

## Using LANforge python script to test QoS on WiFi Networks

Goal: Create data connections with different QoS settings and report on throughput and latency

This script automates creating data connections with BK, BE, VI, VO and/or other QoS settings. It then runs the tests for a specified amount of time and reports on latency and throughput. The report is an xlsx spreadsheet that can be opened in your favorite spread-sheet tool. This script requires LANforge 5.4.2 or higher.





- 2. Run lf\_tos\_test.py script.
  - A. Change directory to the /home/lanforge/scripts directory (or other location if you have installed scripts elsewhere), and run the lf\_tos\_tst.py script with the --help argument to understand your options..

<pre>File Edit View Search Terminal Help [greearb@ben-home lf_scripts]\$ ./lf_tos_test.pyhelp usage: lf_tos_test.py [-h] [upstream_port UPSTREAM_PORT] [station STATION]</pre>	o greearb@b	pen-home:~/btbits/x64_btbits/server/lf_scripts	• • ×
<pre>[greearb@ben-home lf_scripts]\$ ./lf_tos_test.pyhelp usage: lf_tos_test.py [-h] [upstream_port UPSTREAM_PORT] [station STATION]</pre>	File Edit View Search T	ērminal Help	
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duration DURATION Duration to run traffic, in minutes	tos TOS speed mbps SPEED ME	IP Type of Service: BK BE VI VO PPS	
duration DURATION Duration to run traffic, in minutes		Total requested transmit speed, in Mbps	
	duration DURATION	Duration to run traffic, in minutes	
proto PROTO List of protocols (udp tcp)	proto PROTO	List of protocols (udp tcp)	
[greearb@ben-home lf_scripts]\$	lgreearb@ben-home lf_sc	ripts]\$	

B. Run the script with arguments for your test case. The basic idea is to provide a list of stations you wish to use for traffic generation, the upstream port, the type of service settings to use, requested bandwidth, etc. Examples

Run BE, BK, VI VO traffic between eth1 and sta0000, 500Mbps total traffic requested, with 15 second duration:

./lf\_tos\_test.py --upstream 1.eth1 --lfmgr 192.168.100.156 --station "1.sta00000" \ --tos "BK BE VI VO" --speed mbps 500 --duration 0.25 --proto "udp" greearb@ben-home:~/btbits/x64\_btbits/server/lf\_scripts V A X File Edit View Search Terminal Help [greearb@ben-home lf\_scripts]\$ ./lf\_tos\_test.py --upstream 1.eth1 --lfmgr 192.168.100.156 --station "1.s
ta00000" --tos "BK BE VI V0" --speed\_mbps 500 --duration 0.25 --proto "udp"
[set\_port 1 1 sta00000 NA NA NA 0 NA NA NA 8388610]
[set\_port 1 1 sta00000 NA NA NA 0 NA NA NA 8388610]
Station is associated with IP address.
[add\_endp scr-tos-0-A 1 1 sta00000 lf\_udp -1 NA 56000 56000 NA -1 -1 increasing NO NA 0 0]
[add\_endp scr-tos-0-A 1 1 sta00000 lf\_udp -1 NA 125000000 125000000 NA -1 -1 increasing NO NA 0 0]
[add\_endp scr-tos-0-B 1 1 eth1 lf\_udp -1 NA 125000000 125000000 NA -1 -1 increasing NO NA 0 0]
[add\_endp scr-tos-0-B 1 1 eth1 lf\_udp -1 NA 125000000 125000000 NA -1 -1 increasing NO NA 0 0]
[add\_endp scr-tos-0-B 1 1 eth1 lf\_udp -1 NA 125000000 125000000 NA -1 -1 increasing NO NA 0 0]
[add\_endp scr-tos-0-B 1 1 eth1 lf\_udp -1 NA 125000000 125000000 NA -1 -1 increasing NO NA 0 0]
[srt\_scr\_tos-0-B 1 1 eth1 lf\_udp -1 NA 125000000 125000000 NA -1 -1 increasing NO NA 0 0]
[add\_endp scr-tos-0-B 1 1 eth1 lf\_udp -1 NA 125000000 125000000 NA -1 -1 increasing NO NA 0 0]
[srt\_scr\_tos-0-B 1 1 eth1 lf\_udp -1 NA 125000000 125000000 NA -1 -1 increasing NO NA 0 0]
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[srt\_scr\_tos-0-A 2]
[srt\_scr\_tos-0-B]
[srt\_scr\_tos-0-A 2]
[srt\_scr\_t default@ btbits>> default\_tm: Setting state on CX: scr-tos-0 to RUNNING. >>RSLT: 0 Cmd: 'set\_cx\_state' 'all' 'scr-tos-0' 'RUNNING' default@ btbits>> DtDIts>> [add\_endp scr-tos-1-A 1 1 sta00000 lf\_udp -1 NA 56000 56000 NA -1 -1 increasing NO NA 0 0 ] [add\_endp scr-tos-1-A 1 1 sta00000 lf\_udp -1 NA 56000 56000 NA -1 -1 increasing NO NA 0 0] [add\_endp scr-tos-1-B 1 1 eth1 lf\_udp -1 NA 125000000 125000000 NA -1 -1 increasing NO NA 0 0 ] [add\_endp scr-tos-1-B 1 1 eth1 lf\_udp -1 NA 125000000 125000000 NA -1 -1 increasing NO NA 0 0] [add\_endp scr-tos-1-B 1 1 eth1 lf\_udp -1 NA 125000000 125000000 NA -1 -1 increasing NO NA 0 0] Cross-connect: scr-tos-1 added to Test-Manager: default\_tm. >>RSLT: 0 Cmd: 'add\_cx' 'scr-tos-1' 'default\_tm' 'scr-tos-1-A' 'scr-tos-1-B' default@ btbits>> default\_tm: Setting state on CX: scr-tos-1 to RUNNING. >>RSLT: 0 Cmd: 'set\_cx\_state' 'all' 'scr-tos-1' 'RUNNING' default@

