

Networks in a Box

Candela
TECHNOLOGIES

Objective

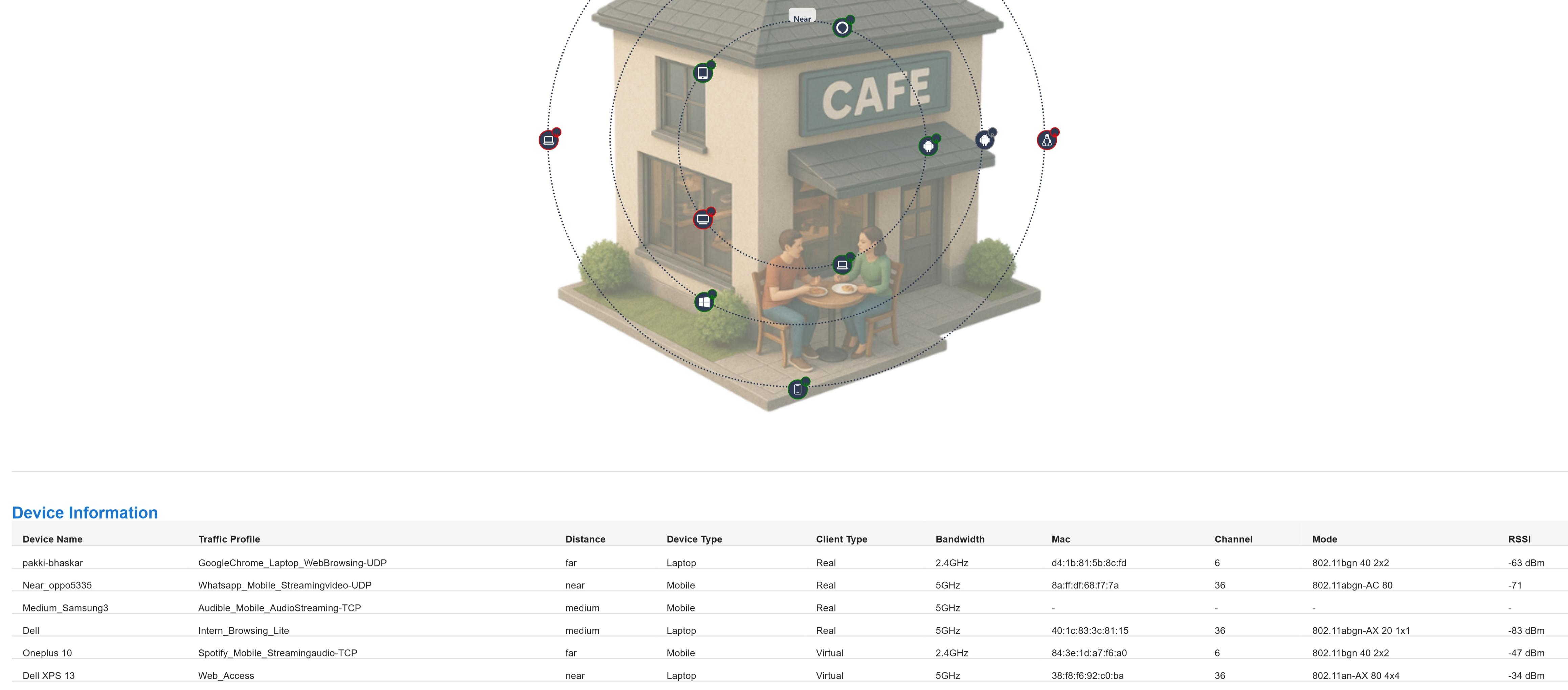
The objective of this test is to evaluate the performance and operational capabilities of access points in various real-world environments, including home, office, hospital, and stadium settings, using Candela's Networks in a Box solution. The test will involve emulating virtual devices and using real devices at different distances (near, medium, and far) and applying predefined traffic profiles to simulate activities such as video streaming, online gaming, browsing, file downloads, and application video streams (YouTube, Netflix, Zoom, etc.). Additionally, the performance of IoT devices connected to Alexa will be assessed. The aim is to identify key performance metrics and potential issues related to AP capacity, coverage, QoS, and device handling under typical usage scenarios.

