Network Testing and Emulation Solutions

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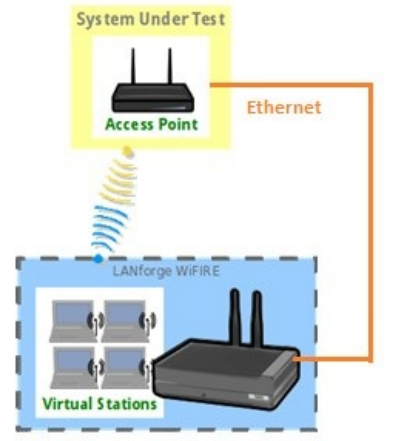
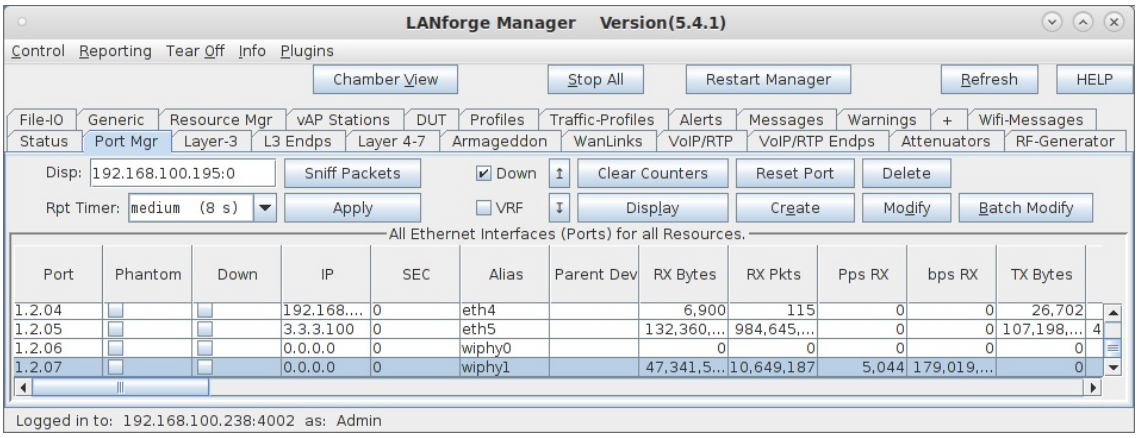
Diagnostic script for WiFi packet capture files.

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.

