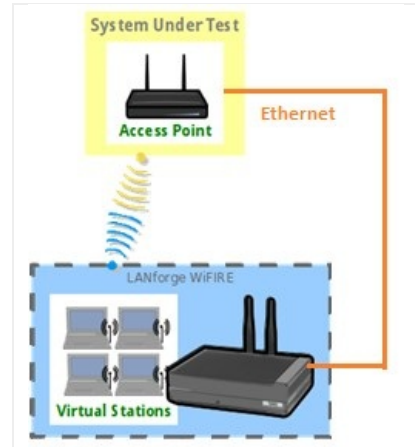


Diagnostic script for WiFi packet capture files.

Goal: Use a diagnostic script to parse a WiFi packet capture file and generate histograms, packet loss stats, and other helpful information for diagnosing WiFi behaviour.

LANforge will be used to create a WiFi capture file, and then we will run the diagnostic script to help understand the on-air behaviour.



1. Create capture file.

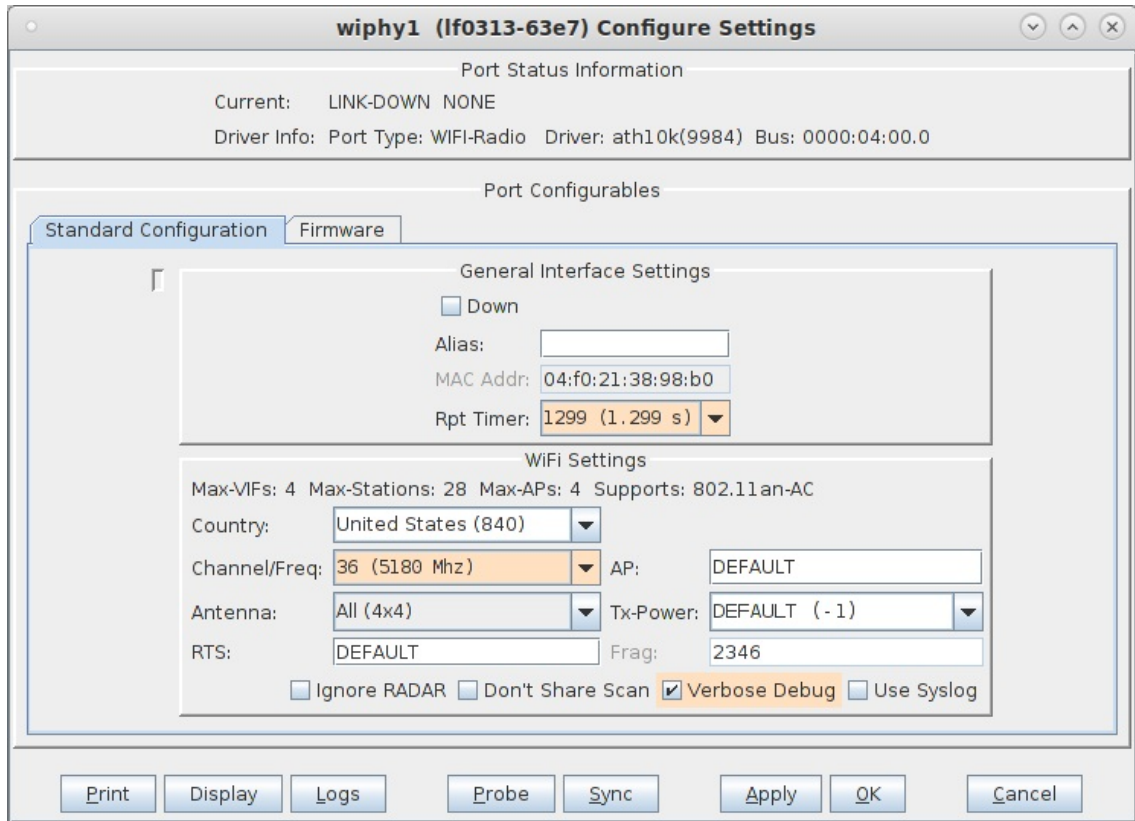
- A. If you already have your own capture file or know how to create them, then skip this section.
- B. Packet captures are created using WiFi Monitor interfaces. LANforge can automatically create and manage these for you. The simplest way to create a capture is to use the Port-Mgr tab in the LANforge GUI.

