

Generating Traffic for WLAN Testing

Goal: Setup and run Wireless LAN traffic using the LANforge CT523 or similar system. In this test scenario, the LANforge CT523 is used to simulate 4 virtual wireless stations that associate with a third party access point. Three traffic tests will be configured and run to demonstrate possible wireless access point tests. **NOTE**: This cookbook assumes that you have already created a VAP, and have an interface that is handing out DHCP addresses.





1. Create the virtual wireless stations.

Note: All of its virtual stations will use the same wireless AP in this example, but each station *may* be configured for a different AP as long as all stations on the same radio use APs on the same channel.

A. Go to the Port Manager

• LA	Nforge	e Man	ager Version(5.	4.1)										
<u>C</u> ontrol	Report	ting]	<u>[</u> ear-Off <u>I</u> nfo <u>P</u> lu	gins										
					Cham	nber <u>V</u> ie	w	<u>S</u> top A	JI	Restart N	1anager	Ē	Refresh	HELP
Test Mg Status	Test Mgr Test Group Resource Mgr Event Log Alerts Port Mgr vAP Stations DUT Profiles Traffic-Profiles Messages Status Layer-3 L3 Endps VolP/RTP VolP/RTP Endps Armageddon WanLinks Attenuators RF-Generator File-10 Layer 4-7 Generic													
[Disp: 192.168.100.121:0 Sniff Packets ☑ Down 1 Clear Counters Reset Port Delete													
F	Rpt Tim	er: me	edium (8 s) 🔻		Apply			I Di	sp <u>l</u> ay	Crea	ate Mo	dify B	atch Modify	
					A	ll Ether	net Interfaces	(Ports) for	all Resource	es. ———				
Port	Pha	Down	IP	SEC	Alias	Parent Dev	RX Bytes	RX Pkts	Pps RX	bps RX	TX Bytes	TX Pkts	Pps TX	bps TX
1.1.00			192.168.100.216	0	eth0		109,389,970	1,412,882	17	13,855	281,379,123	278,612	14	112,651
1.1.01			10.1.1.7	0	eth1		750,048	4,868	0	0	701,990	5,009	0	6
1.1.02		~	0.0.0.0	0	eth2		0	0	0	0	0	0	0	(
1.1.03			0.0.0.0	0	wiphy0		15,236,542	16,628,	9	20,450	11,185,167	7,390,395	0	56
1.1.04		-	0.0.0.0	0	wipnyi	winby0	1.026	109	0	0	2 092	0	0	
11.1.05	-		0.0.0.0	0	wlan0	wiphy0	1,020	3	0	0	2,082	13	0	
1.1.00			0.0.0.0	0	WIGHT	wipityi	0		0	0	0	V	U	
•		11												•

B. Select port wiphy0 and click Create

• (Create VLANs or	n Port: 1.1.03			
•	O MAC-VLAN	802.1Q-VLAN	○ <u>R</u> edirect	○ <u>B</u> ridge	O Bond
U	GRE Tunnel	○ <u>W</u> iFi STA	⊖ WiFi <u>V</u> AP	🔾 WiFi Monitor	🔾 WiFi Virtual Radio
2	Shelf: 📘 💌 F	Resource: 1 (lf03	50-81e8) 🔻	Port: 3 (wiphy0)
B	Quantity: 1				
	Basic Settings	WiFi Settings	Advanced S	ettings	
	VLAN ID:]	
	STA ID:]	
	Parent MAC:	04:f0:21:38:ad:	b 3]	
~	MAC Addr:	xx;;*;x;;x;;x;	-]	
4	DHCP-IPv4	Multiple Subn	ets		
	<u>I</u> P Address:]	
	IP <u>M</u> ask or Bits:]	
	<u>G</u> ateway IP:]	
	#1 Redir <u>N</u> ame:				
	#2 Redir Name:]	
6	Down Ap	ply <u>C</u> ancel		Ready	

