Setting up a RADIUS Server

Goal: To set up a LANforge wireless access point with a local RADIUS server.

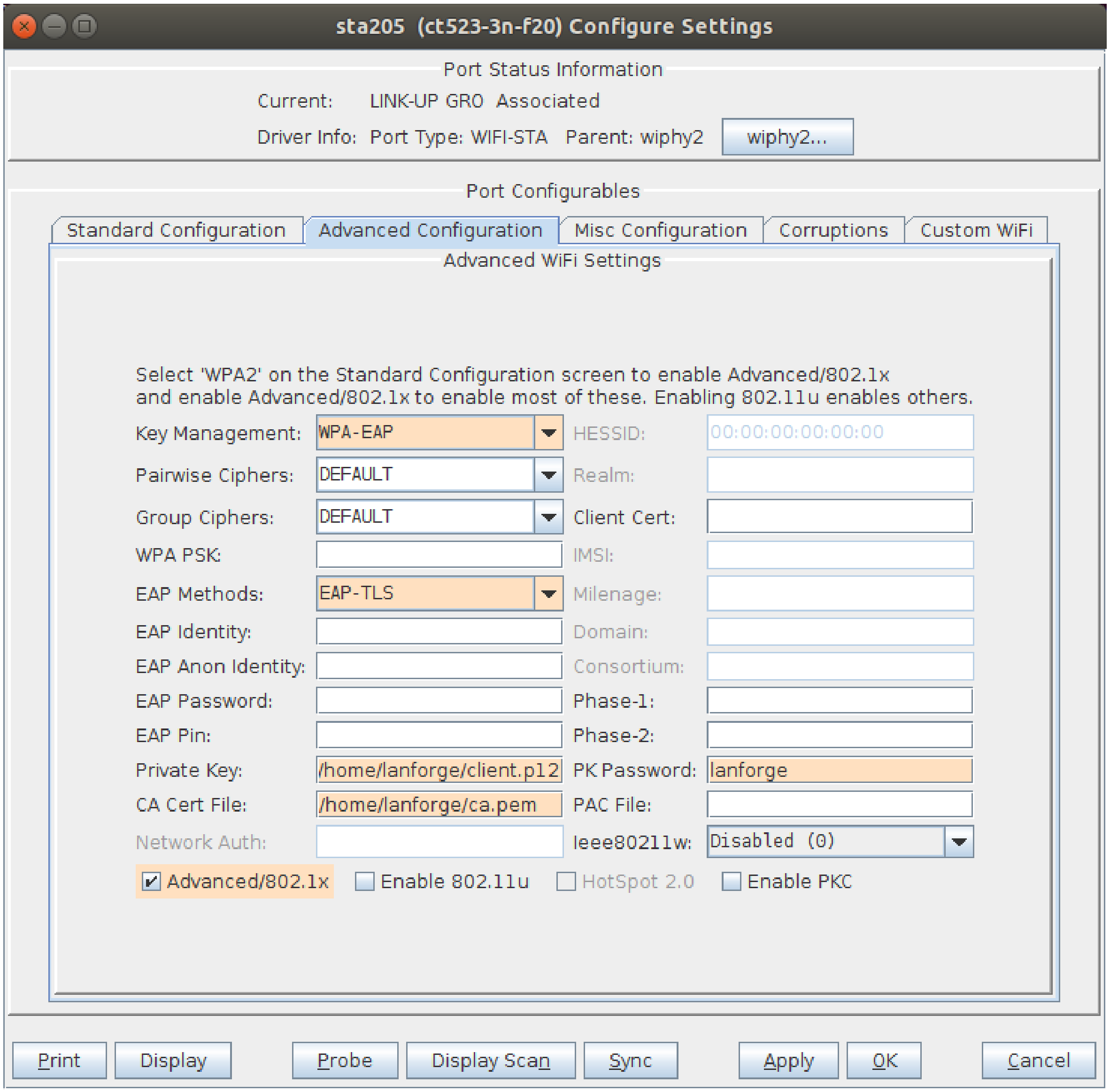
1. **The LANforge auto-install --do_radius option will setup FreeRADIUS on the LANforge system with two example EAP methods, EAP-TLS and EAP-TTLS**

