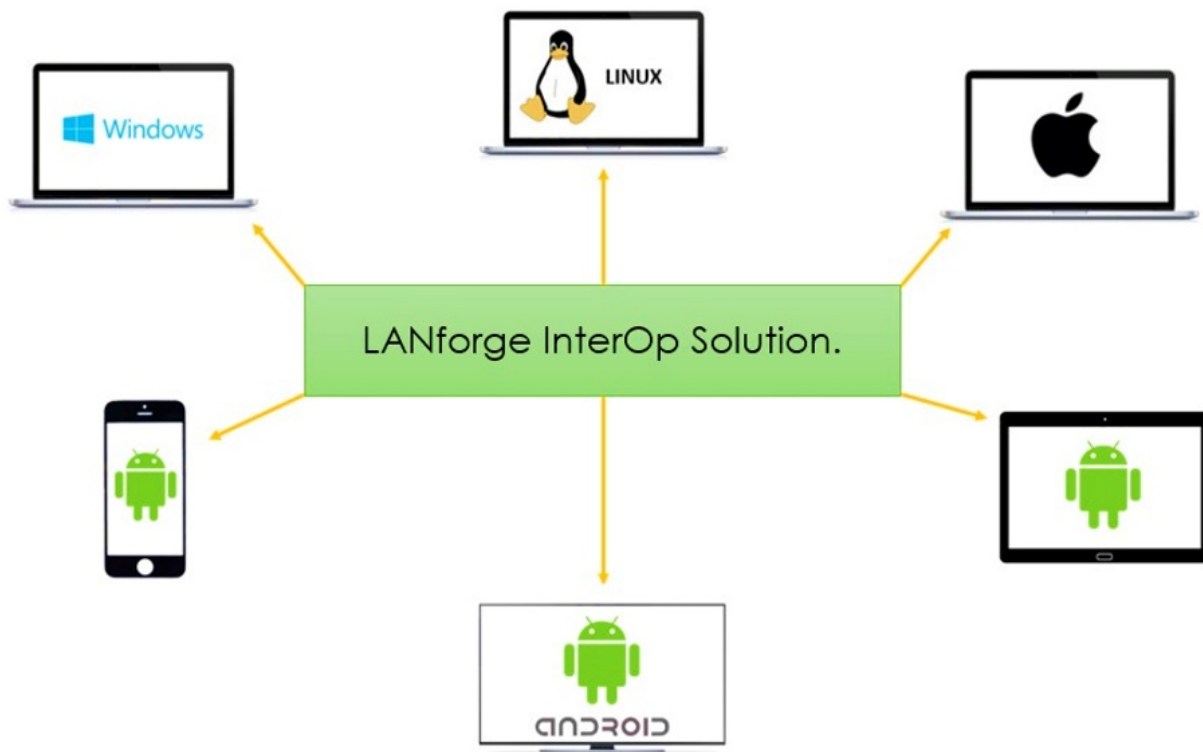


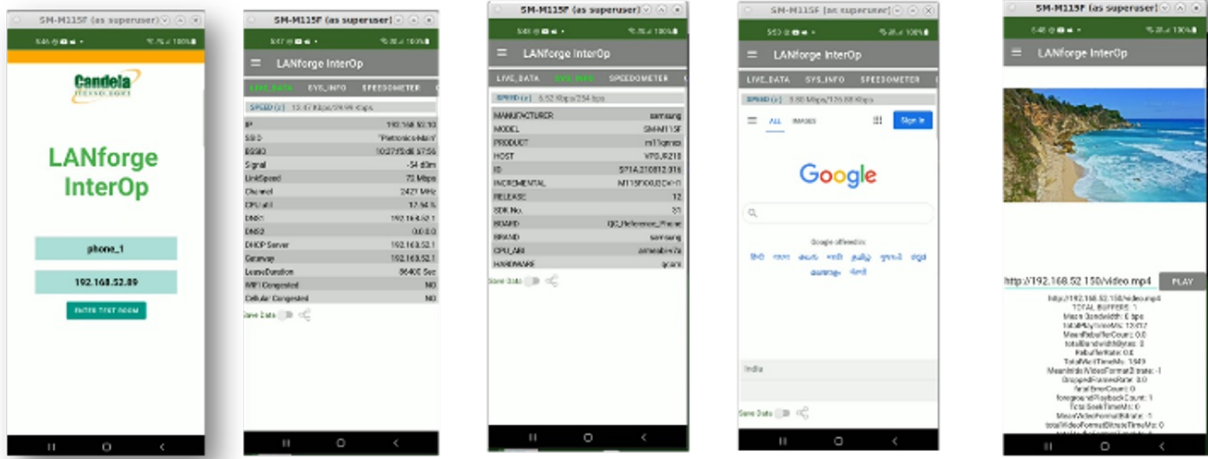
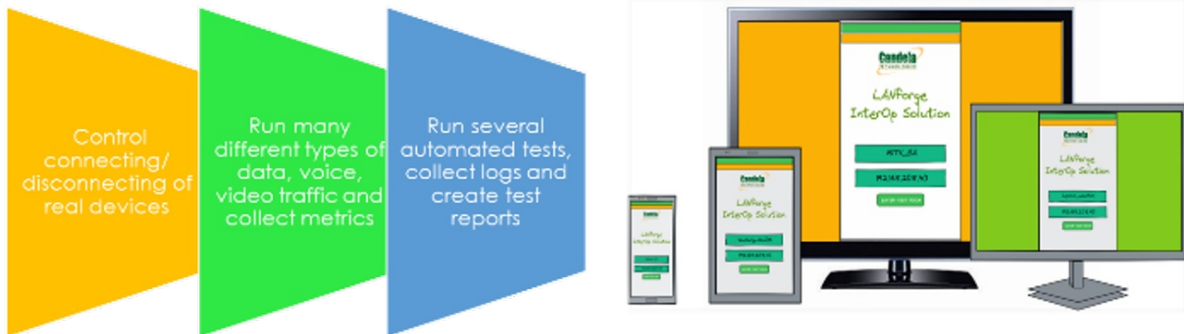
LANforge InterOp: WiFi Testing with Real Clients