The screenshot shows the LANforge Manager GUI (Version 5.4.1) with the 'Port Mgr' tab selected. The interface includes various control buttons and a table of Ethernet interfaces for all resources.

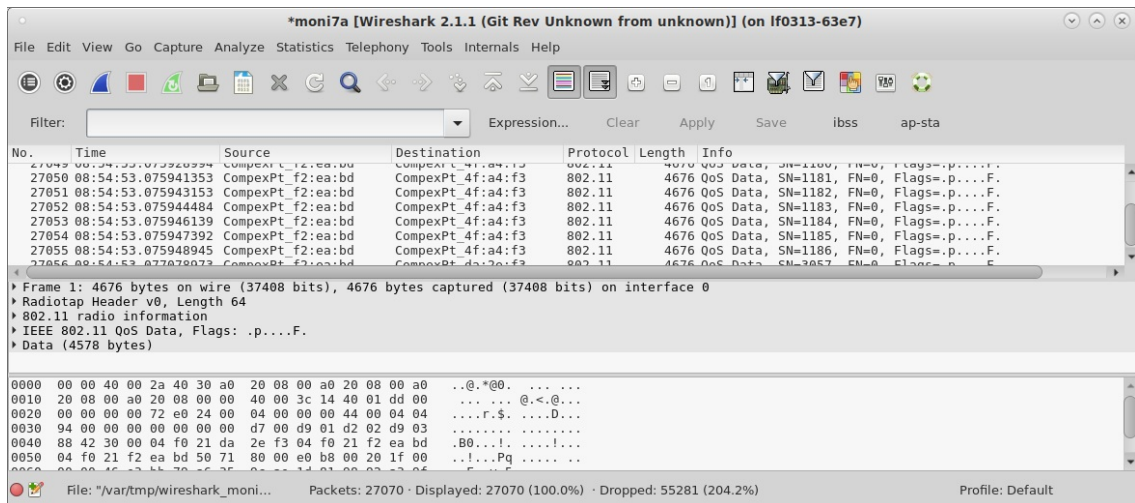
Port	Phantom	Down	IP	SEC	Alias	Parent Dev	RX Bytes	RX Pkts	Pps RX	bps RX	TX Bytes
1.2.04	<input type="checkbox"/>	<input type="checkbox"/>	192.168.100.195	0	eth4		6,900	115	0	0	26,702
1.2.05	<input type="checkbox"/>	<input type="checkbox"/>	3.3.3.100	0	eth5		132,360,...	984,645,...	0	0	107,198,...
1.2.06	<input type="checkbox"/>	<input type="checkbox"/>	0.0.0.0	0	wiphy0		0	0	0	0	0
1.2.07	<input type="checkbox"/>	<input type="checkbox"/>	0.0.0.0	0	wiphy1		47,341,5...	10,649,187	5,044	179,019,...	0

Logged in to: 192.168.100.238:4002 as: Admin

- C. Select WiFi radio that you wish to use and double-click it to bring up the modify window. Set the frequency to match the channel you wish to sniff and click OK to submit the changes and close the window.



- D. Make sure the radio is still selected, and click the 'Sniff Packets' button on the Port Mgr tab. You normally need to be connected to the LANforge system using remote-desktop or VNC for this to work properly. After you click 'Sniff Packets', a monitor interface will be created and Wireshark will start. When your capture is complete, stop the capture in Wireshark and save the capture file.



2. Use the do_wifi_diag.bash script to diagnose the capture file.

- A. The LANforge scripts package is normally installed in /home/lanforge/scripts. You can also clone the repository from github using this link: <https://github.com/greearb/lanforge-scripts>. Assuming it is in the standard location, change to the wifi_diag directory: `cd /home/lanforge/scripts/wifi_diag`. The `./do_wifi_diag.bash` script will be used to launch the wifi-diag script.