2. **The config files for FreeRADIUS are located in /etc/raddb**

   A. /etc/raddb/certs contains the files necessary for **EAP-TLS**

   B. The LANforge auto-install copies the necessary files into /home/lanforge for use by LANforge wireless clients.

   C. For **EAP-TLS**, use client.p12 as the client's Private Key and ca.pem as the client's CA Cert File. The Private Key password is *lanforge*



sta205 (ct523-3n-f20) Configure Settings

Port Status Information

Current: LINK-UP GRO Associated

Driver Info: Port Type: WIFI-STA Parent: wiphy2

Port Configurables

Advanced WiFi Settings

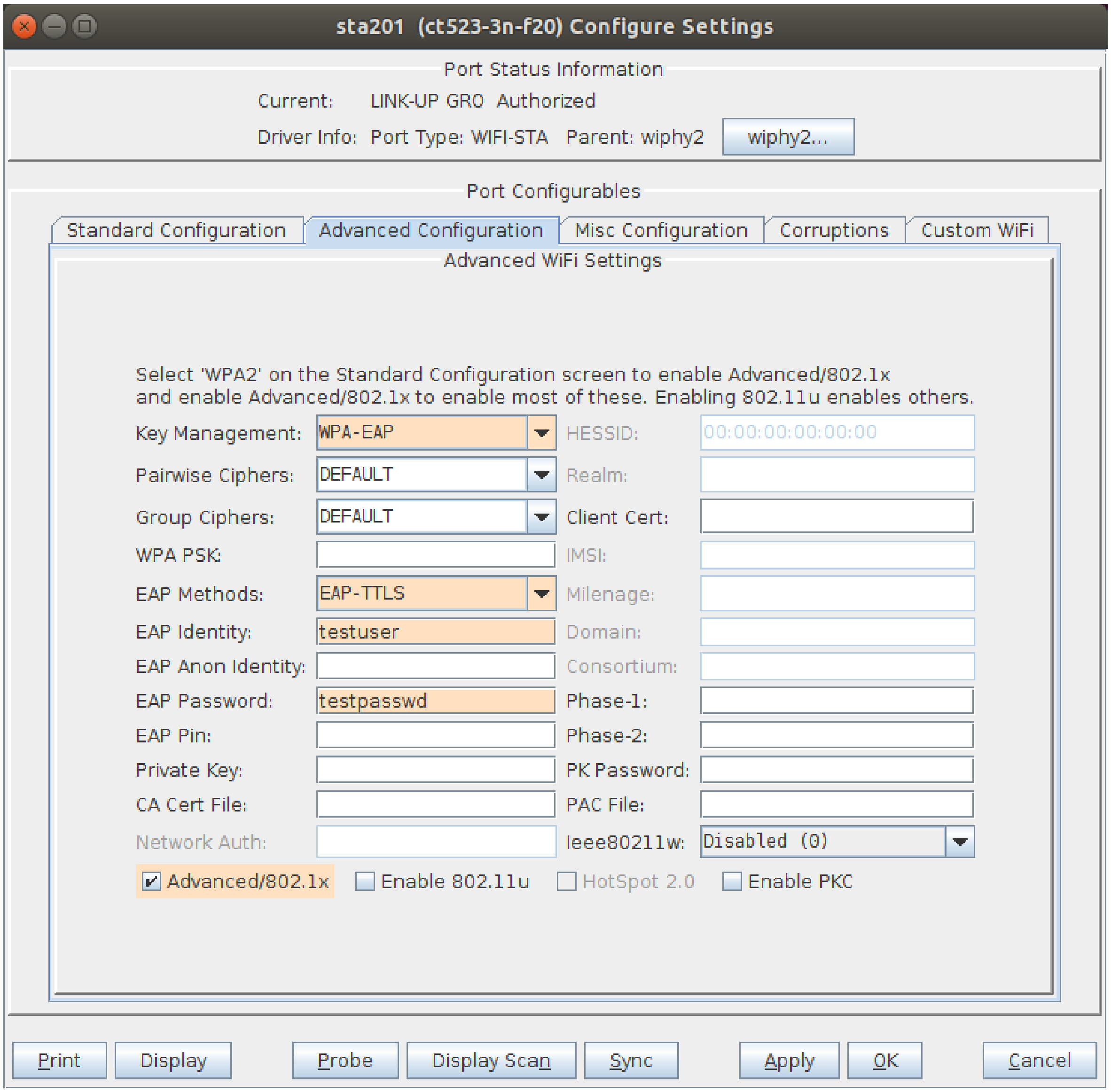
Select 'WPA2' on the Standard Configuration screen to enable Advanced/802.1x
and enable Advanced/802.1x to enable most of these. Enabling 802.11u enables others.

