IoT Security and Privacy

Assignment 4 – Raspberry Pi Connecting to Campus Wireless Networks

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Questions:

Please assemble the Raspberry Pi and do whatever that can be done can to connect raspberry pi to the *eduroam* or *UCF_WPA2* Wireless Networks. References [1][2][3][4] could help. Please also refer to the attached writing about pervious students connecting Pi to eduroam at another university.

Q1. Record the group members and equipment lent to the group at https://docs.google.com/spreadsheets/d/1vEO7b1TkHFoSCxoxAC2bE6RXZ3rB0s_vKujV4zDjtM8/edit?usp=sharing. (1 point)

Answer: Done it.

Q2. Include a picture of the assembled Raspberry Pi. (2 points)

Answer:

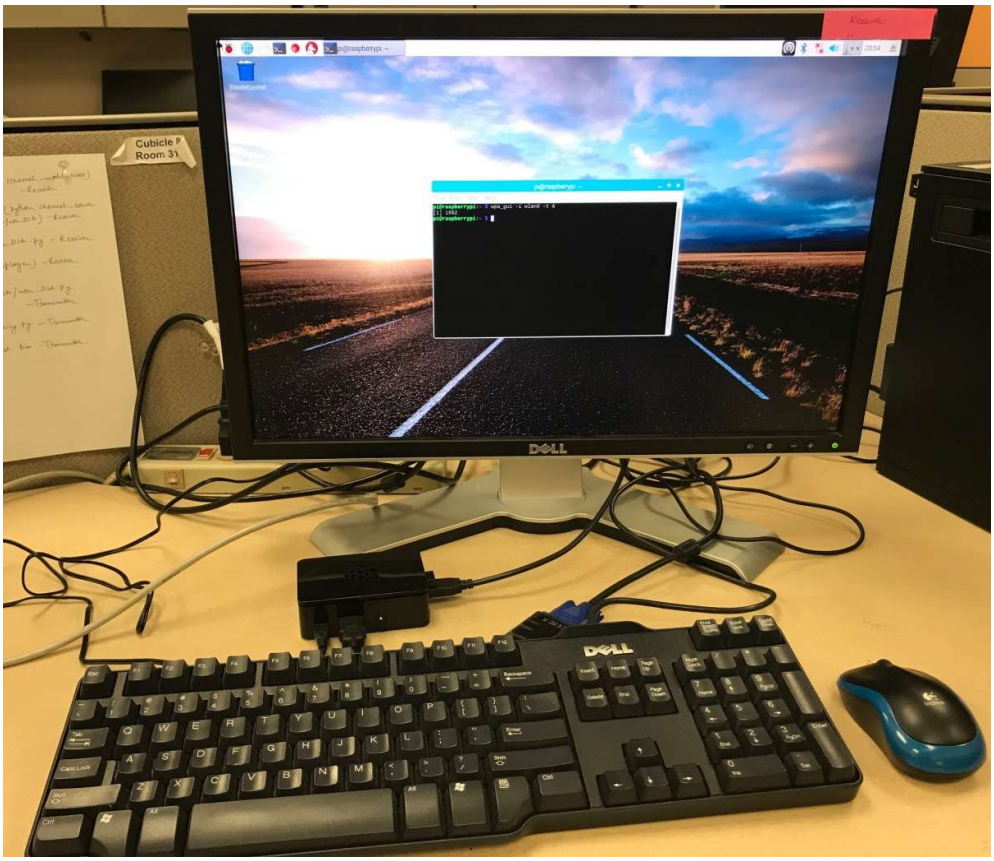

Figure 1: Assembled Raspberry Pi with Monitor, Keyboard, and Mouse

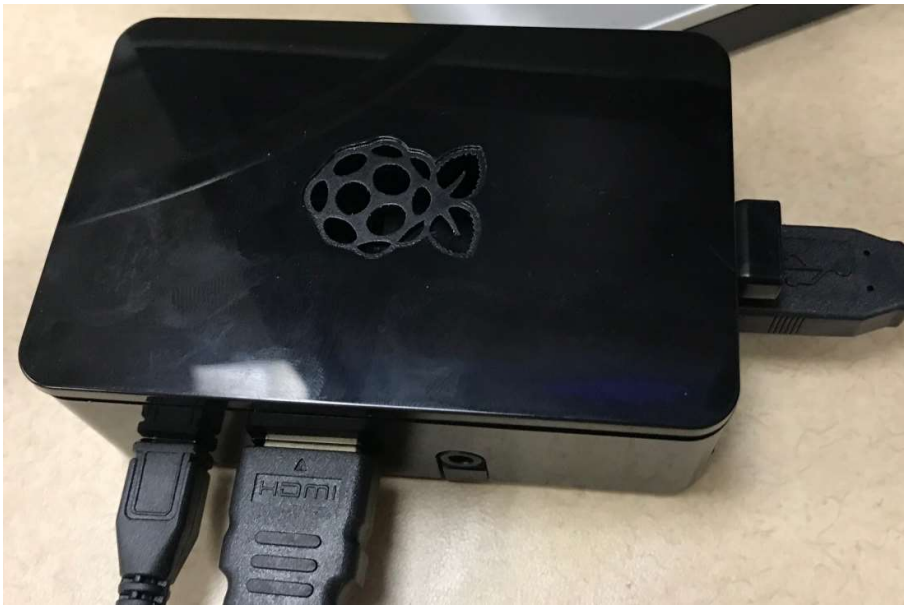

Figure 2: Assembled Raspberry Pi Only

Q3. If successful, document carefully the instructions of connecting raspberry pi to *eduroam*/*UCF_WPA2*. (7 points)

Answer: It is successful. We have gone through the documents and links from [1][2][3][4] and successfully set up our raspberry pi to UCF_WPA2 network.

Steps:

1. We downloaded the CA certificates (AddTrust External CA Root and InCommon Server CA Root) from UCF CST website, from manual configuration [5] webpage. We saved the second certificate by right clicking and clicking save link as option.