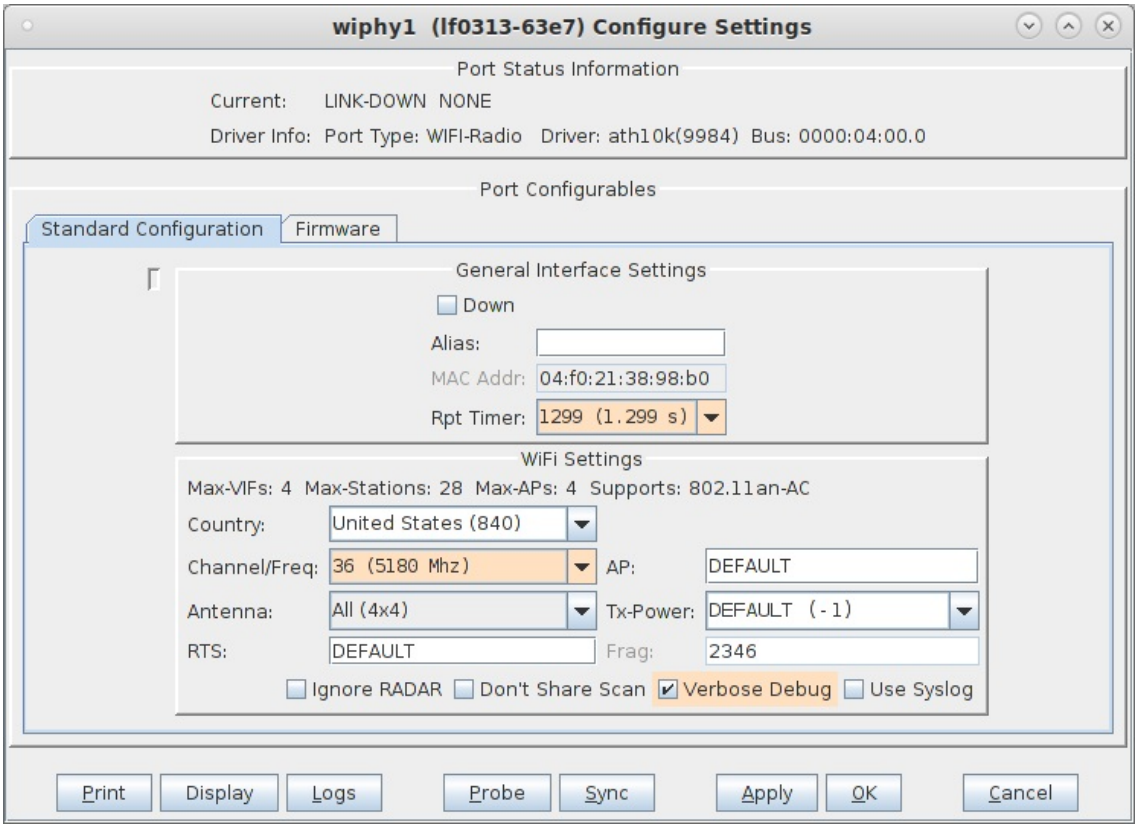
LANforge will be used to create a WiFi capture file, and then we will run the diagnostic script to help understand the on-air behaviour.



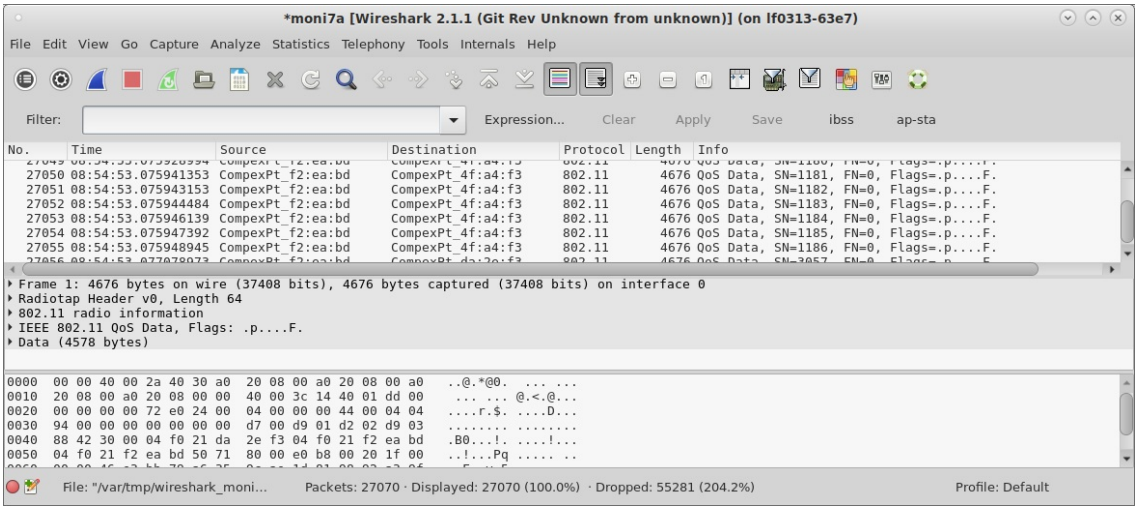
1. Create capture file.
   A. If you already have your own capture file or know how to create them, then skip this section.
   B. Packet captures are created using WiFi Monitor interfaces. LANforge can automatically create and manage these for you. The simplest way to create a capture is to use the Port-Mgr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



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 connectedto 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.