Key Management:	WPA-EAP	HESSID:	00:00:00:00:00:00
Pairwise Ciphers:	DEFAULT	Realm:	
Group Ciphers:	DEFAULT	Client Cert:	
WPA PSK:		IMSI:	
EAP Methods:	EAP-TLS	Milenage:	
EAP Identity:		Domain:	
EAP Anon Identity:		Consortium:	
EAP Password:		Phase-1:	
EAP Pin:		Phase-2:	
Private Key:	/home/lanforge/client.p12	PK Password:	lanforge
CA Cert File:	/home/lanforge/ca.pem	PAC File:	
Network Auth:		Ieee80211w:	Disabled (0)

☑ Advanced/802.1x ☐ Enable 802.11u ☐ HotSpot 2.0 ☐ Enable PKC

   D. /etc/raddb/users contains the user and password for **EAP-TTLS**

E. The example **EAP-TTLS** user is testuser with password testpasswd. Additional entries can be added to the users file, then restart FreeRADIUS with *systemctl restart radiusd.service*



sta201 (ct523-3n-f20) Configure Settings

Port Status Information

Current: LINK-UP GRO Authorized

Driver Info: Port Type: WIFI-STA Parent: wiphy2

Port Configurables

Advanced WiFi Settings

Select 'WPA2' on the Standard Configuration screen to enable Advanced/802.1x and enable Advanced/802.1x to enable most of these. Enabling 802.11u enables others.

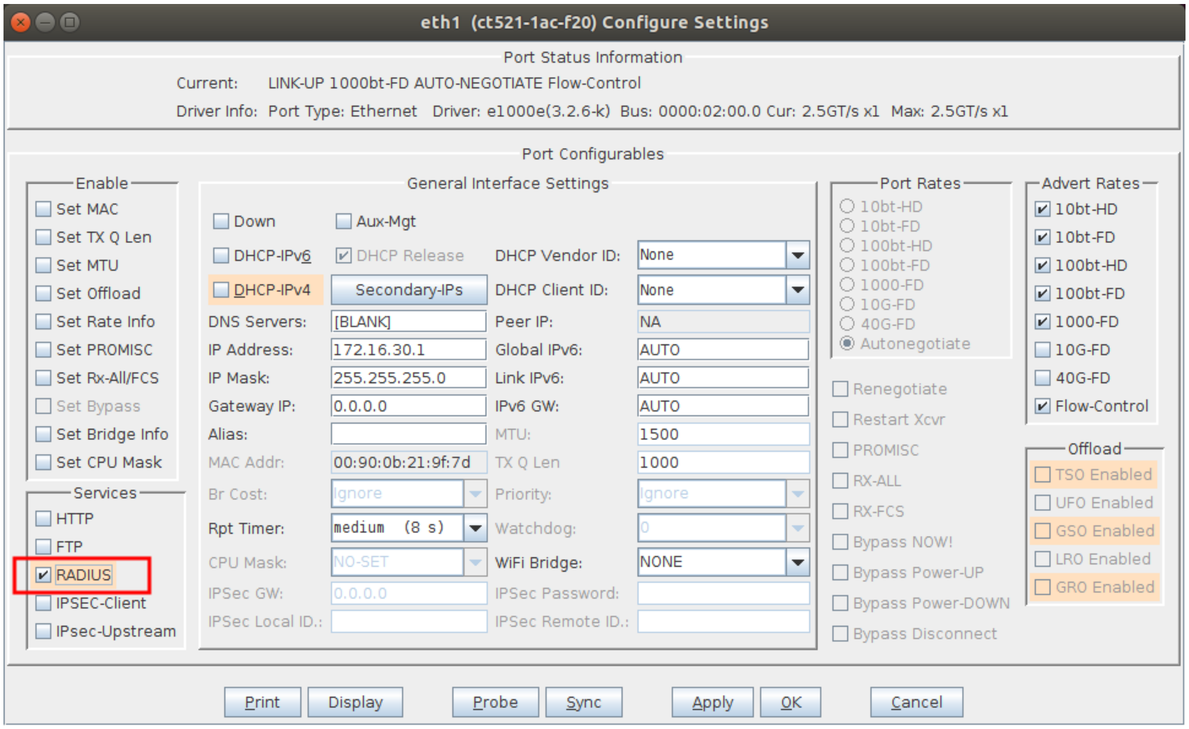
Key Management:	WPA-EAP	HESSID:	00:00:00:00:00:00
Pairwise Ciphers:	DEFAULT	Realm:	
Group Ciphers:	DEFAULT	Client Cert:	
WPA PSK:		IMSI:	
EAP Methods:	EAP-TTLS	Milenage:	
EAP Identity:	testuser	Domain:	
EAP Anon Identity:		Consortium:	
EAP Password:	testpasswd	Phase-1:	
EAP Pin:		Phase-2:	
Private Key:		PK Password:	
CA Cert File:		PAC File:	
Network Auth:		Ieee80211w:	Disabled (0)