For many years, WiFi access points' performance, scale, and functional testing in the lab had two different methodologies. One method was to benchmark the performance of the AP in completely isolated and conducted environments using RF chambers, emulated WiFi clients, and traffic generator tools. This method provided the most amount of the test coverage, determinism, and repeatability in testing, but it missed the key element of realism.

The second method relied on setting up a test lab in large walk-in screen room with lots of real devices and real application traffic. This method solved the realism problem, but at the cost of lack of proper automation and objective statistics on real application performance.

Candela LANforge InterOp solution attempts to bring the best of both worlds and provide a test solution that can scale and bring the realism, but at the same time provide automation and objective measurements of WiFi performance with real applications.



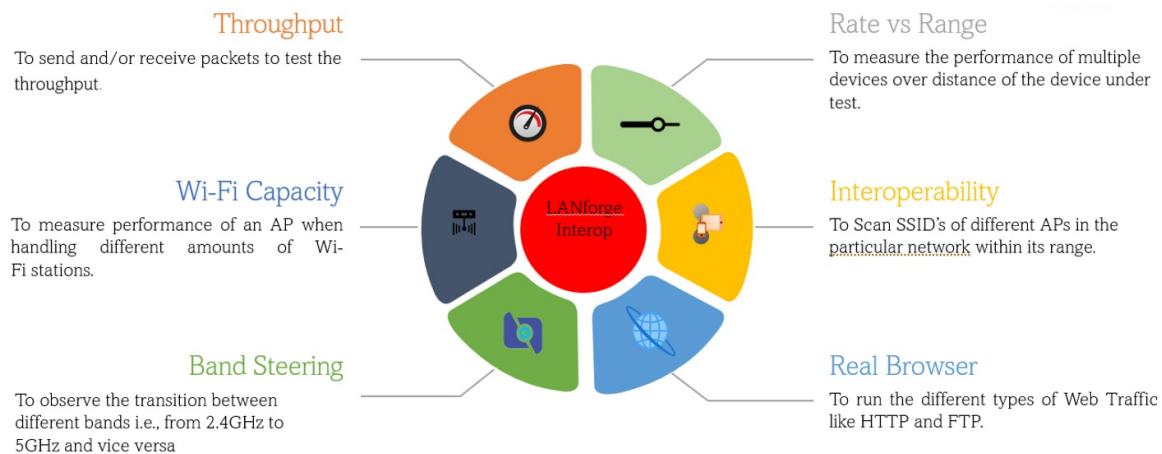


The LANforge InterOp product involves a set of completely automated testcases to test Access Points with real devices and real applications and measure and report KPIs.

Users install a lightweight LANforge InterOp software application on the end user devices and this software allows the test server to control these devices and run various tests. The endpoint application is made available on various standard and non-standard operation systems.

LANforge InterOp Features

- Realtime WiFi statistics display.
- Multiple device management and traffic generation.
- Ease of log fetching when faced with an issue.



LANforge InterOp Use Cases

RF Chambers:



- Control real devices in small numbers and run tests in RF chambers
- Tests normally run with a combination of virtual and real devices
- All real and virtual devices controlled from the same GUI or automation scripts.

Walk-In RF Screen Rooms:



- Setup large walk in screen rooms with 100+ real devices.
- Control all devices from a single test dashboard.

- Run tests at scale and get detailed test report.

Fully Automated Real Device Wi-Fi Testing

Test House:



- Spread large amounts of real devices in a real house and run various fully automated tests.
- Generate detailed coverage and capacity heatmaps.

