SIUC Eduroam WiFi Configuration for Linux

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1 Background

SIUC's campus WiFi service is part of **Eduroam**. Eduroam is "world-wide roaming access service developed for the international research and education community. Eduroam allows students, researchers and staff from participating institutions to obtain Internet connectivity when visiting other participating institutions."

SIUC IT provides a tool, **Cloudpath**, that is supposed to automatically setup WiFi connections. See: `http://oit.siu.edu/wireless/`

There are two problems with this tool. First, it works only for *Ubuntu and Fedora* distributions. Second, it requires that you run code that you know nothing about on your computer, as *root* (a serious *security concern*).

Luckily, there is nothing special about Ubuntu or Fedora (beyond their particular tools), so it is possible to configure *any Linux distro* to be able to use the SIUC Eduroam WiFi. Still, it can be confusing to figure out which specific settings are required for successful connection, and how to achieve these settings with each distro's network configuration utilities.

This document describes how to *manually* set up the required configuration for the SIUC Eduroam WiFi system, and even how to manually initiate the WiFi connection.

Secure/encrypted WiFi in Linux relies on a tool known as **wpa_supplicant**, an implementation of the supplicant for the 802.11i WiFi security protocols (WPA, etc). This tool should have been installed by any reasonable Linux installer if a WiFi card was detected. Before proceeding, make certain the `wpa_supplicant` program/package is installed.

2 wpa_supplicant Configuration Settings

The configuration settings for secure access points are typically stored in the file `/etc/wpa_supplicant.conf`. Different settings can be stored for different access points in separate **network** entries. Access points are identified by their **SSIDs**.

A network entry configuration that works for SIUC Eduroam is as follows:

```
network={
    ssid="eduroam"
    proto=RSN
    key_mgmt=WPA-EAP
    eap=PEAP
    identity="siu123456789@siu.edu"   #Replace the digits with your ID!
    password="YOUR NETWORK PASSWORD"  #Replace with your SIUC PWD!
    phase2="auth=MSCHAPV2"
}
```

To prepare your Linux system to connect to SIUC's Eduroam WiFi, this `network` entry needs to be *appended* to `/etc/wpa_supplicant.conf`.

Note that `/etc/wpa_supplicant.conf` should be able to be read/modified only by *root!* Thus, you will have to `su` to root or use `sudo` to carry out the following actions.

First, make a *backup* of the original version of the file, for example:

```
cp /etc/wpa_suplicant.conf /etc/wpa_supplicant.conf.orig
```

Now, there are two ways to modify `wpa_supplicant.conf` as required:

1. Use a *text editor* (e.g., `vi`) to place the above configuration text at the end of the `wpa_supplicant.conf` file.
2. Have the configuration text in a file by itself, and run a shell command to append it to `wpa_supplicant.conf`.

Assuming you have the configuration text in a file, `eduroam.txt`, you can append it by doing the following in a shell window:

```
cat eduroam.txt >> /etc/wpa_supplicant.conf
```

Note that because your *network password* goes into this file unencrypted, it is critical that the file be *readable only by root* (which should be the default). Verify this by running "`ls -l wpa_supplicant.conf`" where you should see something like:

```
-rw------- 1 root ... wpa_supplicant.conf
```

3 Connection Options

Once you have a `wpa_supplicant.conf` file setup properly, you should be able to use your distro's standard network management tool(s) to connect to SIUC Eduroam, since the eduroam entry in `wpa_supplicant.conf` should be found and used. This will generally require that you *reboot* so that the modified `wpa_supplicant.conf` files gets reread and reassociation forced.

In the unlikely event that the distro's network tools fail to properly find the eduroam entry because it was setup manually, or find it but improperly modify it, you should be still able to manually connect SIUC Eduroam. (First make sure the `wpa_supplicant.conf` file has not had the eduroam entry deleted or modified.)

There are two commands you can use to manually initiate a WiFi connection:

- `wpa_cli`
- `wpa_supplicant`

3.1 Connecting with wpa_cli

`wpa_cli` is the intended tool to manually control `wpa_supplicant`:

```
wpa_cli [-i INTERFACE] [command...]
```

`INTERFACE` is the interface name, e.g., `wlp1s0`. You should not need to specify it if you have only a single WiFi network interface on your machine. The network interfaces on your machine can be listed by doing:

```
ip link
```

If you call `wpa_cli` without any `command` arguments, you get an *interactive environment* in which you can type `wpa_cli` commands (use `help` to see a list of commands).

If you call it with one or more `command` arguments, those commands get run and `wpa_cli` then terminates, e.g.:

```
wpa_cli reassociate
```

Some key `wpa_cli` commands are:

- `reassociate` – force AP reassociation
- `list_networks` – list defined networks and their indices
- `select_network` – select network by index
- `reconfigure` – force `wpa_supplicant` to reread config file

Thus, once eduroam is defined in `wpa_supplicant`, you should be able to load the new configuration file by doing:

```
wpa_cli reconfigure
```

You should then be able to connect to SIUC Eduroam by doing:

```
wpa_cli reassociate
```

Once you associate with a network using `wpa_cli`, your machine should automatically receive an IP address (assuming DHCP is being used). If you do not get an IP address, you may have to call `dhclient` (see below).

Note that `wpa_cli` requires that the `wpa_supplicant` daemon already be running. If it is not, the `wpa_cli` command will fail.

3.2 Connecting with wpa_supplicant

It is possible to use the `wpa_supplicant` *command* to start the `wpa_supplicant` *daemon*, which should cause your machine to automatically attempt to connect to a defined network.

To start `wpa_supplicant` manually and initiate a connection use:

```
wpa_supplicant -B -c/etc/wpa_supplicant.conf -iINTERFACE
```

(`INTERFACE` is the interface name, e.g., `wlp1s0`.)

Note that if you call this command when `wpa_supplicant` is already running (e.g., due to your window manager's networking component) then the above command will fail. In that case, first kill the existing process with:

```
killall wpa_supplicant
```

3.3 DHCP Client

The DHCP client will generally not need to be run explicitly after associating to a network, as it should happen automatically. However, if your network tool and/or commands like `ifconfig` show that an IP address is not being obtained, the DHCP client can be run manually using this command:

```
dhclient
```