DUT Configuration

Test Network		Cafe in a Box	Kiosk Cafe
Name of the Test Scenario			
Test Duration (minutes)		10	12
No. of Devices in test			
2GHz SSID		TPLINK_2G	
2GHz BSSID		78:8c:b5:48:d3:86	
2GHz Security		WPA2	
5GHz SSID		TPLINK_5G	
5GHz BSSID		78:8c:b5:48:d3:87	
5GHz Security		WPA2	
6GHz SSID		TPLINK_6G	
6GHz BSSID		5e:8c:b5:48:d3:88	
6GHz Security		WPA3	

Client Distributions and Pass/Fail Analysis

The distribution of clients across various distances—near, medium, and far can be seen in the below image. Each client's pass/fail status was determined based on SLA criteria, with green indicating pass and red indicating fail. This representation provides a clear summary of the test outcomes across various client distances.



Device Information

Device Name	Traffic Profile	Distance	Device Type	Client Type	Bandwidth	Mac	Channel	Mode	RSSI
pakki-bhaskar	GoogleChrome_Laptop_WebBrowsing-UDP	far	Laptop	Real	2.4GHz	d4:1b:81:5b:8c:fd	6	802.11bgn 40 2x2	-63 dBm
Near_oppo5335	Whatsapp_Mobile_Streamingvideo-UDP	near	Mobile	Real	5GHz	8a:ff:df:68:f7:7a	36	802.11abgn-AC 80	-71
Medium_Samsung3	Audible_Mobile_AudioStreaming-TCP	medium	Mobile	Real	5GHz	-	-	-	-
Dell	Intern_Browsing_Lite	medium	Laptop	Real	5GHz	40:1c:83:3c:81:15	36	802.11abgn-AX 20 1x1	-83 dBm
Oneplus 10	Spotify_Mobile_Streamingaudio-TCP	far	Mobile	Virtual	2.4GHz	84:3e:1d:a7:f6:a0	6	802.11bgn 40 2x2	-47 dBm
Dell XPS 13	Web_Access	near	Laptop	Virtual	5GHz	38:fb:f6:92:c0:ba	36	802.11an-AX 80 4x4	-34 dBm
HP Laptop	Zoom_Laptop_Streamingvideo-UDP	far	Laptop	Virtual	6GHz	70:15:fb:17:22:39	-1	AUTO 20 1x1	0 dBm
iPhoneX	Facebook_Mobile_StreamingVideo-UDP	far	Mobile	Virtual	5GHz	84:3e:1d:a3:c1:9a	36	802.11an-AC 80 2x2	-62 dBm
Lenovo	GoogleChrome_Laptop_WebBrowsing-UDP	medium	Laptop	Virtual	2.4GHz	84:3e:1d:84:13:74	6	802.11bgn 40 2x2	-40 dBm
Mi TV	DisplayMenu_SmartTV_WebBrowsing	near	SmartTV	Virtual	2.4GHz	38:fb:f6:11:34:b4	6	802.11bgn 40 4x4	-17 dBm
Samsung Tab	Swiggy_Tablet_WebBrowsing-TCP	near	Tablet	Virtual	2.4GHz	38:fb:f6:06:28:b4	6	802.11bgn 40 4x4	-15 dBm
Amazonecho	Alexa_AmazonEchoDot_Streamingaudio-TCP1	near	Amazonechidot	Virtual	5GHz	38:fb:f6:75:d1:ba	36	802.11an-AC 80 4x4	-33 dBm