Coverage Test House

Capacity Test House

Real Campus Test Networks:

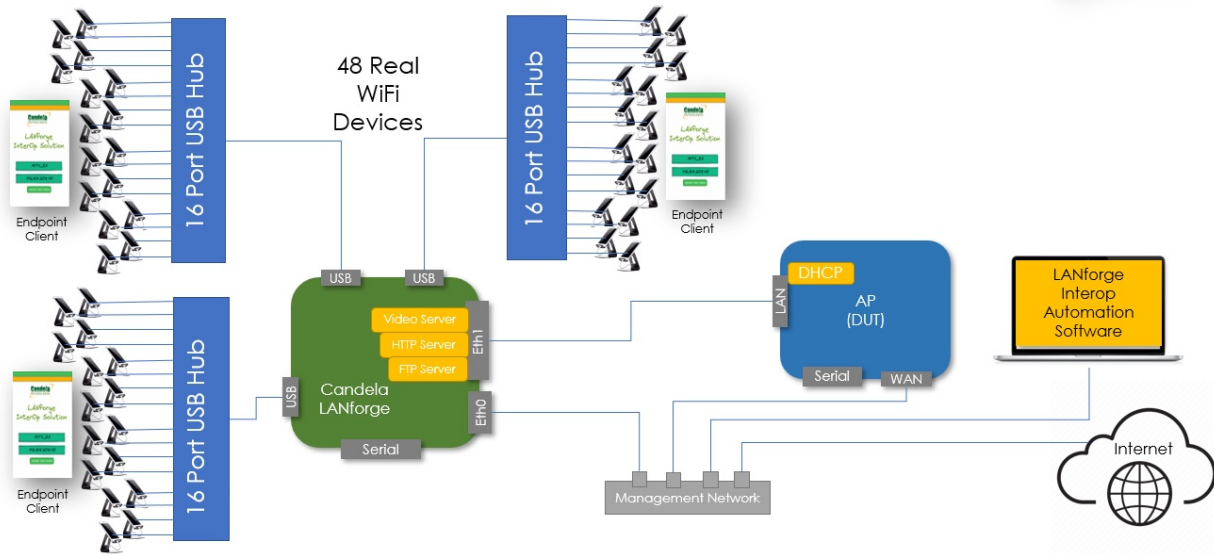


- Setup larger scale test networks in real college campuses.
- Run tests with 100s of real devices using LANforge interop and gather KPIs.

Real Campus Network Testing

LANforge InterOp Test Setup

LANforge InterOp software allows both inband and out of band control of real devices from the LANforge server. All real devices can be connected via USB or Ethernet to the LANforge server for out of band controls and inband controls can be achieved through the WiFi test interface.



After installing the software on all the devices and pointing them to the LANforge server, all devices will be discovered by the server and will show up on the device dashboard in the GUI from which the tester can control all the devices and run various tests.