☑ Advanced/802.1x ☐ Enable 802.11u ☐ HotSpot 2.0 ☐ Enable PKC

3. **An alternative to FreeRADIUS is to use the hostapd RADIUS server.**

A. Stop the FreeRADIUS service with *systemctl stop radiusd.service*

B. Modify the interface to use for the hostapd process and select the RADIUS checkbox.



eth1 (ct521-1ac-f20) Configure Settings

Port Status Information

Current: LINK-UP 1000bt-FD AUTO-NEGOTIATE Flow-Control

Driver Info: Port Type: Ethernet Driver: e1000e(3.2.6-k) Bus: 0000:02:00.0 Cur: 2.5GT/s x1 Max: 2.5GT/s x1

Port Configurables

Enable
□ Set MAC
□ Set TX Q Len
□ Set MTU
□ Set Offload
□ Set Rate Info
□ Set PROMISC
□ Set Rx-All/FCS
□ Set Bypass
□ Set Bridge Info
□ Set CPU Mask

Services
□ HTTP
□ FTP
☑ RADIUS
□ IPSEC-Client
□ IPsec-Upstream

General Interface Settings
□ Down □ Aux-Mgt
□ DHCP-IPv6 ☑ DHCP Release DHCP Vendor ID: None
□ DHCP-IPv4 Secondary-IPs DHCP Client ID: None
DNS Servers: [BLANK] Peer IP: NA
IP Address: 172.16.30.1 Global IPv6: AUTO
IP Mask: 255.255.255.0 Link IPv6: AUTO
Gateway IP: 0.0.0.0 IPv6 GW: AUTO
Alias: MTU: 1500
MAC Addr: 00:90:0b:21:9f:7d TX Q Len 1000
Br Cost: Ignore Priority: Ignore
Rpt Timer: medium (8 s) Watchdog: 0
CPU Mask: NO-SET WiFi Bridge: NONE
IPSec GW: 0.0.0.0 IPSec Password:
IPSec Local ID.: IPSec Remote ID.:

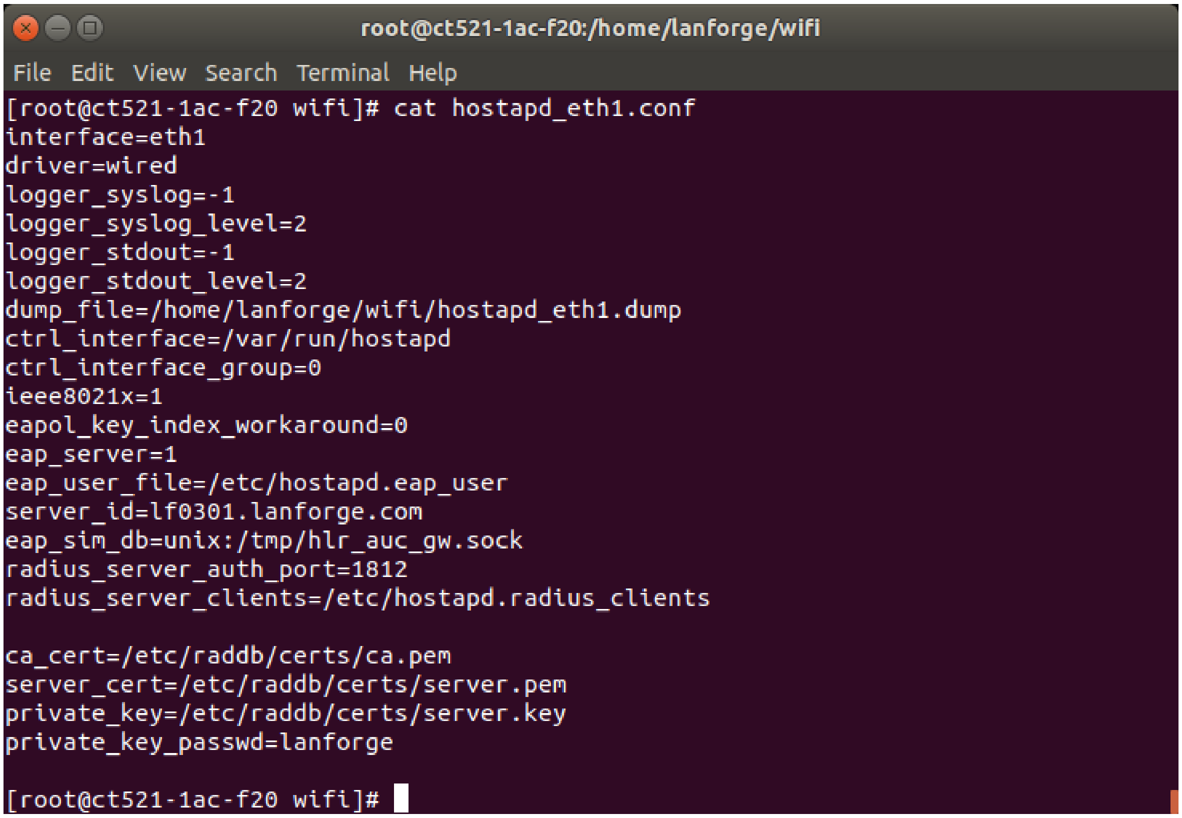
Port Rates
○ 10bt-HD
○ 10bt-FD
○ 100bt-HD
○ 100bt-FD
○ 1000-FD
○ 10G-FD
○ 40G-FD
● Autonegotiate