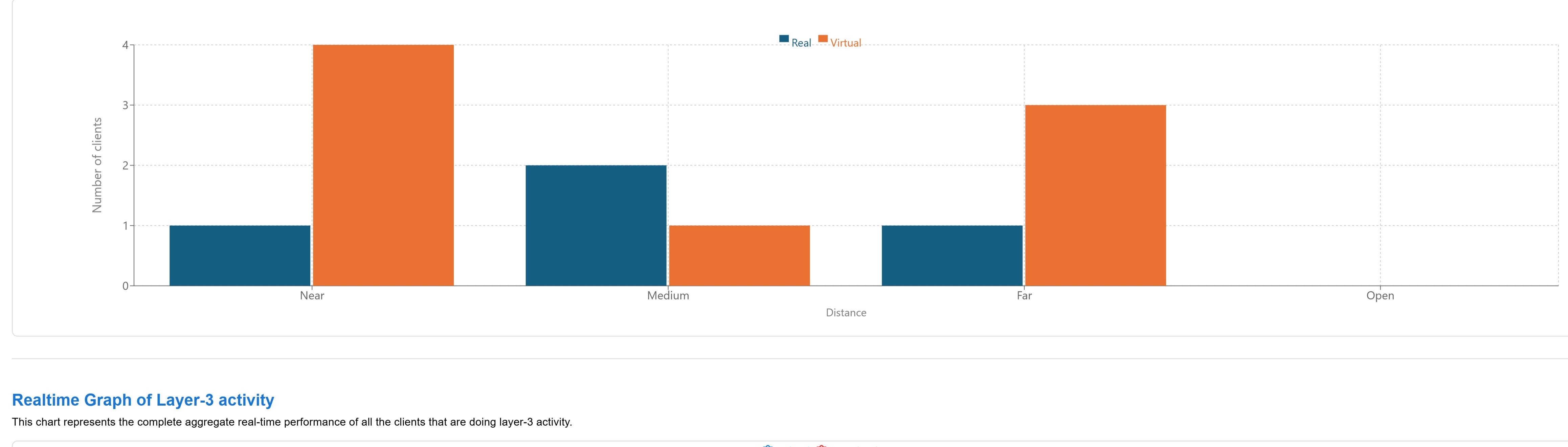
Performance with respect to device types

This representation highlights the pass/fail performance rates across various device types, including mobiles, laptops, tablets, gaming consoles, IoT devices, and smart wearables. The data allows us to assess which device categories perform optimally with the Access Point, providing insights that similar devices are likely to exhibit comparable performance in real-world scenarios.



Performance with respect to traffic types

This representation presents the pass/fail performance rates across different traffic types, including video conferencing, audio/video streaming, gaming, and IoT applications. By examining these results, we can determine which traffic types perform better with the Access Point and infer that similar traffic can be effectively deployed in real-world scenarios.



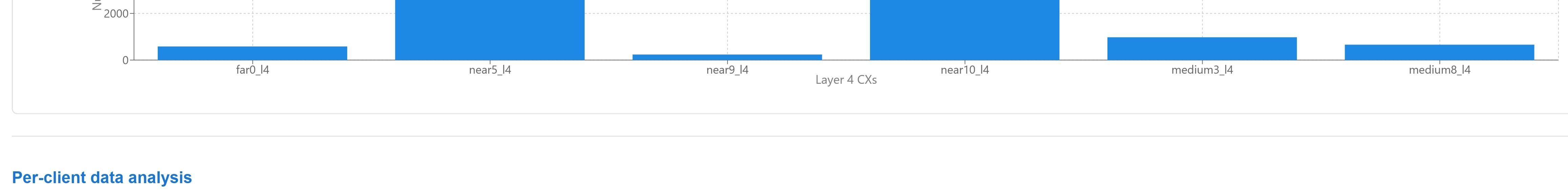
Number of Clients vs Distance

This chart represents the number of clients both real and virtual placed at varying distances—near, medium, and far.