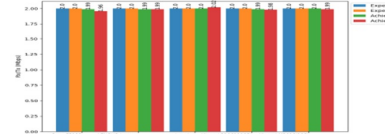
ID	Shelf	Prio	Hostname	User	HW Version	ChIP	Tx Bytes	Rx Bytes	bps-Tx3s	bps-Rx3s	CpuPort	CPU-port	Ports	Free Mem	Free Swap	Load	Max Staged	Max #FUP	STA UP	GPS	M0	
1	1	1	#0312-2002	Linux#0854	192.168.219.197	488,451,745	16,904,000	525,050	14,309,4004	4003	0	1 2 3	Free Mem	Free Swap	Load	Max Staged	Max #FUP	STA UP	GPS	M0		
11	1	1	5WCH2016	AI Samsung	samsung SM-A750F r10 s...	10.0.0.24	199,704,244	2,925,344	110,596	1,720	0	0 1 2	1,659,244	0	0	50	15	12	12	0.0x 0.0x 0m	3.7i	
14	1	1	compair0175	A3Poco	vivo v2017 r11 sdc 30	10.0.0.23	128,713,262	1,378,934	110,346	1,4740	0	0 1	2,103,104	0	0	50	15	12	12	0.0x 0.0x 0m	3.6i	
10	1	1	c4-miu-ota-bd48	A3Poco	Xiaomi POCO F1 r10 sdc 29	10.0.0.38	189,373,196	4,930,094	0	0	0	0	0	0	0	50	15	12	12	0.0x 0.0x 0m	5.7i	
12	1	1	mi-server	A4Redmi	Xiaomi Redmi Note 6 Pro r...	10.0.0.18	179,400,204	4,881,090	183,674	4,408	0	0	0	1 2 3 4 5 6 7 8 9 1...	1,663,984	0	0	50	15	12	0.0x 0.0x 0m	5.8i
17	1	1	cm-buil-405-8	A20Note	HMD Global Note 6 S Pro...	10.0.0.36	179,201,441	4,636,786	89,032	2,032	0	0	0	1 2 3 4 5 6 7 8 9 10...	2,076,748	0	0	50	15	12	0.0x 0.0x 0m	3.6i
15	1	1	mi-server	A6Redmi	Xiaomi Redmi Note 6 Pro r...	10.0.0.16	179,814,741	4,926,138	54,370	245	0	0	0	1 2 3 4 5 6 7 8 9 10...	3,329,908	0	0	50	15	12	0.0x 0.0x 0m	5.8i
23	1	1	ubuntu-16-30-35	01loppo	OPPO CPH1737 r711 sdc...	10.0.0.38	134,400,701	1,815,466	32,960	1,050	0	0	0	1 2 3 4 5 6 7 8 9 10...	3,777,468	0	0	50	15	12	0.0x 0.0x 0m	5.9i
26	1	1	c4-miu-ota-bd48	B3Poco	Xiaomi POCO F1 r10 sdc 29	10.0.0.31	93,159,070	2,567,034	50,970	1,450	0	0	0	1 2 3 4 5 6 7 8 9 10...	3,366,144	0	0	50	15	12	0.0x 0.0x 0m	5.7i
27	1	1	compair0175	B3Vivo	vivo v2017 r11 sdc 30	10.0.0.39	128,643,100	1,360,290	41,997	1,301	0	0	0	1	1,999,232	0	0	50	15	12	0.0x 0.0x 0m	3.9i
28	1	1	Ubuntu-14.04	B4realme	OPPO CPH1859 r9 sdc 28	10.0.0.17	127,976,160	1,321,789	131,992	2,042	0	0	0	1	1,879,196	0	0	50	15	12	0.0x 0.0x 0m	3.3i
49	1	1	m3-vm-ota-bd01	B5Redmi	Xiaomi M20101961 r11 sdc...	10.0.0.70	174,497,348	4,761,214	170,614	4,978	0	0	0	1 2 3 4 5 6 7 8 9 10...	1,607,812	0	0	50	15	12	0.0x 0.0x 0m	3.8i
25	1	1	c4-miu-ota-bd17	B6Redmi	Xiaomi Redmi Note 7S r10...	10.0.0.20	190,193,750	4,888,708	92,936	1,301	0	0	0	1 2 3 4 5 6 7 8 9 10...	1,627,908	0	0	50	15	12	0.0x 0.0x 0m	3.8i
25	1	1	Ubuntu-14.04.2	C1realme	OPPO CPH1859 r9 sdc 28	10.0.0.45	127,976,160	1,321,789	131,992	2,042	0	0	0	1	3,664,452	0	0	50	15	12	0.0x 0.0x 0m	5.8i
43	1	1	21H41E13	C2Samsung	samsung SM-M315F r12 s...	10.0.0.51	132,978,512	1,689,408	130,624	2,368	0	0	0	1 2 3 4 5	2,841,436	0	0	50	15	12	0.0x 0.0x 0m	5.7i
40	1	1	ubuntu-0-172	C3realme	realme RMX2002 r11 sdc...	10.0.0.6	164,532,354	2,735,756	55,968	739	0	0	0	1 2 3 4 5	3,345,400	0	0	50	15	12	0.0x 0.0x 0m	5.6i
44	1	1	cp-ubuntu-122.2	C4Oppo	OPPO CPH1931 r10 sdc 29	10.0.0.39	210,234,176	5,662,298	188,466	7,066	0	0	0	1 2 3 4 5 6 7 8 9 10...	1,203,996	0	0	50	15	12	0.0x 0.0x 0m	2.1i
41	1	1	cp-ubuntu-122.2	D1loppo	OPPO CPH1893 r9 sdc 28	10.0.0.5	200,468,854	5,212,936	73,957	1,056	0	0	0	1 2 3 4 5 6 7 8 9 10...	1,585,520	0	0	50	15	12	0.0x 0.0x 0m	3.8i
47	1	1	c4-miu-ota-bd48	D2Poco	Xiaomi POCO F1 r10 sdc 29	10.0.0.49	199,349,743	5,157,626	212,021	7,170	0	0	0	1 2 3 4 5 6 7 8 9 10...	3,184,324	0	0	50	15	12	0.0x 0.0x 0m	5.7i
50	1	1	compair0175	D3Vivo	vivo v2017 r11 sdc 30	10.0.0.39	186,468,604	3,115,267	193,509	5,557	0	0	0	1 2 3 4 5 6 7 8 9 10...	3,602,784	0	0	50	15	12	0.0x 0.0x 0m	5.7i
56	1	1	mi-server	D4Redmi	Xiaomi Redmi Note 5 r8.1...	10.0.0.46	179,238,497	4,853,780	153,629	5,821	0	0	0	1 2 3 4 5 6 7 8 9 10...	750,856	0	0	50	15	12	0.0x 0.0x 0m	2.8i
54	1	1	21H44004	D5samsung	samsung SM-A6050 r10 s...	10.0.0.3	128,816,941	1,368,976	123,154	1,866	0	0	0	1	1,904,200	0	0	50	15	12	0.0x 0.0x 0m	3.6i