□ Renegotiate
□ Restart Xcvr
□ PROMISC
□ RX-ALL
□ RX-FCS
□ Bypass NOW!
□ Bypass Power-UP
□ Bypass Power-DOWN
□ Bypass Disconnect

Advert Rates
☑ 10bt-HD
☑ 10bt-FD
☑ 100bt-HD
☑ 100bt-FD
☑ 1000-FD
□ 10G-FD
□ 40G-FD
☑ Flow-Control

Offload
□ TSO Enabled
□ UFO Enabled
□ GSO Enabled
□ LRO Enabled
□ GRO Enabled

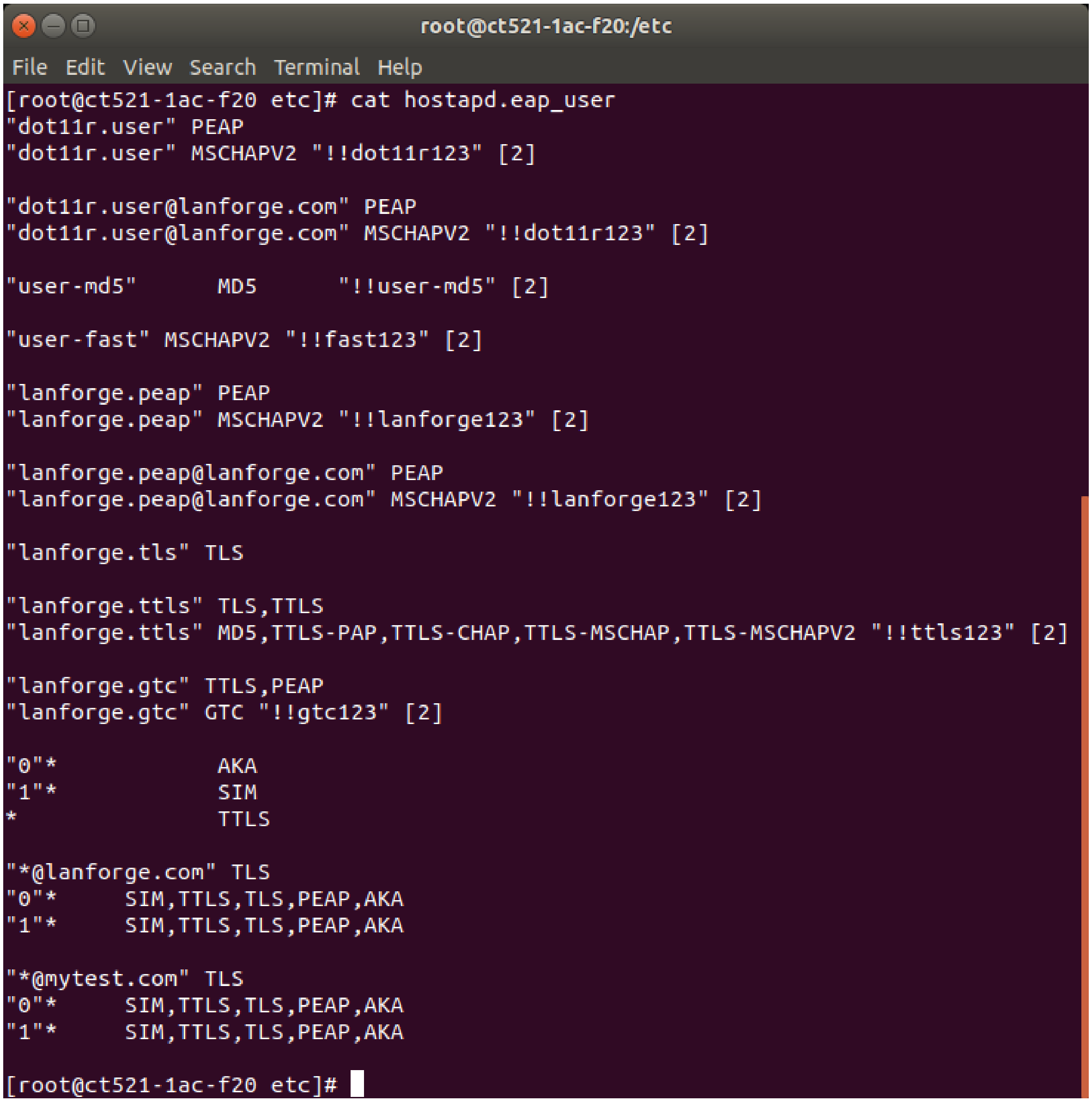
C. Create a hostapd_<port-name>.conf file in the /home/lanforge/wifi directory with the following info.



