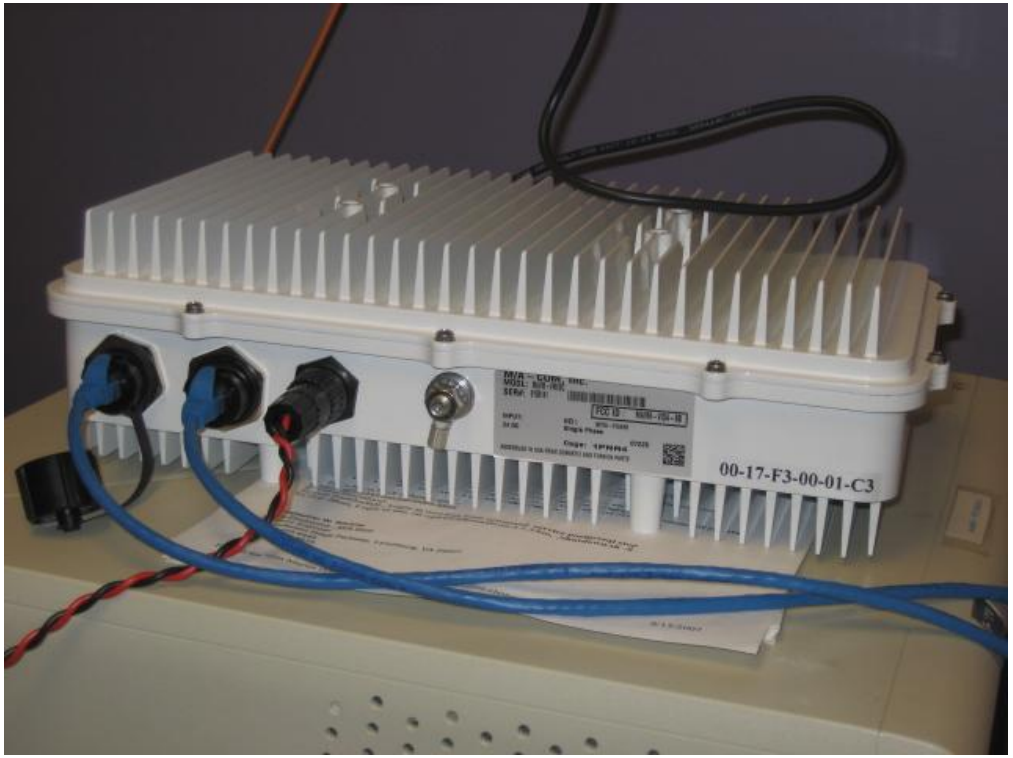
Clemson University WiMAX Activities Update for the AATG 9/7/2007