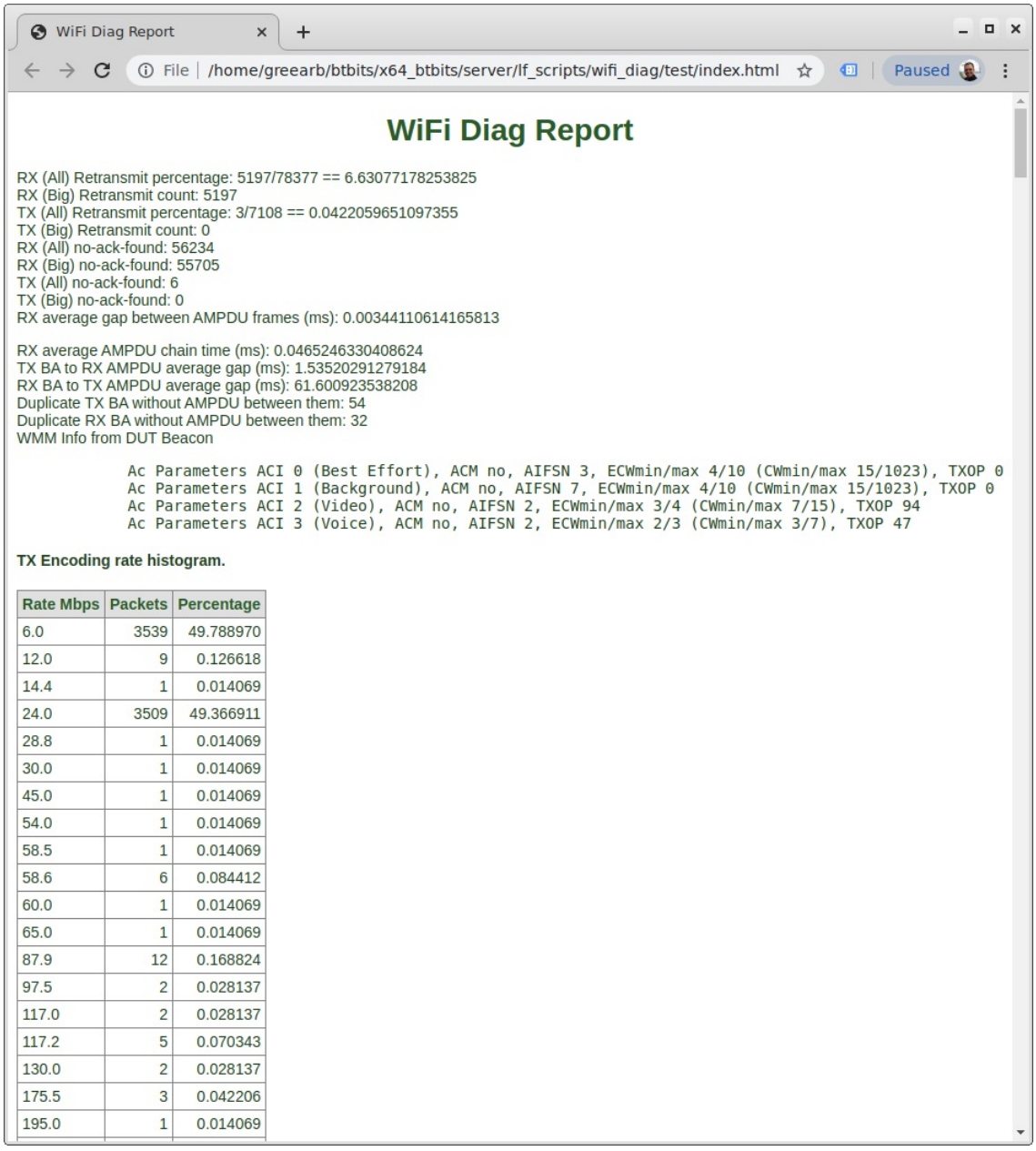
2. Use the do_wifi_diag.bash script to diagnose the capture file.

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/lanfore/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 10501132 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

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