root@ct521-1ac-f20:/home/lanforge/wifi
File Edit View Search Terminal Help

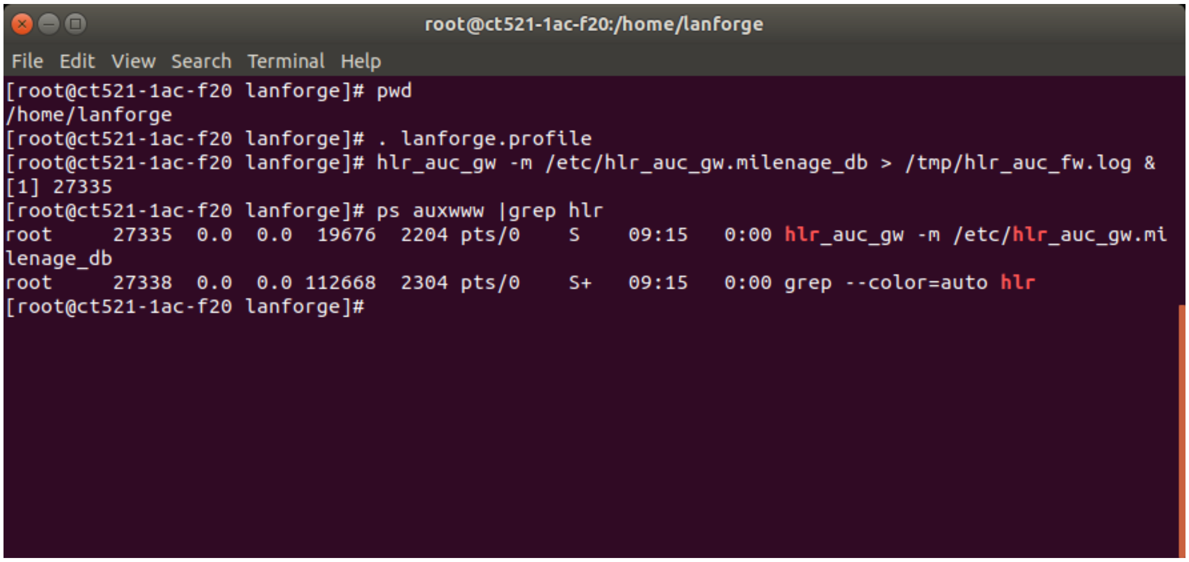
```
[root@ct521-1ac-f20 wifi]# cat hostapd_eth1.conf
interface=eth1
driver=wired
logger_syslog=-1
logger_syslog_level=2
logger_stdout=-1
logger_stdout_level=2
dump_file=/home/lanforge/wifi/hostapd_eth1.dump
ctrl_interface=/var/run/hostapd
ctrl_interface_group=0
ieee8021x=1
eapol_key_index_workaround=0
eap_server=1
eap_user_file=/etc/hostapd.eap_user
server_id=lf0301.lanforge.com
eap_sim_db=unix:/tmp/hlr_auc_gw.sock
radius_server_auth_port=1812
radius_server_clients=/etc/hostapd.radius_clients

ca_cert=/etc/raddb/certs/ca.pem
server_cert=/etc/raddb/certs/server.pem
private_key=/etc/raddb/certs/server.key
private_key_passwd=lanforge

[root@ct521-1ac-f20 wifi]#
```

