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mac80211_hwsim - software simulator of 802.11 radio(s) for mac80211

Introduction

mac80211_hwsim is a Linux kernel module that can be used to simulate arbitrary number of IEEE 802.11 radios for mac80211. It can be used to test most of the mac80211 functionality and user space tools (e.g., hostapd and wpa_supplicant) in a way that matches very closely with the normal case of using real WLAN hardware. From the mac80211 view point, mac80211_hwsim is yet another hardware driver, i.e., no changes to mac80211 are needed to use this testing tool.

The main goal for mac80211_hwsim is to make it easier for developers to test their code and work with new features to mac80211, hostapd, and wpa_supplicant. The simulated radios do not have the limitations of real hardware, so it is easy to generate an arbitrary test setup and always reproduce the same setup for future tests. In addition, since all radio operation is simulated, any channel can be used in tests regardless of regulatory rules.

mac80211_hwsim kernel module has a parameter 'radios' that can be used to select how many radios are simulated (default 2). This allows configuration of both very simply setups (e.g., just a single access point and a station) or large scale tests (multiple access points with hundreds of stations).

mac80211_hwsim works by tracking the current channel of each virtual radio and copying all transmitted frames to all other radios that are currently enabled and on the same channel as the transmitting radio. Software encryption in mac80211 is used so that the frames are actually encrypted over the virtual air interface to allow more complete testing of encryption.

A global monitoring netdev, hwsim#, is created independent of mac80211. This interface can be used to monitor all transmitted frames regardless of channel.

Simple example

This example shows how to use mac80211_hwsim to simulate two radios: one to act as an access point and the other as a station that associates with the AP. hostapd and wpa_supplicant are used to take care of WPA2-PSK authentication. In addition, hostapd is also processing access point side of association.

```
# Build mac80211_hwsim as part of kernel configuration

# Load the module
modprobe mac80211_hwsim

# Run hostapd (AP) for wlan0
hostapd hostapd.conf

# Run wpa_supplicant (station) for wlan1
wpa_supplicant -Dnl80211 -iwlan1 -c wpa_supplicant.conf
```

More test cases are available in hostap.git: git://w1.fi/srv/git/hostap.git and mac80211_hwsim/tests subdirectory (http://w1.fi/gitweb/gitweb.cgi?p=hostap.git;a=tree;f=mac80211_hwsim/tests)