

Networks in a Box



Objective

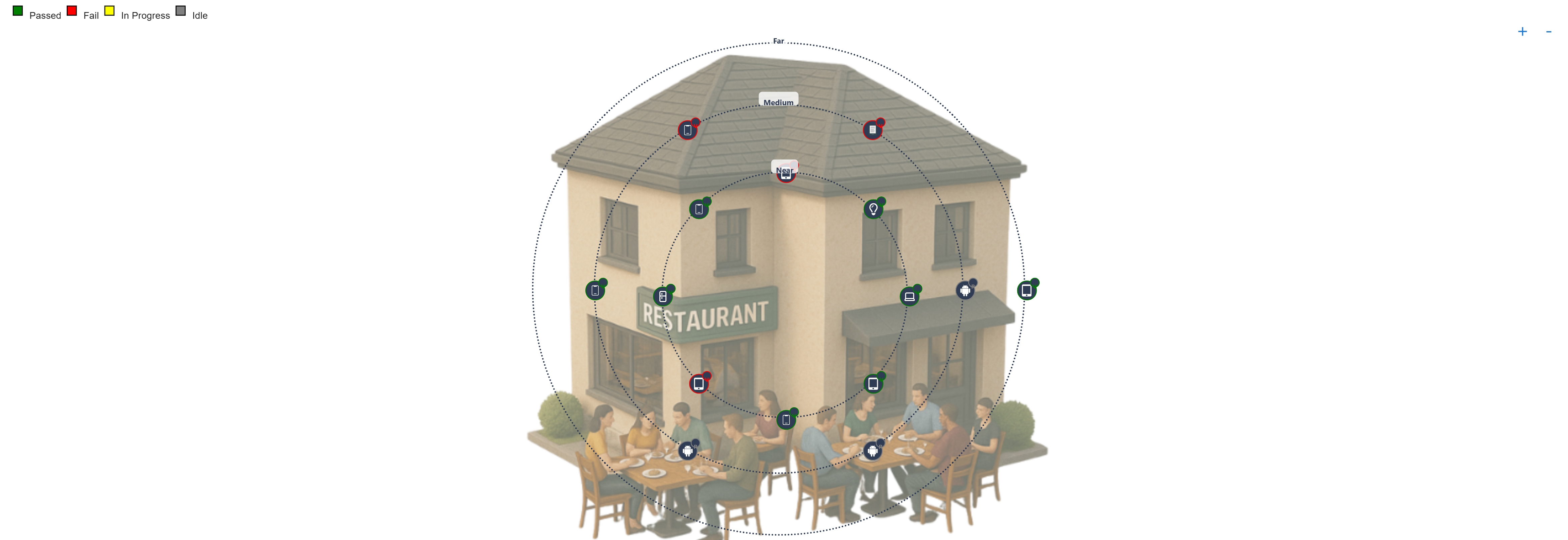
The objective of this test is to evaluate the performance and operational capabilities of access points in various real-world environments, including home, office, hospital, and stadium settings, using Candela's Networks in a Box solution. The test will involve emulating virtual devices and using real 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	Restaurant in a Box
Name of the Test Scenario	Quick Serve
Test Duration (minutes)	10
No. of Devices in test	15
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.