C. Select the Wifi STA button, then enter MAC, Quantity, STA ID, and SSID. Select the DHCP-IPv4 checkbox:

٠	Create VLANs or	Port: 1.1.03			
•	O MAC-VLAN	0 802.1Q-VLAN	○ <u>R</u> edirect	○ <u>B</u> ridge	O Bond
U	⊖ GRE Tunnel	◉ <u>W</u> iFi STA	⊖ WiFi <u>V</u> AP	○ WiFi Monitor	🔾 WiFi Virtual Radio
2	Shelf: 1 💌 F	Resource: 1 (lf03	50-81e8) 🔻	Port: 3 (wiphy0) 🗸
B	Quantity: 4				
	Basic Settings	WiFi Settings	Advanced S	ettings	
	VLAN ID:]	
	STA ID:	0		J	
	Parent MAC:	04:f0:21:38:ad:	b 3]	
	MAC Addr:	XXX:XXX:XXX:*:*:XXX	-		
4	DHCP-IPv4	🗌 Multiple Subn	ets		
	IP Address:]	
	IP <u>M</u> ask or Bits:]	
	<u>G</u> ateway IP:]	
	#1 Redir <u>N</u> ame:]	
	#2 Redir Name:				
6	Down Ap	ply <u>C</u> ancel		Ready	
	A. In this ex	ample, all 4 virtual	stations will co	nnect to the same	access point

- B. If your access point can serve DHCP, you can select the 'DHCP-IPv4' checkbox here to enable each virtual station as a DHCP client
- C. If you choose to enter IP addresses manually, the create function will increment the last octet of the IP address for each virtual station created
- D. Click **Apply** when finished

D. Verify that the virtual wireless stations are created

• LA	💿 LANforge Manager Version(5.4.1) 💿 💷 😣													
<u>C</u> ontrol	Control Reporting Tear-Off Info Plugins													
				Cł	namber <u>V</u> ie	ew	<u>S</u>	top All	Restar	t Manage	r	<u>R</u> efresh	HEI	LP
Event L	Event Log Alerts Port Mgr vAP Stations DUT Profiles Traffic-Profiles Messages Attenuators RF-Generator File-10 Layer 4-7 Generic Test Mgr Test Group Resource Mgr													
Stat	us	ř t	ayer-3 L	3 End	ps	VoIP	/RTP	VoIP/RTF	Endps	<u>.</u>	Armageddon		WanLinks	
Disp	Disp: 192.168.100.121:0 Sniff Packets Image: Clear Counters Reset Port Delete													
Rpt	Timer:	mediu	ım (8s) 🔻	Ap	oply	[VRF I	Disp <u>l</u> a	у	Cr <u>e</u> ate	Mo <u>d</u> ify	<u>B</u> atcl	h Modify	
	All Ethernet Interfaces (Ports) for all Resources.													
Port	Pha	Down	IP	SEC	Alias	Parent Dev	RX Bytes	RX Pkts	Pps RX	bps RX	TX Bytes	TX Pkts	Pps TX	Ł
1.1.00			192.168.100.216	0	eth0		104,514,68	3 1,364,054	15	13,122	230,922,952	230,972	16]
1.1.01			10.1.1.7	0	ethl		747,27	6 4,850	0	48	699,364	4,990	0	
1.1.02		~	0.0.0.0	0	eth2			0 0	0	0	0	0	0	
1.1.03			0.0.0.0	0	wiphy0		8,770,822,	. 13,489,	37	73,887	4,797,568,	3,196,706	0	
1.1.04			0.0.0.0	0	wiphyl			109	0	0	0	0	0	
1.1.05		~	0.0.0.0	0	wlan0	wiphy0	1,02	5 3	0	0	2,082	13	0	
1.1.06		~	0.0.0.0	0	wlan1	wiphy1		0 0	0	0	0	0	0	_
1.1.07			10.1.5.11	0	sta0	wiphy0	2,371,710,	. 1,580,197	0	35	2,443,823,	1,608,241	0	
1.1.10			10.1.5.8	0	stal	wiphy0	2,358,154,	. 1,572,053	0	0	2,457,516,	1,616,318	0	
1.1.11			10.1.5.9	0	sta2	wiphy0	444,14	5 3,281	0	0	511,478	3,871	0	
1.1.13			10.1.5.10	0	sta3	wiphy0	442,07) 3,263	0	35	511,714	3,861	0	