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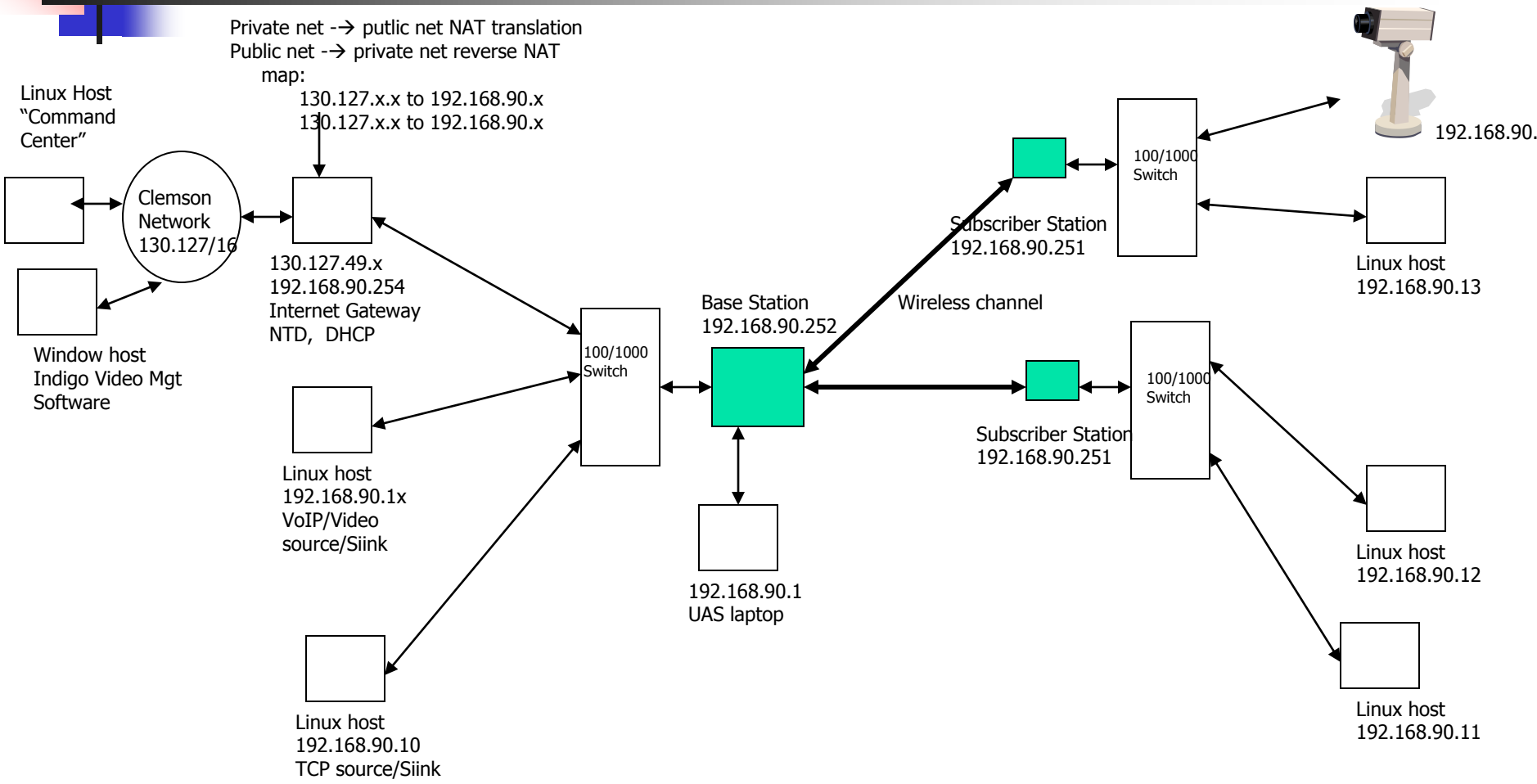
M/A-COM Equipment

- Airlink:
  - IEEE 802.16e function – although just supports Fixed/Nomadic clients
  - 5MHz channels at 4.9GHz
  - OFDM 256 FFT
  - 27dBm output power
  - TDD operation, 10ms frame time, variable US/DS split
  - Supported modulation methods: BPSK (1/2, 3/4), 16 QAM(1/2,3/4), 64QAM(1/2,3/4)
- Interfaces:
  - RJ-45 Ethernet
  - 24 V DC Power
  - 4.9 GHz RF and GPS Antenna
- Managed by M/A-COM UAS Admin software