2. Next we imported the certificates in raspberry pi local directory by executing the following two commands from terminal:
    a. Moved certificate files to **/usr/local/share/ca-certificates/**
        i. Run **sudo mv /home/pi/Downloads/addtrustexternalcaroot.crt /usr/local/share/ca-certificates/** command in terminal.
        ii. Run **sudo mv /home/pi/Downloads/incommonca.cer /usr/local/share/ca-certificates/** command in terminal.
    b. Run **sudo update-ca-certificates** command in terminal.
3. After this, we did not get any GUI wifi tool enabled in our raspebrry pi. So we opted manual procedure, which worked for us. The procedure is described in details:
    a. We edited *"/etc/wpa_supplicant/wpa_supplicant.conf"* as follows:
        i. Typed **sudo nano/etc/wpa_supplicant/wpa_supplicant.conf** in terminal.
        ii. Changed absolute file path of addtrustexternalcaroot.crt (downloaded in /pi/home/Downloads) in *"wpa_supplicant.conf"* file.

iii. Replaced USERNAME and PASSWORD with valid NID information.

The screenshot (Figure 3) of *"wpa_supplicant.conf"* file is given bellow.

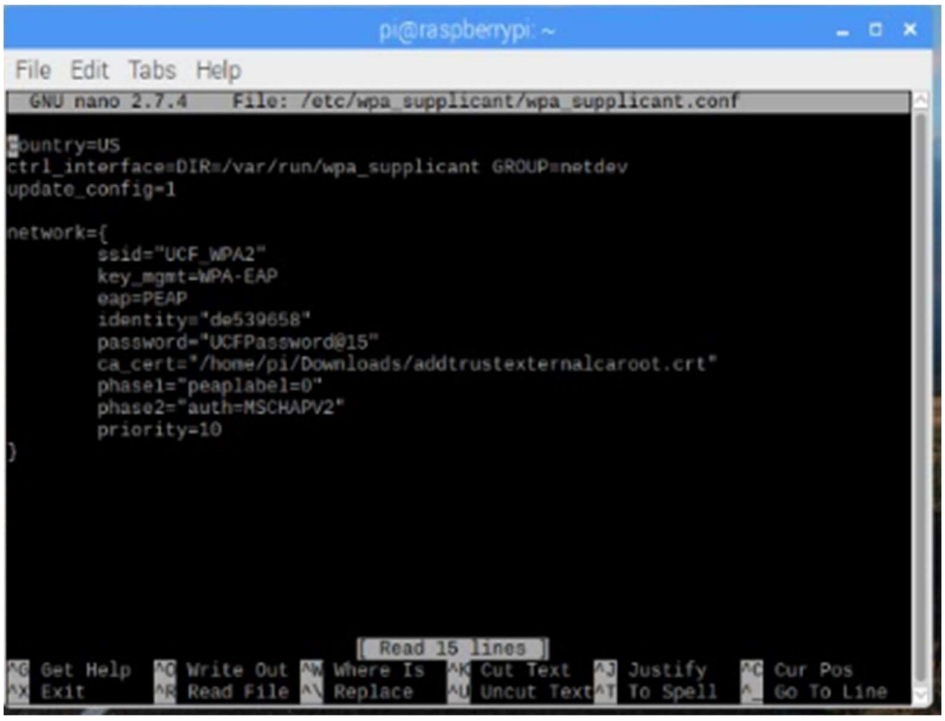

Figure 3: wpa_ supplicant.conf Configuration File Settings

b. Next we edited *"/etc/network/interfaces"* file in following steps:

i. i. Typed **sudo nano /etc/network/interfaces** on terminal

ii. ii. Added the following lined in interfaces file

auto wlan0
iface wlan0 inetdhcp
wpa-conf /etc/wpa_supplicant/wpa_supplicant.conf

c. The screenshot (Figure 4) of our *"/etc/network/interfaces"* file is given below.

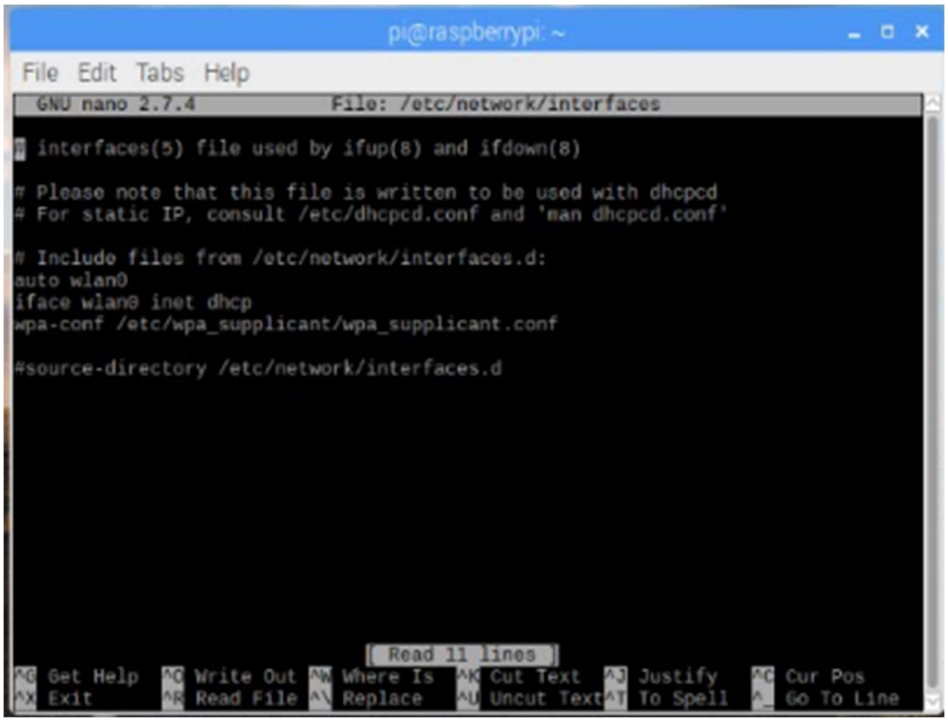

Figure 4: Network Interfaces File Settings

4. Next we tested configuration for proper authentication by running the following command in terminal:

sudo wpa_supplicant -i wlan0 -c /etc/wpa_supplicant/wpa_supplicant.conf

5. We rebooted the raspberry pi.

6. Ultimately, we manually installed WPA GUI running **sudo apt-get install wpagui** command in terminal. We enabled the gui by running **wpa_gui -i wlan0 -t &** in terminal. We were able to use internet with UCF_WPA2 Wi-Fi. We have given the screenshots (Figure 5, 6, and 7) of wpa_gui tool from our raspberry pi setup.