E. Scroll to the right to view each station's link quality and other interface details

۲	LANfor	ge Manage	r Version	(5.4.1)								•			
<u>C</u> 0	Control Reporting Tear-Off Info Plugins														
				Chamber <u>v</u>	liew	5	top All	Resta	art Manage	r	Refr	esh	HELP		
E	ent Log	Alerts P	ort Mgr 🛛 🛛	AP Stations	DUT	Profiles 1	Fraffic-Profil	es Messa	ages						
r	Attenuate	ors F	RF-Generato	or File	e-IO	Layer 4-7	Generi	c Tes	st Mgr	Test Gro	up I	Resource M	gr		
\vdash	Status	Layer	-3	L3 Endps	Vo	IP/RTP	VolP	RTP Endps		Armagedo	don	WanLink	s		
р	isn: 1021	69 100 121	.0	Spiff Packet		R Down	t Clear	Counters	Reset	Port r	olata				
	isp. 192.1	00.100.121		Shiin Tacker		Down	I Clear	counters	Reset		Pelete				
R	pt Timer:	medium (8	s) 🔻	Apply		VRF	1 D	isp <u>l</u> ay	Cr <u>e</u> a	te I	4o <u>d</u> ify	Batch Mod	lify		
					All Etherne	t Interface	(Ports) for	all Resourc	es						
		1										1			
d	bps TX II	Bytes TX II	bps RX II	Bytes BX	Reset	TX-Rate	RX-Rate	Status	AP	Channel	Mode	Activity	Sig		
 				-,											
0	144,700	6 238,555	16,677	137,491	Complete	1 Gbps	1 Gbps					0			
0	(819,124	0	863,676	Complete	1 Gbps	1 Gbps					0			
0	(0 0	0	0	Complete	0 bps	0 bps					0			
0	23	3 4,797,5	73,965	8,771,9	Complete		0 bps			0	802.11a	1			
0	(0 0	0	0	Complete		0 bps			0	802.11a	0			
0	(2,082	0	1,026	Complete	0 Mbps	0 bps	NONE	Not-Ass	0	802.11a	1	0 dBn		
0	(0 0	0	0	Complete	0 Mbps	0 bps	NONE	Not-Ass	0	AUTO 20	0	0 dBn		
0	(2,443,8	0	2,371,7	Complete	6 Mbps	351 Mbps	Authorized	04:F0:21	36	802.11a	1	-63 dł		
0	(2,457,5	0	2,358,1	Complete	6 Mbps	351 Mbps	Authorized	04:F0:21	36	802.11a	1	-63 dł		
0	39	9 511,964	34	444,572	Complete	6 Mbps	351 Mbps	Authorized	04:F0:21	36	802.11a	1	-63 dł		
0	(511.714	0	442.070	Complete	87.8 Mbps	351 Mbps	Authorized	04:E0:21	36	802.11a	1	-63 dF		

For more information see LANforge User's Guide: Ports (Interfaces)

- 2. Create Layer-3 connections between the station interfaces.
 - A. Go to the Layer-3 tab and click Create

LANforge Manager Version	ח(5.4.1)				
<u>Control</u> <u>Reporting</u> <u>Tear-Off</u> <u>Info</u>	Plugins				
Chamber <u>V</u> iew	<u>S</u> top All	Restart Manage	r	<u>R</u> efresh	HELP
Event Log Alerts Port Mgr Attenuators RF-Generator Status Layer-3 L3 En	/AP Stations DUT Pr File-10 Layer 4-7 dps VoIP/RTP	ofiles Traffic-Profile Generic Test M VoIP/RTP Endps	gr Test Grou Armageddo	ip Resou on Wa	urce Mgr anLinks
Timer: fast (1 s) 🔻 Go T	est Manager all	▼ Select A	ll Start + S	top - Quie	esce Clea
w 0-500	Go	Di	sp <u>l</u> ay Cr <u>e</u> ate	Mo <u>d</u> ify	Delete
		elected Test Manage	r		
Name Type State	Pkt Rx A Pkt Rx B	Bps Rx A	Bps Rx B	Rx Drop %	A Rx Drop
,,					

B. Create a station-to-station UDP speed test:

• udp-0-1 - C	reate/Modify Cross Cor	nne	ct				e	
+ - All	Display	<u>S</u> yn	c <u>B</u> atch-Create	Ap	oply	<u>0</u> K	<u>C</u> a	ncel
CX Name: CX Type:	Cross-Connect Judp-0-1 LANforge / UDP			•				
Resource	Endpoint A	-	Endpoint B 1 (lf0350-81e8)	-				
Port:	7 (sta0)	-	10 (stal)	-				
Min Tx Rate:	DOCSIS 1 (30 Mbps)	•	DOCSIS 1 (30 Mbps)	-				
Max Tx Rate:	Same	-	Same	-				
Min PDU Size:	AUTO	-	AUTO	-				
Max PDU Size:	Same	-	Same	-				
IP ToS:	Best Effort (0)	-	Best Effort (0)	-				
Pkts To Send:	Infinite	-	Infinite	-				