34	1	1	bye400	D6lenovo	Lenovo Lenovo L9811 r9...	10.0.0.8	201,496,267	5,184,696	152,272	4,744	0	0	0	1 2 3 4 5 6 7 8 9 10...	2,127,228	0	0	50	15	12	0.0x 0.0x 0m	3.7i
48	1	1	rd-buil-573	D7Oneplus	OnePlus ONEPLUS A6000...	10.0.0.69	156,981,513	4,313,724	181,129	5,237	0	0	0	1 2 3 4 5 6 7 8 9 10...	4,087,032	0	0	50	15	12	0.0x 0.0x 0m	7.8i
45	1	1	c4-miu-ota-bd14	E1Poco	Xiaomi M2004J10P r10 sdc...	10.0.0.11	154,388,581	2,045,862	130,165	2,586	0	0	0	1 2 3	3,309,472	0	0	50	15	12	0.0x 0.0x 0m	5.9i
32	1	1	compair0175	E2Vivo	vivo v2017 r11 sdc 30	10.0.0.12	128,477,899	1,340,024	131,386	1,789	0	0	0	1	1,173,460	0	0	50	15	12	0.0x 0.0x 0m	2.8i
42	1	1	compair0180	E3vivo	vivo v2022 r11 sdc 30	10.0.0.29	178,967,043	4,822,132	161,429	6,026	0	0	0	1 2 3 4 5 6 7 8 9 10...	1,669,968	0	0	50	15	12	0.0x 0.0x 0m	2.9i
32	1	1	mi-server	E4Redmi	Xiaomi Redmi Note 5 Pro r...	10.0.0.13	176,273,698	4,870,392	50,885	1,549	0	0	0	1 2 3 4 5 6 7 8 9 10...	1,538,232	0	0	50	15	12	0.0x 0.0x 0m	3.8i
39	1	1	c4-miu-ota-bd17	E5Redmi	Xiaomi Redmi Note 7 r10...	10.0.0.22	168,664,309	5,371,934	100,032	1,053	0	0	0	1 2 3 4 5 6 7 8 9 10...	1,557,532	0	0	50	15	12	0.0x 0.0x 0m	2.8i
20	1	1	m3-vm-ota-bd13	F1Poco	Xiaomi M20101961 r11 sdc...	10.0.0.30	178,957,931	4,836,604	182,973	6,016	0	0	0	1 2 3 4 5 6 7 8 9 10...	3,324,492	0	0	50	15	12	0.0x 0.0x 0m	5.8i
29	1	1	2107025	F2samsung	samsung SM-M215F r12 s...	10.0.0.56	99,150,815	1,517,648	28,090	314	0	0	0	1	1,244,756	0	0	50	15	12	0.0x 0.0x 0m	3.6i
30	1	1	compair025	F3Vivo	vivo v2017 r10 sdc 23	10.0.0.4	129,948,788	1,428,142	114,008	1,548	0	0	0	1	1,482,256	0	0	50	15	12	0.0x 0.0x 0m	2.9i
38	1	1	mi-server	F4Redmi	Xiaomi Redmi Note 5 Pro r...	10.0.0.14	178,797,001	4,835,498	182,314	6,261	0	0	0	1 2 3 4 5 6 7 8 9 10...	1,769,824	0	0	50	15	12	0.0x 0.0x 0m	3.6i
37	1	1	c4-miu-ota-bd17	G1Redmi	Xiaomi Redmi Note 7 r10...	10.0.0.21	143,894,444	4,674,376	145,123	6,221	0	0	0	1 2 3 4 5 6 7 8 9 10...	754,600	0	0	50	15	12	0.0x 0.0x 0m	2.8i
35	1	1	mi-server	G2Redmi	Xiaomi Redmi Note 4 r7.0...	10.0.0.47	133,889,733	1,697,352	86,002	1,368	0	0	0	1	764,852	0	0	50	15	12	0.0x 0.0x 0m	2.9i
37	1	1	c4-miu-ota-bd18	G3Redmi	Xiaomi Redmi Note 7 Pro r...	10.0.0.32	200,629,493	5,261,068	173,661	5,224	0	0	0	1 2 3 4 5 6 7 8 9 10...	2,921,024	0	0	50	15	12	0.0x 0.0x 0m	5.7i
31	1	1	cp-ubuntu-122.2	G4realme	realme RMX2021 r11 sdc...	10.0.0.15	209,444,015	5,874,016	61,397	895	0	0	0	1 2 3 4 5 6 7 8 9 10...	1,653,124	0	0	50	15	12	0.0x 0.0x 0m	3.7i
39	1	1	mi-server	G5Redmi	Xiaomi Redmi Note 4 r7.0...	10.0.0.48	73,588,815	1,417,346	56,405	1,304	0	0	0	1	1,118,536	0	0	50	15	12	0.0x 0.0x 0m	2.9i
22	1	1	compair110017	G6Vivo	vivo v2017 r12 sdc 31	10.0.0.59	128,806,844	1,931,818	53,957	2,768	0	0	0	1 2 3	3,213,748	0	0	50	15	12	0.0x 0.0x 0m	5.8i
13	1	1	ubuntu-13.25	G7realme2pro	OPPO RMX2001 r10 sdc 29	10.0.0.67	200,921,428	5,265,142	193,810	6,609	0	0	0	1 2 3 4 5 6 7 8 9 10...	3,315,036	0	0	50	15	12	0.0x 0.0x 0m	2.8i
16	1	1	wpv1_hot_corp.p...	H1Nexus	Huawei Nexus 6P r8.1.0 s...	10.0.0.25	187,028,166	4,955,381	150,928	5,397	0	0	0	1 2 3 4 5 6 7 8 9 10...	0	0	0	50	15	12	0.0x 0.0x 0m	2.8i
18	1	1	mi-server	H2Redmi	Xiaomi Mi A1 r7.1.2 sdc 25	10.0.0.43	82,573,499	1,145,030	98,234	1,789	0	0	0	1	2,050,404	0	0	50	15	12	0.0x 0.0x 0m	3.6i
19	1	1	CP-ubuntu-123	H3Oppo	OPPO CPH2083 r9 sdc 28	10.0.0.40	123,161,116	1,671,684	121,003	2,042	0	0	0	1	1,389,320	0	0	50	15	12	0.0x 0.0x 0m	2.8i
21	1	1	m3-vm-ota-bd13	H4Poco	Xiaomi M20101961 r11 sdc...	10.0.0.68	179,436,017	4,876,380	192,800	6,630	0	0	0	1 2 3 4 5 6 7 8 9 10...	3,074,840	0	0	50	15	12	0.0x 0.0x 0m	5.8i
21	1	1	Ubuntu-13.03.2	H5Lenovo	realme RMX2021 r11 sdc...	10.0.0.44	59,058,098	1,268,762	129,530	1,520	0	0	0	1 2 3 4 5	1,154,440	0	0	50	15	12	0.0x 0.0x 0m	3.7i

