



Lab 6: halfMac with Autoresponder Control

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1 Introduction

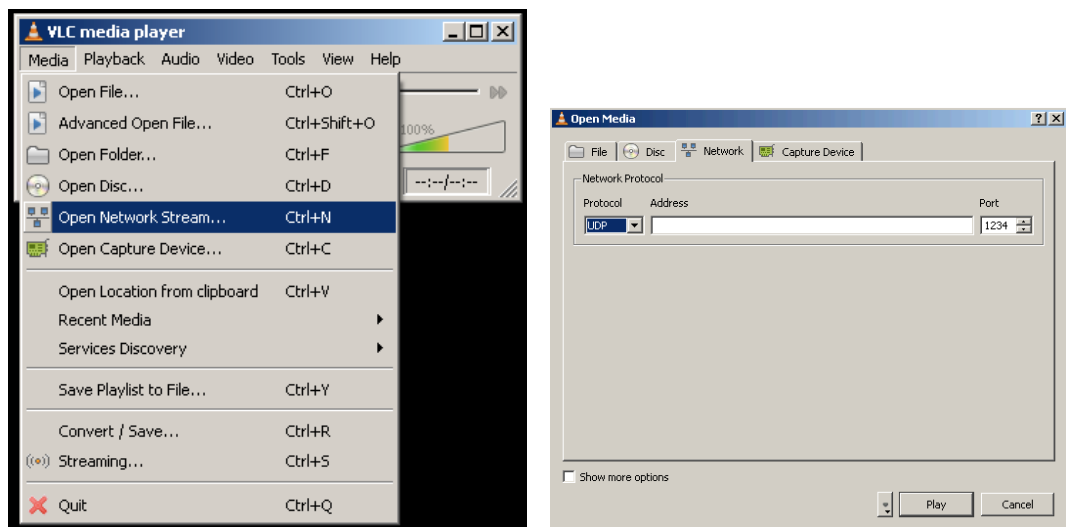
In this lab, we perform the same operations as the previous lab but make use of the autoresponder that is part of the WARPMAC framework. Detailed description of the autoresponder and its operation can be found at <http://warp.rice.edu/trac/wiki/OFDM/MIMO/Docs/AutoResponse>

Like before, make the necessary changes to the skeleton code that is provided.

2 Testing your MAC

2.1 Video Reception

Launch VLC Media Player, open the network stream as shown in Figure 1, select “UDP” and click “play.” Finally un-mute the computer.



(a) Open the network stream

(b) UDP on port 1234

Figure 1: VLC configuration

2.2 Oscilloscope Measurements

A key metric in MAC performance is the turn-around-time (TAT) in responding to the reception of a wireless packet with the transmission of another wireless packet. In this area (among others), WARP is uniquely capable since wireless processing is local to the board. Using an oscilloscope, trigger on the falling edge of the “RX” signal and observe the rising edge of the “TX.” This will allow you to measure the TAT between data reception and ACK transmission. Please notify a workshop instructor for assistance with the oscilloscopes. Measure the following:

1. TAT between fall of RX to rise of TX:
2. TX jitter relative to fall of Rx:

3 Lab 6+

For the final stage of the lab, we offer two open-ended extensions that do not have pseudocode in the original source file. There are many ways to realize these extensions in the design.

3.1 Extension 1:

Use WARP's serial port to change the delay before the ACK transmission and view the effect on the oscilloscope. To do this, you will need to call the `PHY_AUTORESPONSE_TXACTION_CONFIG` with a different delay value upon user interaction with the keyboard.

3.2 Extension 2:

Build out the other half of the MAC. Can you source video or audio to another group? A suggested design approach may be:

1. Implement a timeout scheme where, absent the reception of an ACK, you immediately re-transmit the packet
2. Instead of making these retransmissions be immediate, implement a binary exponential back-off mechanism.

By the end of these steps, you will have a full implementation of an ALOHA MAC.