D. Setup the desired EAP methods and passwords in the /etc/hostapd.eap_users file.



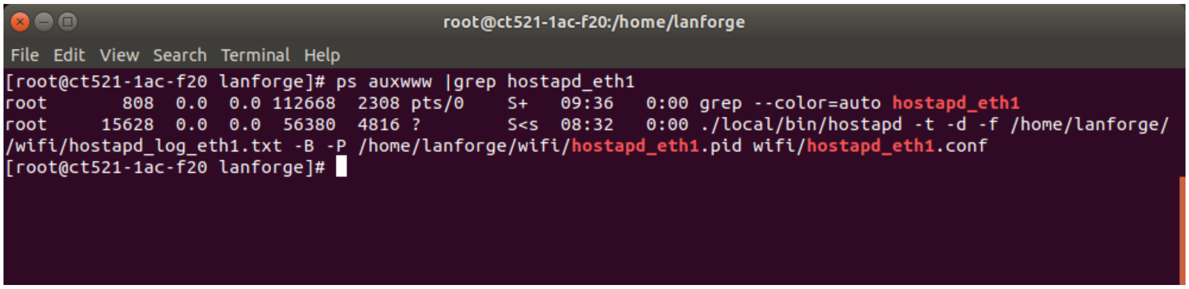
```
[root@ct521-1ac-f20 etc]# cat hostapd.eap_user
"dot11r.user" PEAP
"dot11r.user" MSCHAPV2 "!!dot11r123" [2]

"dot11r.user@lanforge.com" PEAP
"dot11r.user@lanforge.com" MSCHAPV2 "!!dot11r123" [2]

"user-md5"      MD5      "!!user-md5" [2]

"user-fast" MSCHAPV2 "!!fast123" [2]

"lanforge.peap" PEAP
"lanforge.peap" MSCHAPV2 "!!lanforge123" [2]

"lanforge.peap@lanforge.com" PEAP
"lanforge.peap@lanforge.com" MSCHAPV2 "!!lanforge123" [2]

"lanforge.tls" TLS

"lanforge.ttls" TLS,TTLS
"lanforge.ttls" MD5,TTLS-PAP,TTLS-CHAP,TTLS-MSCHAP,TTLS-MSCHAPV2 "!!ttls123" [2]

"lanforge.gtc" TTLS,PEAP
"lanforge.gtc" GTC "!!gtc123" [2]

"0"*            AKA
"1"*            SIM
*               TTLS

"*@lanforge.com" TLS
"0"*     SIM,TTLS,TLS,PEAP,AKA
"1"*     SIM,TTLS,TLS,PEAP,AKA

"*@mytest.com" TLS
"0"*     SIM,TTLS,TLS,PEAP,AKA
"1"*     SIM,TTLS,TLS,PEAP,AKA

[root@ct521-1ac-f20 etc]#
```

E. If using **EAP-SIM** or **EAP-AKA**, verify entries in the /etc/hlr_auc_gw.milenage_db file, then start the HLR tool.


root@ct521-1ac-f20:/home/lanforge
File Edit View Search Terminal Help

```
[root@ct521-1ac-f20 lanforge]# pwd
/home/lanforge
[root@ct521-1ac-f20 lanforge]# . lanforge.profile
[root@ct521-1ac-f20 lanforge]# hlr_auc_gw -m /etc/hlr_auc_gw.milenage_db > /tmp/hlr_auc_fw.log &
[1] 27335
[root@ct521-1ac-f20 lanforge]# ps auxwww |grep hlr
root     27335  0.0  0.0  19676  2204 pts/0    S    09:15   0:00 hlr_auc_gw -m /etc/hlr_auc_gw.mi
lenage_db
root     27338  0.0  0.0 112668  2304 pts/0    S+   09:15   0:00 grep --color=auto hlr
[root@ct521-1ac-f20 lanforge]#
```