C. The auto-created data connections can be found in the Layer-3 tab in the LANforge GUI.

LANforge Manager     Version(5.4.2)													
Control Reporting Tear Off Info Plugins													
	Chamber ⊻iew     Stop All     Restart Manager     Befresh     HELP												
Resource Mgr VAP Stations DUT Profiles Traffic-Profiles Event Log Alerts Messages Warnings +													
VoIP/RTP En	VolP/RTP Endps Attenuators RF-Generator File-10 Generic Test Mgr Test Group Collision-Domains												
Status	Port	Mgr	Layer-3	L3 Endp	s	Layer 4-7	Arma	ageddon	Wanl	links	VoIP/RTP		
Rpt Ti	Rpt Timer: fast (1 s) ▼ Go Test Manager all ▼ Select All Start + Stop - Quiesce Clear												
View	View 0 - 500 🔽 Go Disp <u>l</u> ay Cr <u>e</u> ate Mo <u>d</u> ify Delete												
				-Cross Co	nnects for	Selected Te	st Manager-						
Name	Туре	State	Pkt Rx A	Pkt Rx B	Bps Rx B	Bps Rx A	Rx Drop % A	Rx Drop % B	Drop Pkts A	Drop Pkts B	Avg RTT	Rŗ	
scr-tos-0 LF/	/UDP	Run	184,419	86	55,788	121,938,	1.212	0	2,334	0	40		
scr-tos-1 LF/	/UDP	Run	191,625	81	55,748	124,886,	0	0	0	0	28		
scr-tos-2 LF/	/UDP	Run	182,942	82	55,784	124,881,	0	0	0	0	17		
scr-tos-3 LF/	/UDP	Run	185,055	82	55,346	124,904,	0	0	0	0	15		
Logged in to:	Logged in to: 192.168.100.156:4002 as: Admin												