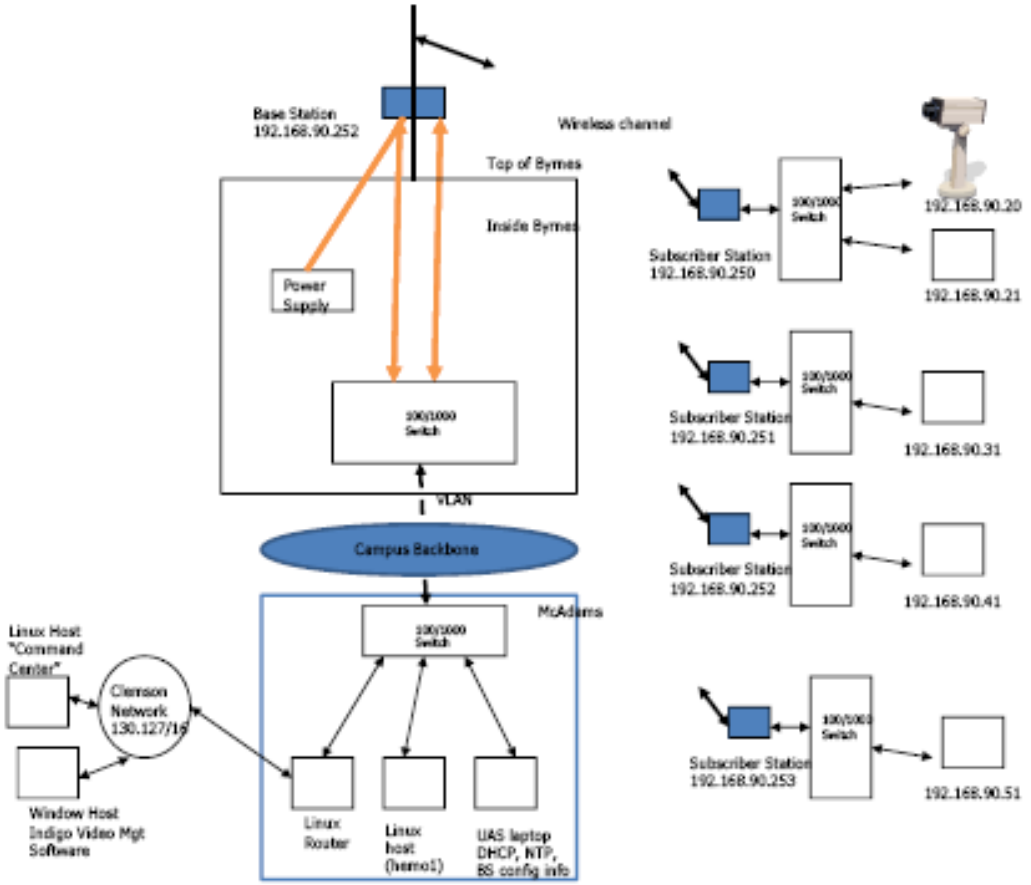
M/A-COM Base Station



Testbed: Lab Network



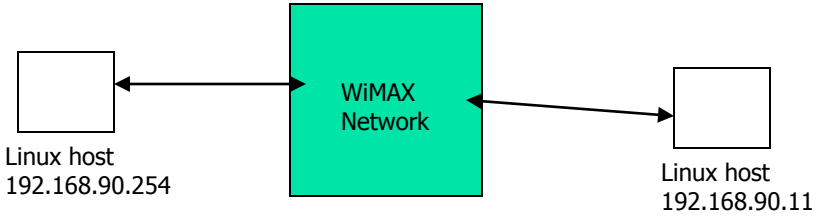
Campus Deployment



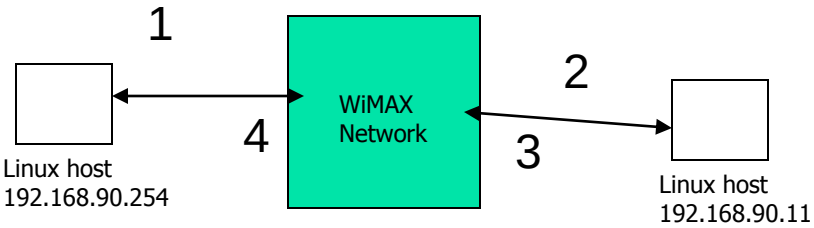


Validation Test 1

DS modulation	US modulation	US/DS throughput (single flow)	Rss at the SS
64QAM 2/3 (capacity: 15.36Mbps)	64QAM 2/3	UDP: US:4.8Mbps DS:4.8Mbps	
16QAM1/2 (capacity: 7.68Mbps	16QAM1/2		
64QAM2/3	16QAM1/2	TCP US: 2 Mbps DS: 4.3 Mbps	
64QAM3/4	16QAM1/2		
64QAM3/4	QPSK1/2		
64QAM3/4	BPSK1/2		