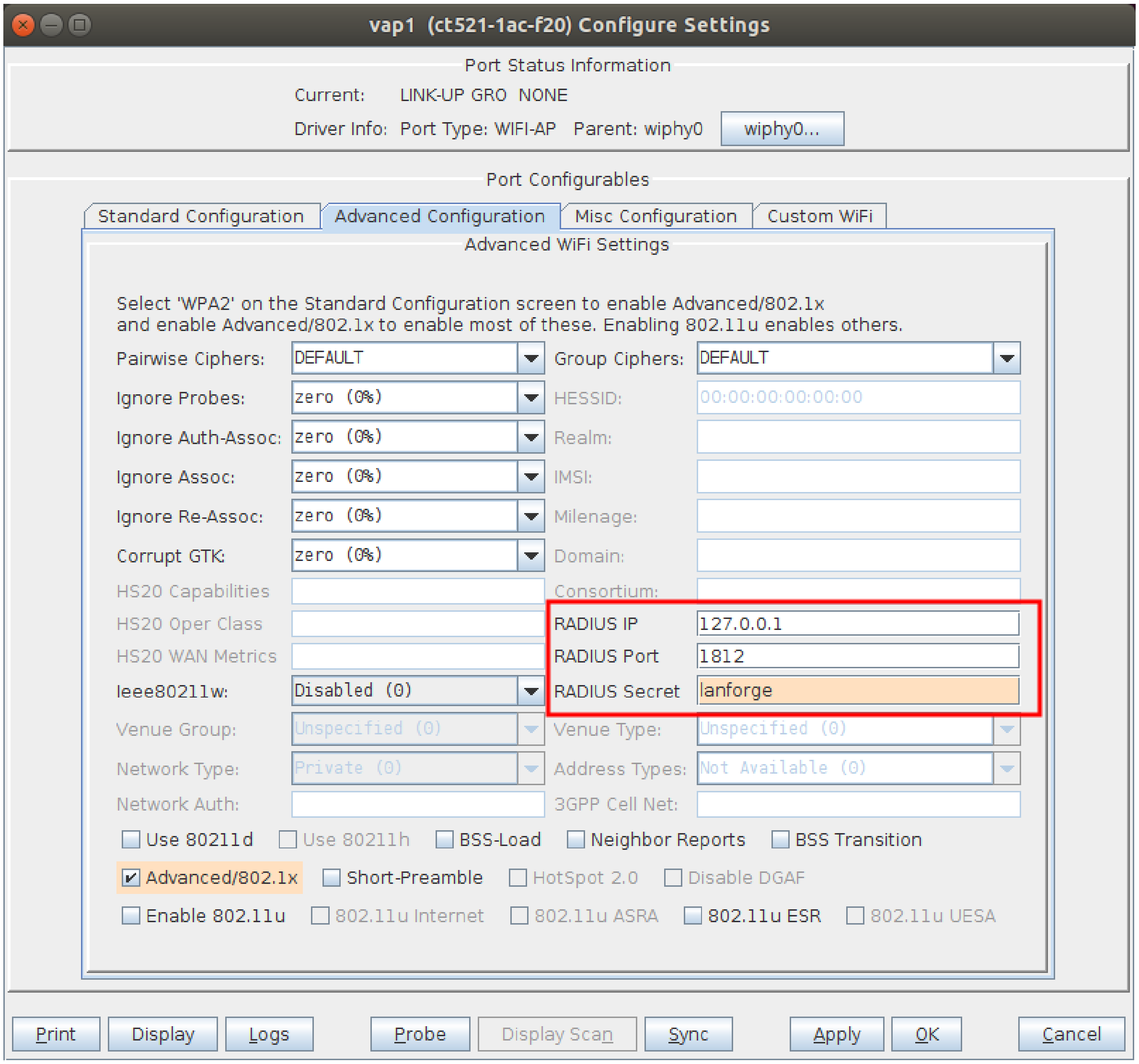
F. Verify the hostapd process is running for the interface selected for the RADIUS server, here it is eth1.



root@ct521-1ac-f20:/home/lanforge
File Edit View Search Terminal Help

```
[root@ct521-1ac-f20 lanforge]# ps auxwww |grep hostapd_eth1
root       808  0.0  0.0 112668  2308 pts/0    S+   09:36   0:00 grep --color=auto hostapd_eth1
root     15628  0.0  0.0  56380  4816 ?        S<s  08:32   0:00 ./local/bin/hostapd -t -d -f /home/lanforge/
/wifi/hostapd_log_eth1.txt -B -P /home/lanforge/wifi/hostapd_eth1.pid wifi/hostapd_eth1.conf
[root@ct521-1ac-f20 lanforge]# 
```

4. **Whether you use FreeRADIUS or hostapd RADIUS, setup your AP with the RADIUS server's IP address and port.**
   A. If using a LANforge AP on the same system as the RADIUS server, then the AP will address the RADIUS server at localhost or 127.0.0.1 with port 1812.



Current: LINK-UP GRO NONE

Driver Info: Port Type: WIFI-AP Parent: wiphy0

Select 'WPA2' on the Standard Configuration screen to enable Advanced/802.1x
and enable Advanced/802.1x to enable most of these. Enabling 802.11u enables others.

Pairwise Ciphers: DEFAULT
Group Ciphers: DEFAULT
Ignore Probes: zero (0%)
HESSID: 00:00:00:00:00:00
Ignore Auth-Assoc: zero (0%)
Realm:
Ignore Assoc: zero (0%)
IMSI:
Ignore Re-Assoc: zero (0%)
Milenage:
Corrupt GTK: zero (0%)
Domain:
HS20 Capabilities
Consortium:
HS20 Oper Class
RADIUS IP 127.0.0.1
HS20 WAN Metrics
RADIUS Port 1812
Ieee80211w: Disabled (0)
RADIUS Secret lanforge
Venue Group: Unspecified (0)
Venue Type: Unspecified (0)
Network Type: Private (0)
Address Types: Not Available (0)
Network Auth:
3GPP Cell Net:

☐ Use 80211d ☐ Use 80211h ☐ BSS-Load ☐ Neighbor Reports ☐ BSS Transition
☑ Advanced/802.1x ☐ Short-Preamble ☐ HotSpot 2.0 ☐ Disable DGAF
☐ Enable 802.11u ☐ 802.11u Internet ☐ 802.11u ASRA ☐ 802.11u ESR ☐ 802.11u UESA

   B. If using an external AP or WLAN Controller, then configure the device to address the RADIUS server on the network connected to a LANforge interface configured for RADIUS.