D. Here are the details of one of the connections.

			scr-tos-0 - Creat	odify Cross Connect						
+ - All				<u>D</u> isplay	<u>S</u> ync <u>B</u> atch-Create	Apply OK	<u>C</u> anc	el		
CX Name: CX Type:	Cross-Connect  scr-tos-0  LANforge / UDP			<b>.</b>	Report Timer:	Cross-Connect default (5 s)			•	
Resource	Endpoint A	-	Endpoint B 1 (TR-398)		Pld Pattern	Endpoint A increasing	-	Endpoint B increasing	•	
Port:	18 (sta00000)	-	1 (eth1)	-	Min IP Port: Max IP Port:	AUTO Same	•	AUTO Same	▼ ▼	
Min Tx Rate: Max Tx Rate:	New Modem (56 Kbps) Same		125000000 (125 Mbps) Same	me		Forever Same		Forever Same	•	
Min PDU Size:		•			Min Reconn:	0 (0 ms) 🗸		0 (0 ms)	•	
IP ToS:	BK (WiFi) (64)	-	BK (WiFi) (64)	-	Max Reconn: Multi-Conn:	Same Normal (0)	•	Same Normal (0)	▼	
Pkts To Send:	Infinite	e v Infinite v				Script Thresholds		Script Thresholds		

E. The script will run for the requested duration and then stop the traffic and generate the xlsx report.



F. You can open the xlsx report in your favorite spread sheet tool. Here is the first part of the document.

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	A	В	С	D	E	F	G	Н	1	J	к	L	М	N	-
1	CX-Name	Endp-Name	Port	Protocol	ToS	AP BSSID	Band width	Mode	Last MCS Rx	Combined RSSI	Endpoint Offered Load	Endpoint Rx Throughput	Cx Offered Load	Cx Rx Throughput	
2	scr-tos-0	scr-tos-0-A	1.sta00000	udp	BK	78:d2:94:4f:21:78	80	802.11an-AC	650000Kbps	-63dBm	0.02	46.46	47.69	46.48	6
3	scr-tos-0	scr-tos-0-B	1.eth1	udp	BK						47.67	0.02	47.69	46.48	
4	scr-tos-1	scr-tos-1-A	1.sta00000	udp	BE	78:d2:94:4f:21:78	80	802.11an-AC	650000Kbps	-63dBm	0.02	44.82	45.70	44.84	
5	scr-tos-1	scr-tos-1-B	1.eth1	udp	BE						45.68	0.02	45.70	44.84	
6	scr-tos-2	scr-tos-2-A	1.sta00000	udp	VI	78:d2:94:4f:21:78	80	802.11an-AC	650000Kbps	-63dBm	0.02	42.77	43.33	42.79	870
7	scr-tos-2	scr-tos-2-B	1.eth1	udp	VI						43.31	0.02	43.33	42.79	
8	scr-tos-3	scr-tos-3-A	1.sta00000	udp	<u>vo</u>	78:d2:94:4f:21:78	80	802.11an-AC	650000Kbps	-63dBm	0.02	40.46	41.34	40.48	
9	scr-tos-3	scr-tos-3-B	1.eth1	udp	vo						41.32	0.02	41.34	40.48	
10															
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G. The more interesting part of the report is the throughput and latency results. The latency-range columns show the amount of packets received in certain latency ranges. This gives you an idea of jitter and other latency related information. The average latency is a good way to get a quick idea of the latency.

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1	Cx Rx Throughput	Avg Latency	Min Latency	Max Latency	Latency Range 0	Latency Range 1	Latency Range 2-3	Latency Range 4-7	Latency Range 8-15	Latency Range 16-31	Latency Range 32-63	Latency Range 64-127	Latency Range 128-255	Latency Range 256-511	Later Ran 512-1	
2	46.48	81	0	525	3540	6010	13747	27668	21381	3720	7526	34040	32674	85409	15	<b>R</b>
3	46.48	39	1	223	0	9	3	7	11	16	16	20	18	5	0	_
4	44.84	14	0	149	2537	3982	10384	29199	54870	68519	48288	12679	863	0	o	
5	44.84	22	1	156	0	6	3	10	20	21	27	10	3	3	0	
6	42.79	19	0	56	781	1961	9172	39919	90797	68661	7558	0	0	0	0	970
7	42.79	10	1	54	0	11	11	22	18	24	9	3	0	0	0	
8	40.48	6	1	41	0	377	3071	24264	82920	87847	8397	91	0	0	0	
9	40.48	8	2	27	0	0	19	21	24	23	5	0	0	0	0	
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H. For more details, see the spread-sheet result from this test.
 There is also a more advanced script that does similar work, see: ./If\_tos\_plus\_test.py --help, example output.

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