A. Test 1: sta0-sta1, UDP, 30Mbps

C. Create a station-to-station TCP speed test:

tcp-0-1 - Cre	eate/Modify Cross Con	nec	:t			•••
+ - All	<u>D</u> isplay	<u>S</u> yn	c <u>B</u> atch-Create	A	pply <u>O</u> K	<u>C</u> ancel
CX Name: CX Type:	Cross-Connect tcp-0-1 LANforge / TCP			•		
Resource:	Endpoint A (Client) 1 (lf0350-81e8)	•	Endpoint B (Server) 1 (lf0350-81e8)	-]	
Port: Min Tx Rate:	7 (staO) Tl (1.544 Mbps)	•	10 (stal) Tl (1.544 Mbps)	•		
Max Tx Rate:	Same	•	Same	-		
Min PDU Size:	AUTO Same	•	AUTO Same	•		
IP ToS:	Best Effort (0)	•	Best Effort (0)	-		
Pkts To Send:	11111110		11111110			

A. Test 1: sta0-sta1, TCP, 1.54Mbps bi-directional traffic

For more information see LANforge User's Guide: Layer-3 Cross-Connects (FIRE)

- 3. Run traffic tests concurrently, and view results.
 - A. This example shows little packet loss, however being that this is traffic sent wirelessly via stations, their may be interruptions due to busy channel frequencies, if needed, adjust your Tx rate accordingly.

LANforge	Manag	er Versio	n(5.4.1)									
<u>C</u> ontrol <u>R</u> eport	ontrol <u>R</u> eporting <u>T</u> ear-Off <u>I</u> nfo <u>P</u> lugins											
	hamber	⊻iew	<u>S</u> t	op All	Restart Manag	er	<u>R</u> efresh	HELP				
Event Log Alerts Port Mgr VAP Stations DUT Profiles Traffic-Profiles Messages												
Attenuators	Attenuators RF-Generator File-IO Layer 4-7 Generic Test Mgr Test Group Resource Mgr											
Status	Layer-3	L3 En	dps Vo	IP/RTP	VoIP/RTP Endps	Armageddo	on Wa	nLinks				
Timer: fast	(1 s)	🔻 Go T	est Manager	all	▼ Select	All Start + <u>S</u> t	op - Quie	sce Clei				
0 - 500	0 - 500 Go Disp <u>l</u> ay Cr <u>e</u> ate Mo <u>d</u> ify Delete											
				nnects for Se	elected Test Manag	er						
Name	Туре	State	Pkt Rx A	Pkt Rx B	Bps Rx A	Bps Rx B	Rx Drop % A	Rx Drop				
tcp-0-1	LF/TCP	Run	22	23	1,437,232	1,445,531	4.348					
udp-0-1	LF/UDP	Run	19,723	20,615	28,522,417	29,094,228	0					
•								Þ				

B. The Layer-3 Endpoints tab has more detail.

LANforge M	anager V	/ersion(5.4.1)									
<u>C</u> ontrol <u>R</u> eporting <u>T</u> ear-Off <u>I</u> nfo <u>P</u> lugins												
Cha	mber <u>∨</u> iew		<u>S</u> top All	Restart	Manager	<u>R</u> efre	esh HELP					
Event Log Alerts Port Mgr vAP Stations DUT Profiles Traffic-Profiles Messages Attenuators RF-Generator File-IO Layer 4-7 Generic Test Mgr Test Group Resource Mgr Status Layer-3 L3 Endps VoIP/RTP VoIP/RTP Endps Armageddon WanLinks												
					Start	+ <u>S</u> top -	Quiesce Clear					
Rate New Modem (56 Kb	ps) 🔻 (50 MA	X IX Rate	G	Display Cra	ata Madifu R	atch Madifu D					
0 - 1000	- 0	Go			Disp <u>i</u> ay Ci <u>e</u>		attri Mouliy					
			All E	ndpoints								
Name	EID	Run Mr	ng Script	Tx Rate	Tx Rate (1 min)	Tx Rate (last)	Tx Rate LL					
tcp-0-1-A	1.1.7.7	~ ~	None	1,441,042	1,444,123	1,563,483	1,636,842					
tcp-0-1-B	1.1.10.8	~ ~	None	1,483,618	1,493,826	1,565,038	1,648,968					
udp-0-1-A	1.1.7.5		None	27,559,037	27,565,469	29,943,347	30,596,386					
udp-0-1-B	1.1.10.6	~ ~	None	28,705,922	28,804,337	30,432,095	31,337,008					
							•					

C. Select the cross-connects or endpoints and Right-Click → Dynamic Report on the L3 Endp or Layer-3 table to view a live report of the connections.



For more information see LANforge User's Guide: Layer-3 Endpoints (FIRE) For more information see LANforge User's Guide: Reporting

> Candela Technologies, Inc., 2417 Main Street, Suite 201, Ferndale, WA 98248, USA www.candelatech.com | sales@candelatech.com | +1.360.380.1618