- Web page test
- HTTP file download test
- Long-term stability test
- Mixed traffic test

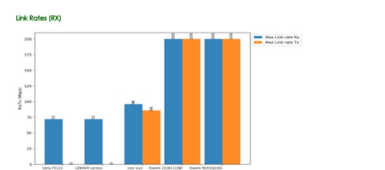
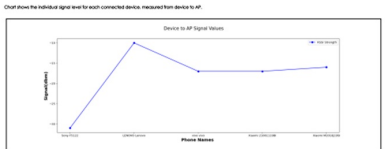
From the tests, key performance metrics such as throughput, packet loss, jitter, voice quality, video quality, webpage load times and more are measured in real time. From this data, charts and detailed test reports (in PDF, HTML, CSV and other formats) can be created.

Location	Mobile Brand	Mobile Hardware Version	RSSI	Data-rate	mcs	NSS	Tput(TCP UL)	Tput(TCP DL)	Tput (UDP UL)	Tput (UDP DL)
A1	Samsung	samsung SM-A750F r10 s	-42	150 mbps	7	1	5.0154	5.0207	0	3.67369
A2	Vivo	vivo vivo 1901 r11 sdk:30	-53	433 mbps	9	1	4.92747	4.19683	0	3.69628
A3	Poco	Xiaomi POCO F1 r10 sdk: 29	-43	866 mbps	11	2	0	5.04234	0	3.11878
A4	Redmi	Xiaomi Redmi Note 6 Pro	-36	433 mbps	9	1	4.84598	5.03162	0	3.47002
A5	Nokia	HMD Global Nokia 6.1 Plu...	-56	433 mbps	9	1	0	4.98338	0	4.70051
A6	Redmi	Xiaomi Redmi Note 6 Pro r...	-37	433 mbps	9	1	5.11024	3.51065	0.60118	3.34019
B1	OpPO	OPPO CPH1727 r7.1.1 sdk...	-35	135 mbps	7	1	5.01391	0.88431	4.59081	3.40636
B2	Poco	Xiaomi POCO F1 r10 sdk: 29	-41	866 mbps	11	2	4.84398	0.22291	0.98559	4.43137
B3	Vivo	vivo vivo 1901 r11 sdk:30	-43	433 mbps	9	1	3.34082	3.07372	0	3.66152
B4	Realme	OPPO CPH1859 r9 sdk: 28	-38	433 mbps	9	1	5.01295	5.00443	0	4.85163
B5	Redmi	Xiaomi M2010J195 r11 sd...	-39	433 mbps	9	1	5.01863	4.24777	0	4.06829
B6	Redmi	Xiaomi Redmi Note 7s r10...	-40	433 mbps	9	1	4.40368	4.21623	0	4.79155
C1	Realme	OPPO CPH1859 r9 sdk: 28	-36	433 mbps	9	1	5.01202	5.00509	0	4.70221
C2	Samsung	Samsung SM-A315F r12 s...	-48	433 mbps	9	1	4.84562	3.53704	0	4.83137
C3	Realme	realme RMX2002 r11 sdk:...	-48	433 mbps	9	1	5.0142	3.93721	4.90208	3.32926
C4	OpPO	OPPO CPH1931 r10 sdk: 29	-47	433 mbps	9	1	5.01202	4.1955	0.29795	4.29218
D1	OpPO	OPPO CPH1853 r9 sdk: 28	-31	433 mbps	9	1	0	0.02509	0.44708	3.27709
D2	Poco	Xiaomi POCO F1 r10 sdk: 29	-35	866 mbps	11	2	0.42767	3.66548	0.26701	4.27888
D3	Vivo	vivo vivo 1818 r11 sdk:30	-34	433 mbps	9	1	1.24667	1.62147	0.43978	2.84298
D4	Redmi	Xiaomi Redmi Note 5 r8.1...	-40	150 mbps	7	1	0	3.52703	0	3.02501
D5	Samsung	samsung SM-A605C r10 s...	-31	150 mbps	7	1	0	1.49416	0	2.32057
D6	Lenovo	Lenovo Lenovo 180111 r9...	-38	866 mbps	11	2	5.80489	2.9208	0.67145	3.92645
D7	Oneplus	OnePlus ONEPLUS A6000 ...	-36	866 mbps	11	2	0	5.01457	0.17277	0
E1	Poco	Xiaomi M2004J19P r10 sd...	-32	433 mbps	9	1	5.01123	0.91448	0	3.90604
E2	Vivo	vivo vivo 1904 r11 sdk:30	-41	433 mbps	9	1	4.86991	1.56763	0	3.87309
E3	Vivo	vivo V2052 r11 sdk: 30	-42	150 mbps	7	1	0	3.75214	0	2.52742
E4	Redmi	Xiaomi Redmi Note 5 Pro r...	-43	433 mbps	9	1	0	3.38157	0.79737	3.47815
E5	Redmi	Xiaomi Redmi Note 7 r10 ...	-37	433 mbps	9	1	0.16261	4.58639	0	0
F1	Poco	Xiaomi M2010J19C r11 sd...	-38	433 mbps	9	1	3.27155	1.25879	0	4.60552
F2	Samsung	samsung SM-M215F r12 s...	-39	433 mbps	9	1	0.00387	2.9204	0	4.99855
F3	Vivo	vivo vivo 1607 r6.0 sdk: 23	-42	135 mbps	7	1	2.40674	2.53435	3.7146	2.73357
F4	Redmi	Xiaomi Redmi Note 5 Pro r...	-35	433 mbps	9	1	5.01107	4.41432	1.26806	3.3156
G1	Redmi	Xiaomi Redmi Note 7 r10 ...	-41	433 mbps	9	1	0	0.70583	0.7814	4.73207
G2	Redmi	Xiaomi Redmi Note 4 r7.0 ...	-41	150 mbps	7	1	0	0.3271	0	3.33271
G3	Redmi	Xiaomi Redmi Note 7 Pro r...	-48	433 mbps	9	1	5.01169	4.11564	0	4.32383
G4	Realme	Realme RMX1971 r11 sdk:...	-31	433 mbps	9	1	1.31636	4.15994	0.95056	4.05955
G5	Redmi	Xiaomi Redmi Note 4 r7.0 ...	-39	150 mbps	7	1	5.01219	0.81354	0	2.69492
G6	Vivo	vivo vivo 1907 r12 sdk: 31	-39	433 mbps	9	1	5.01328	4	5.02217	3.86855
G7	Realme	OPPO RMX1801 r10 sdk: 29	-41	433 mbps	9	1	2.57502	4.92946	4.09662	3.23142
H1	Nexus	Huawei Nexus 6P r8.1.0 s...	-42	866 mbps	11	2	5.18093	4.97976	0	2.97206
H2	Redmi	Xiaomi MI A1 r7.1.2 sdk: 25	-40	433 mbps	9	1	1.7163	4.95124	0	3.31487
H3	OpPO	OPPO CPH2083 r9 sdk: 28	-43	433 mbps	9	1	4.8476	4.27494	4.38822	4.10056
H4	Poco	Xiaomi M2010J19C r11 sd...	-37	433 mbps	9	1	2.48487	0.00838	0	4.72524
H5	Narzo	realme RMX3171 r11 sdk:...	-37	433 mbps	9	1	2.24902	5.02416	4.99435	3.59461
H7	Redmi	Xiaomi M2004J19C r10 sd...	-43	433 mbps	9	1	5.18048	3.13949	0	3.79337
H8	Realme	realme RMX1925 r10 sdk:...	-30	433 mbps	9	1	0.29812	2.43235	0.32984	4.05673
H9	Redmi	Xiaomi Redmi Note 7 Pro r...	-37	433 mbps	9	1	1.2141	3.64535	3.15414	3.92297