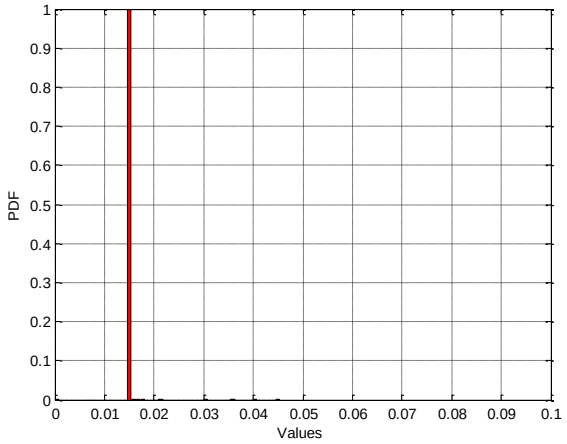


Validation Test 2

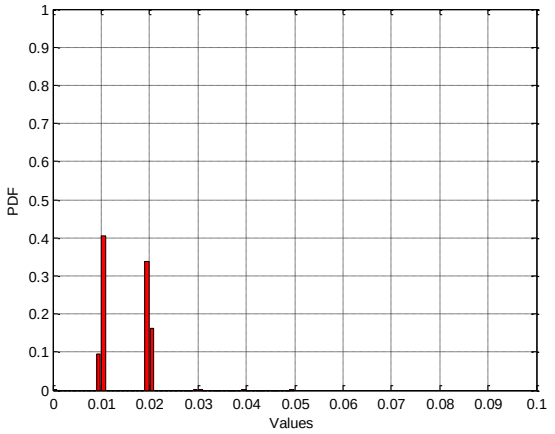


- 192.168.90.254 sends 210 bytes every 15 ms
- Obtain a trace
  - 1: packets sent by 254
  - 2:packets received by 11
  - 3:packets sent by 11
  - 4:packets received by 254
- Obtain the PDF of interpacket departure and arrival times
- Provides a visualization of the dynamics of WiMAX

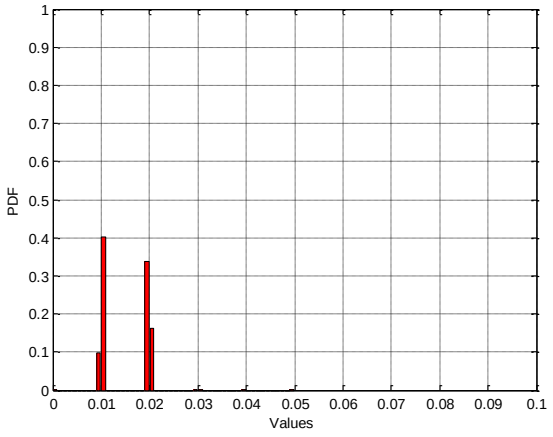
Validation test 2



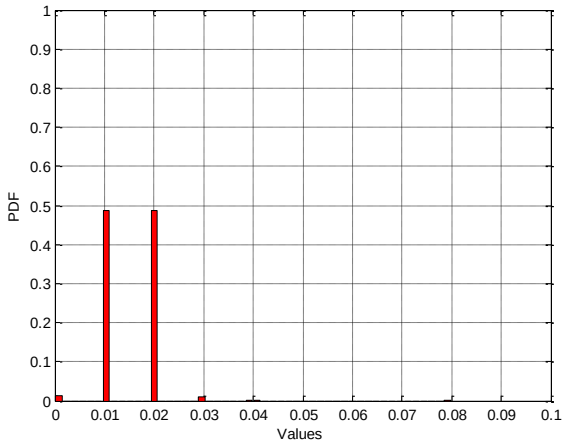
1. At 254 - sender



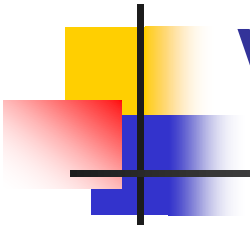
2. At 11 -receiving



3. At 11 – sending the echo



4. At 254 – receiving the echo



Validation

- Applications
  - TCP/UDP network performance test tools
  - VoIP using Asterisk
  - Video streaming
    - IndigoVision surveillance camera
      - Plan to order high end, rugged Pelco analog PTZ camera (SpectraIV) with IndigoVision 9000E Encoder (with analytics and video mgt software)
    - Camcorder
    - Web Cams