- B. Run the `do_wifi_diag.bash` script with appropriate arguments to match your device-under-test (DUT) and pcap file. The diagnostic script can process around 300 packets per second on a fast machine, so it can take a while to process a big file.

```

greearb@ben-dt4:~/btbits/x64_btbits/server/lf_scripts/wifi_diag
File Edit View Search Terminal Help
[greearb@ben-dt4 wifi_diag]$ ./do_wifi_diag.bash -f ~/tmp/lf-dl-60sta.pcapng -o test -d 04:f0:21:f2:ea:bd -C
Removing existing output directory: test
Starting the wifi pcap diag.pl script, this can take a while...
NOTE: Processed 10000 packets and 5144163 input lines in 0:0:29 so far (344 pps).
NOTE: Processed 20000 packets and 10591132 input lines in 0:1:2 so far (322 pps).
NOTE: Processed 30000 packets and 15659389 input lines in 0:1:35 so far (315 pps).
NOTE: Processed 40000 packets and 20895107 input lines in 0:2:8 so far (312 pps).
NOTE: Processed 50000 packets and 26102736 input lines in 0:2:42 so far (308 pps).
NOTE: Processed 60000 packets and 31360660 input lines in 0:3:17 so far (304 pps).
NOTE: Processed 70000 packets and 36535836 input lines in 0:3:53 so far (300 pps).
NOTE: Processed 80000 packets and 41700529 input lines in 0:4:26 so far (300 pps).
NOTE: Processed 90000 packets and 46951889 input lines in 0:5:0 so far (300 pps).
NOTE: Processed 96523 packets and 50262006 input lines in 0:5:22 so far (299 pps).
Warning: empty y range [1:1], adjusting to [0.99:1.01]
Warning: empty y range [1:1], adjusting to [0.99:1.01]
Warning: empty y range [0:0], adjusting to [-1:1]
Warning: empty y range [0:0], adjusting to [-1:1]
Warning: empty y range [1:1], adjusting to [0.99:1.01]
Warning: empty y range [0:0], adjusting to [-1:1]
Report saved to: test/index.html
All done, open this file with a browser to view report: test/index.html
[greearb@ben-dt4 wifi_diag]$

```

- C. When the test is complete, you can open the `[test]/index.html` file to view the results, print to PDF, etc.

WiFi Diag Report

RX (All) Retransmit percentage: 5197/78377 == 6.63077178253825
 RX (Big) Retransmit count: 5197
 TX (All) Retransmit percentage: 3/7108 == 0.0422059651097355
 TX (Big) Retransmit count: 0
 RX (All) no-ack-found: 56234
 RX (Big) no-ack-found: 55705
 TX (All) no-ack-found: 6
 TX (Big) no-ack-found: 0
 RX average gap between AMPDU frames (ms): 0.00344110614165813

RX average AMPDU chain time (ms): 0.0465246330408624
 TX BA to RX AMPDU average gap (ms): 1.53520291279184
 RX BA to TX AMPDU average gap (ms): 61.600923538208
 Duplicate TX BA without AMPDU between them: 54
 Duplicate RX BA without AMPDU between them: 32
 WMM Info from DUT Beacon

Ac Parameters ACI 0 (Best Effort), ACM no, AIFSN 3, ECWmin/max 4/10 (CWmin/max 15/1023), TXOP 0
 Ac Parameters ACI 1 (Background), ACM no, AIFSN 7, ECWmin/max 4/10 (CWmin/max 15/1023), TXOP 0
 Ac Parameters ACI 2 (Video), ACM no, AIFSN 2, ECWmin/max 3/4 (CWmin/max 7/15), TXOP 94
 Ac Parameters ACI 3 (Voice), ACM no, AIFSN 2, ECWmin/max 2/3 (CWmin/max 3/7), TXOP 47

TX Encoding rate histogram.

Rate Mbps	Packets	Percentage
6.0	3539	49.788970
12.0	9	0.126618
14.4	1	0.014069
24.0	3509	49.366911
28.8	1	0.014069
30.0	1	0.014069
45.0	1	0.014069
54.0	1	0.014069
58.5	1	0.014069
58.6	6	0.084412
60.0	1	0.014069
65.0	1	0.014069
87.9	12	0.168824
97.5	2	0.028137
117.0	2	0.028137
117.2	5	0.070343
130.0	2	0.028137
175.5	3	0.042206
195.0	1	0.014069

- D. You can find the full report from this example here: <examples/wifi-diag-report/index.html> You can also view the report in PDF format: <examples/wifi-diag-report.pdf>