Device Name	Signal	Connected SSID	Security	Channel	Mode	Rx Rate (Mbps)	Tx Rate (Mbps)	Band	Direction	Traffic
Station 1020101199	-76	NETGEAR81	WPA2	14	20/50	200	200	40	Uplink and Downlink	UDP, Pkts



Signal Strength reported by the clients:



Objective:

The scan test on the WE-CAN APP is designed to scan the SSID of the different Access Points in the particular network within its range so all the connected clients in the Lanforge WE-CAN server should scan the given SSID within its range.

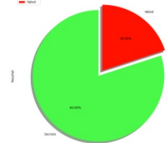
Testing Data (User Input)

Server IP	Target SSID	Security	Mode
192.148.200.40	NETGEAR81	WPA2	20

Phone Scan Table

Phone Name	User Name	MAC Address	Resource ID	Signal Strength	Phone Model	Passed/Failed
Sony F122	sony_apexia	84c7ae23e8d37	10	-26.0	AUTO 20	Success
LSHQVQ	emovovibe	a0329959c79acc	11	-13.0	AUTO 20	Success
vivo vivo	vivo1920	2074544b1449c	12	-13.0	802.11abgn 40	Success
Xiaomi 21041198	device_2	b894a73537a41	13	-17.0	802.11abgn 40	Success
Xiaomi 1020101199	device_1	8c0f4678d328b	14	NA	802.11abgn 40	Failed

Pie Chart of Success and Failure



Lanforge Interop Port Reset Test
2022-11-16-16:11:31

Test Setup Information

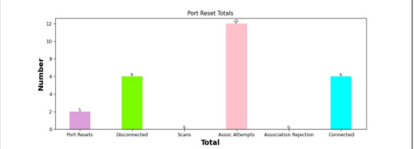
Device under test	DOT Name	Helpcar
	SSID	NETGEAR77-2G
	Test Duration	0:13:55

Objective

The Lanforge Interop port reset test allows user to use lots of real WiFi stations and connect them from the AP under test and then disconnect and reconnect a random number of stations at random intervals. The objective of this test is to verify a representative public venue capacity where a number of stations arrive, connect and depart in quick succession. A successful test result would be that AP remains stable over the duration of the test and that stations can continue to reconnect to the AP.