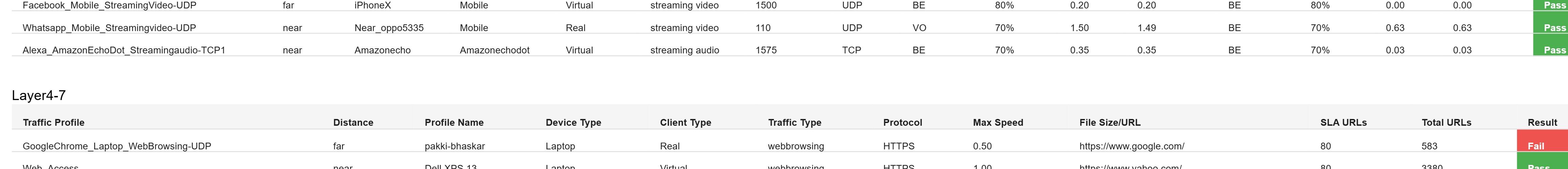
Realtime Graph of Layer-3 activity

This chart represents the complete aggregate real-time performance of all the clients that are doing layer-3 activity.



Realtime Graph of Layer-4 activity

This chart represents the complete aggregate real-time performance of all the clients that are doing layer-4 activity.



Per-client data analysis

Layer3

Traffic Profile	Distance	Profile Name	Device Type	Client Type	Traffic Type	Packet Size	Protocol	Priority DL	DL SLA%	DL Rate	Avg DL Rate	Priority UL	UL SLA%	UL Rate	Avg UL Rate	Result
Spotify_Mobile_Streamingaudio-TCP	far	Oneplus 10	Mobile	Virtual	streaming audio	790	TCP	VO	70%	0.50	0.50	BE	70%	0.10	0.10	Pass
Zoom_Laptop_Streamingvideo-UDP	far	HP Laptop	Laptop	Virtual	streaming video	1170	UDP	BE	70%	0.11	0.00	BE	70%	0.02	0.00	Fail
Facebook_Mobile_StreamingVideo-UDP	far	iPhoneX	Mobile	Virtual	streaming video	1500	UDP	BE	80%	0.20	0.20	BE	80%	0.00	0.00	Pass
Whatsapp_Mobile_Streamingvideo-UDP	near	Near_oppo5335	Mobile	Real	streaming video	110	UDP	VO	70%	1.50	1.49	BE	70%	0.63	0.63	Pass
Alexa_AmazonEchoDot_Streamingaudio-TCP1	near	Amazonechidot	Amazonechidot	Virtual	streaming audio	1575	TCP	BE	70%	0.35	0.35	BE	70%	0.03	0.03	Pass

Layer4-7

Traffic Profile	Distance	Profile Name	Device Type	Client Type	Traffic Type	Protocol	Max Speed	File Size/URL	SLA URLs	Total URLs	Result
GoogleChrome_Laptop_WebBrowsing-UDP	far	pakki-bhaskar	Laptop	Real	webbrowsing	HTTPS	0.50	https://www.google.com/	80	583	Fail
Web_Access	near	Dell XPS 13	Laptop	Virtual	webbrowsing	HTTPS	1.00	https://www.yahoo.com/	80	3380	Pass
DisplayMenu_SmartTV_WebBrowsing	near	Mi TV	SmartTV	Virtual	webbrowsing	HTTPS	0.50	https://www.starbucks.com/menu	70	237	Fail
Swiggy_Tablet_WebBrowsing-TCP	near	Samsung Tab	Tablet	Virtual	webbrowsing	HTTPS	0.20	https://www.swiggy.com/	80	6020	Pass

Intern_Browsing_Lite	medium	Dell	Laptop	Real	webbrowsing	HTTPS	0.50	https://www.amazon.com/	80	977	Pass
GoogleChrome_Laptop_WebBrowsing-UDP	medium	Lenovo	Laptop	Virtual	webbrowsing	HTTPS	0.50	https://www.google.com/	80	659	Fail