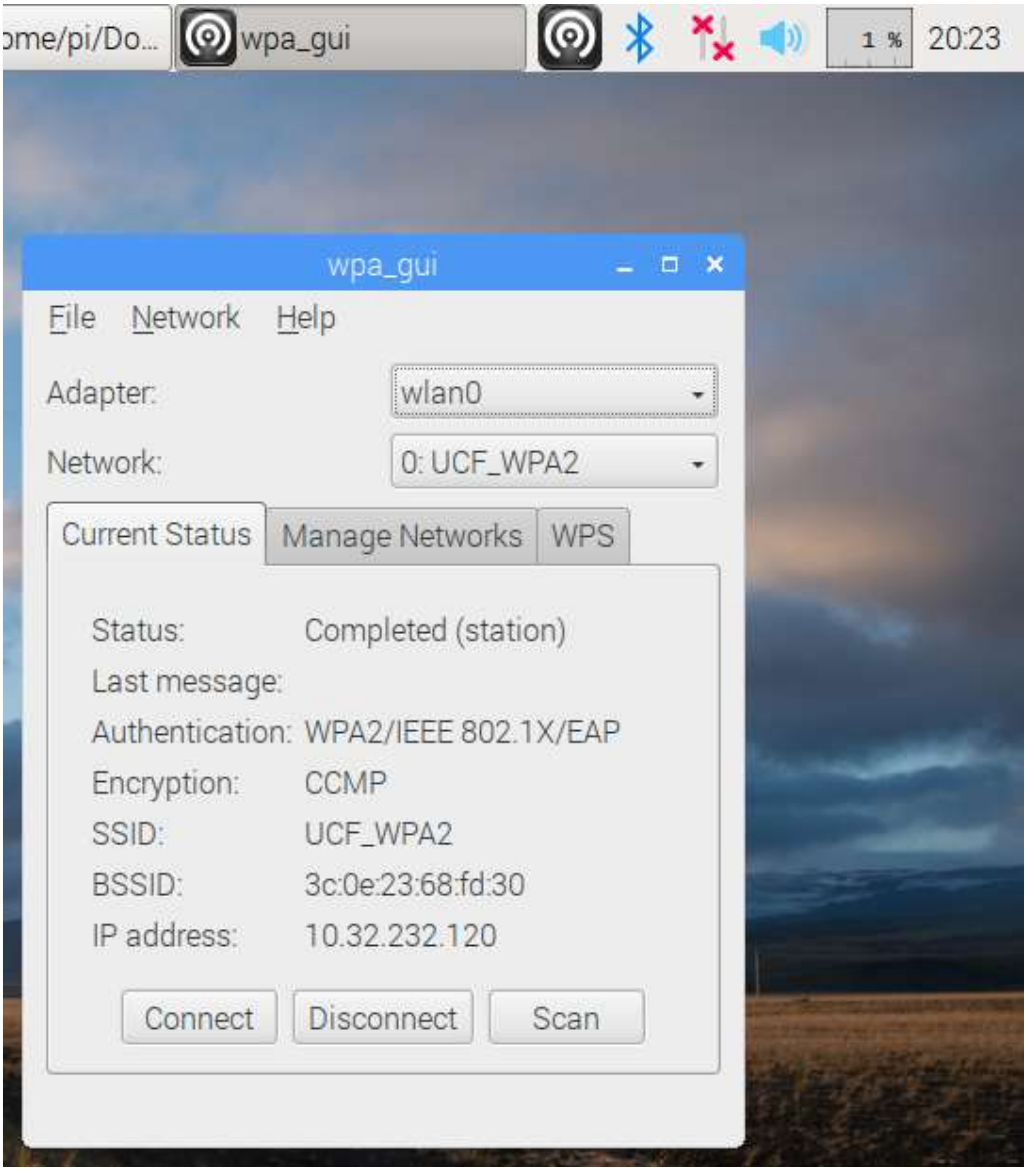

Figure 5: WPA GUI Settings: General Status

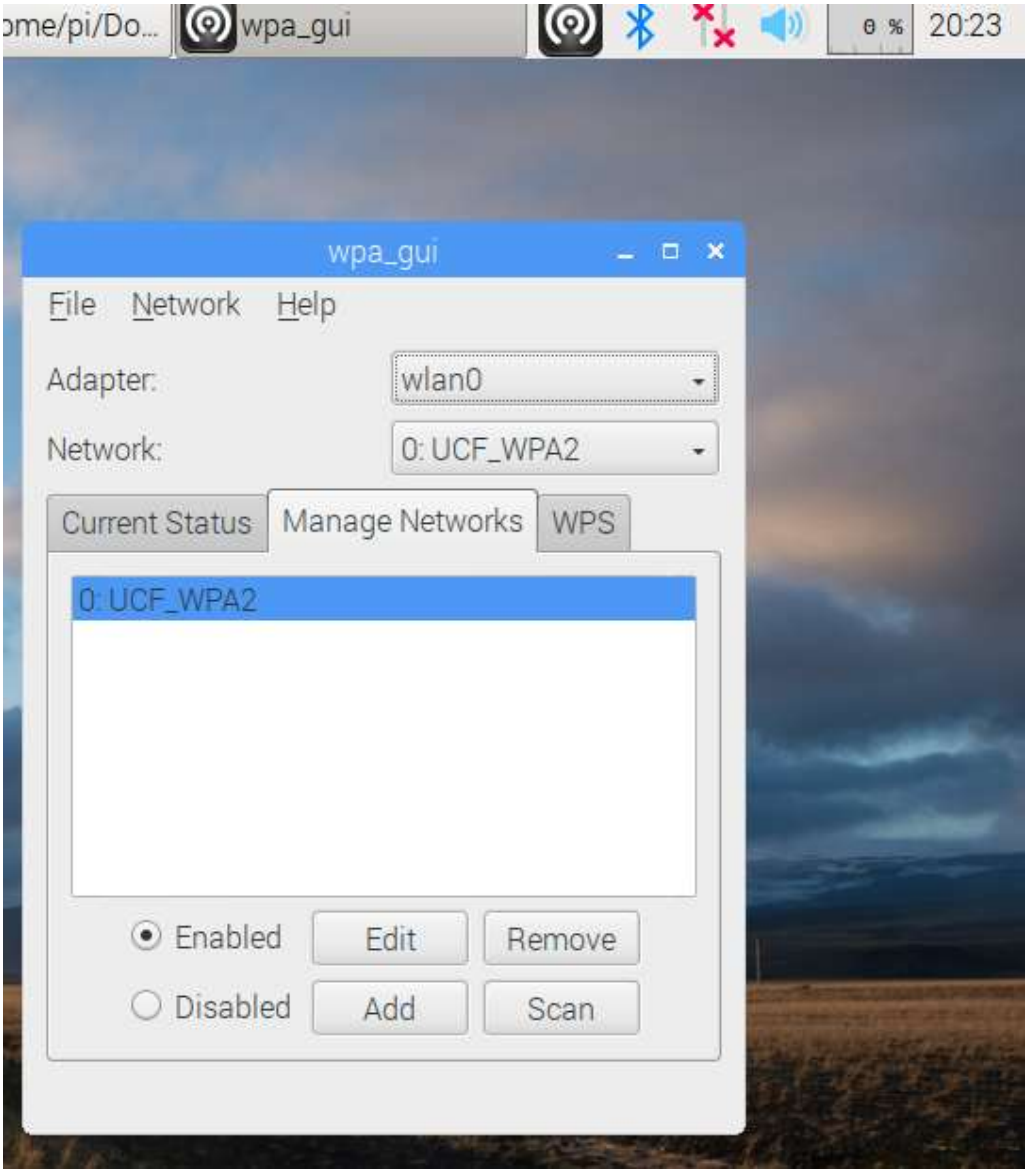

Figure 6: WPA GUI Settings: Manage Networks

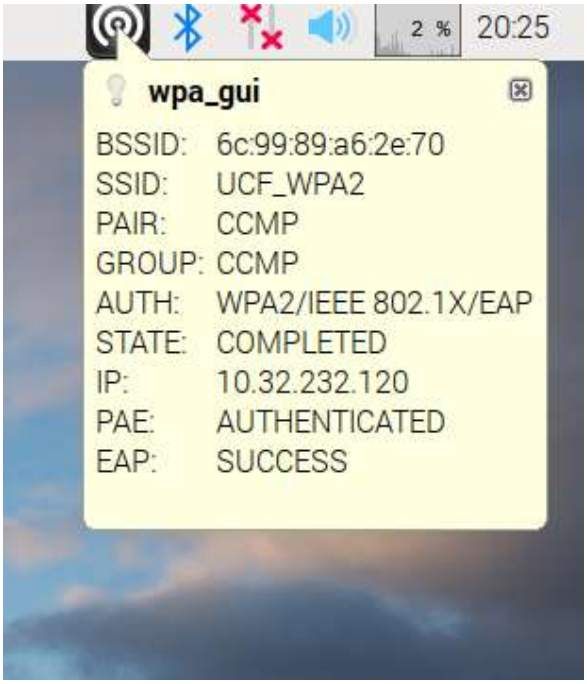

Figure 7: WPA GUI Settings: Overall

References:

1. Good detailed explanation of /etc/network/interfaces syntax?, 2015.
2. WPA_SUPPLICANT.CONF, 2010.
3. Anyone have a Raspberry Pi?, 2015.
4. Connecting Raspberry Pi to eduroam, 2015.
5. http://www.cst.ucf.edu/ucf-wpa2-settings-for-manual-configuration/, 2017.