Port Reset Total Graph

The below graph provides overall information regarding the test count where port reset-total resets provided as test input. Disconnect-H is the total number of disconnect happened for all clients during the test when WiFi was disabled. Score-H is the total number of scoring state achieved by all clients during the test when network is enabled back again. Association attempt-H is the total number of association attempt (Association state) achieved by all client after the WiFi is enabled back again in full test. Connected-H is the total number of connection (Associated state) achieved by all clients during the test when WiFi is enabled back again. Here test clients used 1. Total number of tests provided 2.



Per Client Graph for client 450b13c

The below graph provides information regarding per station behaviour for every reset count where port reset-total resets provided as test input. Disconnect-H is the total number of disconnect happened for a client during every reset when WiFi was disabled. Score-H is the total number of scoring state achieved by a client during the test when network is enabled back again. Association attempt-H is the total number of association attempt (Association state) achieved by a client after the WiFi is enabled back again in full test. Connected-H is the total number of connection (Associated state) achieved by a client during the test when WiFi is enabled back again.

Objective:

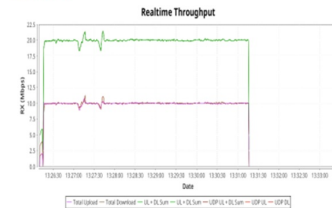
The Lanforge Interop Wi-Fi Capacity Test is designed to measure the performance of an Access Point when handling different types of real clients. The test allows the user to increase the number of stations to test defined steps for each test duration and measure the per station and overall throughput along with the other metrics. The objective of this test is to verify a representative public venue capacity where a number of stations arrive, connect and depart in quick succession. A successful test result would be that AP remains stable over the duration of the test and that stations can continue to reconnect to the AP.

Real-Time UDP Throughput Chart

Below chart shows the measured and calculated throughput for station increments x7 time for UDP Pkts.

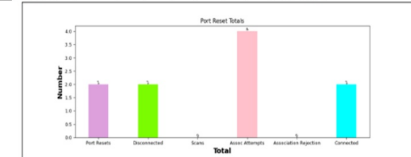
No. of stations(20 & 50)	Traffic type	Total connected clients	Failed clients
20 - stations x 3 - 20	Total Uplink - Downlink, Total Download - Uplink	5	NA

Real Time Chart



Individual Device Performance Chart:

Device Name	Signal	Connected SSID	Security	Channel	Mode	Rx Rate (Mbps)	Tx Rate (Mbps)	Band	Direction	Traffic
Sony F122	20	NETGEAR81	WPA2	4	20	72	0	20	Uplink and Downlink	UDP, Pkts



Real Client WiFi(AMVZ) Reset Observations

The below table shows actual behaviour of real devices for every reset value

Reset Count	Association attempt	Disconnected	Scoring	Association Rejection	Connected
1	2	1	0	0	1
2	2	1	0	0	1

Real Client Detail Info

S.No	Name	Device	User Name	Model	Reset
1	1.4502073c	iPhone	device_2	140222002	11
2	1.39a03031	Pixel3XL	device_1	EMV8531	11
3	1.8f9da5a46722	GalS	device_2	SM_A107T	11

Test basic input information

Lanforge ip	192.148.200.230
Lanforge port	8080
ssid	NETGEAR77-2G
band	20
reset count	2
Time Interval between every reset(sec)	60
No. of Clients	3
Test Time	60
Contact	support@candelatech.com

Generated by Candela Technologies Lanforge Network Test tool
www.candelatech.com

Lanforge InterOp Rate vs Range
2022-11-08-13-24-10

Objective

WiFi InterOp measures the performance of each real client over a certain distance of the SSID. Distance is simulated using programming technique and throughput test is of each client over 1000 steps. The test requires the performance over distance of the device under test. The test uses the user to plot SSID curves both uplink and downlink for different rates of traffic, and different station types.

Device under test	AP Model	NETGEAR3
	Number of Real Stations	3
	SSID	NETGEAR77-2G
	Password	Password123
	Traffic Generated for each Station	10Mbps
	Test Duration	0:50:21

Overall download throughput for 3 real clients using TCP traffic.

The below graph represents overall download throughput for different observation levels.



Table for Graph

Observation Step(s)	Download Throughput(Mbps)
1.00s	1.0000
2.00s	1.0000
4.00s	1.0000
6.00s	1.0000
8.00s	1.0000
10.00s	1.0000
12.00s	1.0000
14.00s	1.0000
16.00s	1.0000
18.00s	14.819
20.00s	0.0000

Lead Times and Support:

Please contact support@candelatech.com if you need any assistance.

Lead Times: Four to six weeks.

TaaS/Onsite Support: Customers with only occasional test needs can use our Test as a Service option. Candela engineers can do the testing for you in our fully equipped test lab and provide a detailed test report with recommendations.

For more information, please contact sales@candelatech.com or give us a call at: 1-360-380-1618

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