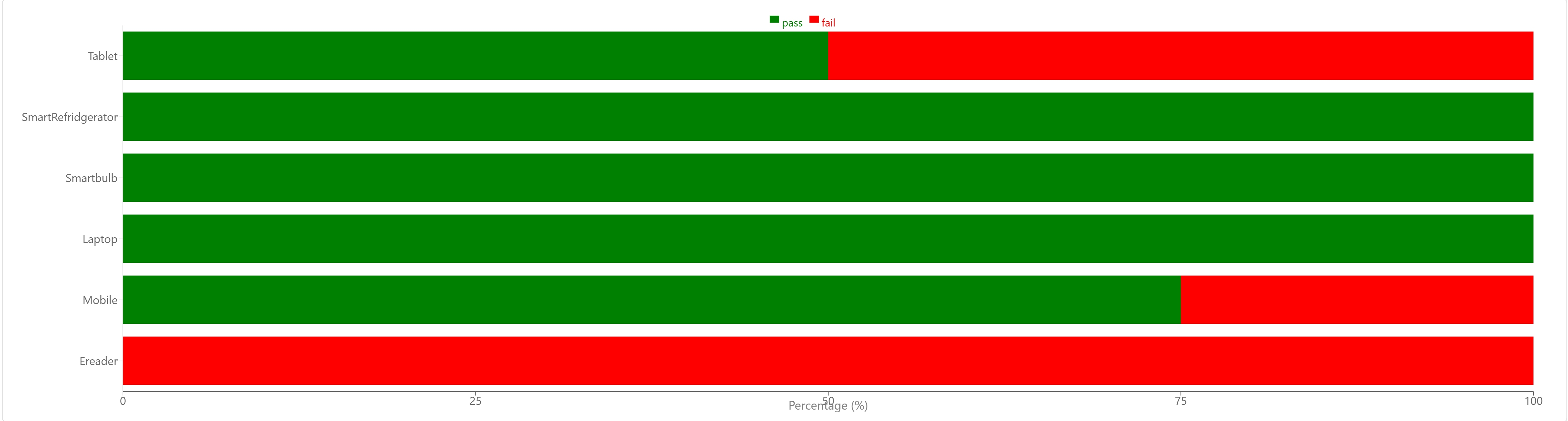


Device Information

Device Name	Traffic Profile	Distance	Device Type	Client Type	Bandwidth	Mac	Channel	Mode	RSSI
Medium_2307	Youtube_Mobile_Downloadvideo-UDP	medium	Mobile	Real	5GHz	-	-	-	-
Medium_Samsung3	Customer_PaymentApp_Mobile	medium	Mobile	Real	5GHz	-	-	-	-
Medium_Oppo1931	Customer_Gaming_Mobile - UDP	medium	Mobile	Real	5GHz	-	-	-	-
HP	Intern_Browsing_Lite	near	Laptop	Virtual	5GHz	38:f8:f6:7b:37:ba	36	802.11an-AC 80 4x4	-33 dBm
iPad	Zoom_Tablet_Streamingvideo-UDP	near	Tablet	Virtual	5GHz	38:f8:f6:f2:ea:ba	36	802.11an-AC 80 4x4	-33 dBm
Oneplus 10	Customer_PaymentApp_Mobile	near	Mobile	Virtual	2.4GHz	38:f8:f6:a3:6e:b4	6	802.11bgn 40 4x4	-24 dBm
Oneplus 10	Chrome_Mobile_WebBrowsing	medium	Mobile	Virtual	2.4GHz	84:3e:1d:25:e0:74	6	802.11bgn 40 2x2	-40 dBm
Samsung Tab	Kitchen-Display_Order_Tablet	near	Tablet	Virtual	2.4GHz	38:f8:f6:9d:47:b4	6	802.11bgn 40 4x4	-24 dBm
LG_smartFridge	SmartRefridgerator_Cloud_Controls	near	SmartRefridgerator	Virtual	2.4GHz	38:f8:f6:c8:4e:b4	6	802.11bgn 20 4x4	-14 dBm
OnePlus12Pro	Customer_PaymentApp_Mobile	near	Mobile	Virtual	6GHz	38:f8:f6:2f:46:b6	259	802.11a-AX 80 2x2	-41 dBm
iPad	Kitchen-Display_Order_Tablet	near	Tablet	Virtual	5GHz	38:f8:f6:8d:6a:ba	36	802.11an-AC 80 4x4	-33 dBm
Wipro Bulb	SmartBulb_IOT_Controls1	near	Smartbulb	Virtual	2.4GHz	38:f8:f6:1a:20:b4	6	802.11bgn 20 4x4	-22 dBm
iPhone 16	Chrome_Mobile_WebBrowsing	medium	Mobile	Virtual	6GHz	e8:bf:b8:7e:c1:88	-1	802.11a-BE 80 2x2	0 dBm
Kindle	Kindle_WebBrowsing	medium	Ereader	Virtual	2.4GHz	84:3e:1d:71:39:74	6	802.11bgn 40 2x2	-40 dBm
Lenovo Tab	Staff_inventoryTablet_sync	far	Tablet	Virtual	5GHz	84:3e:1d:2b:e7:9a	36	802.11an-AC 80 2x2	-62 dBm

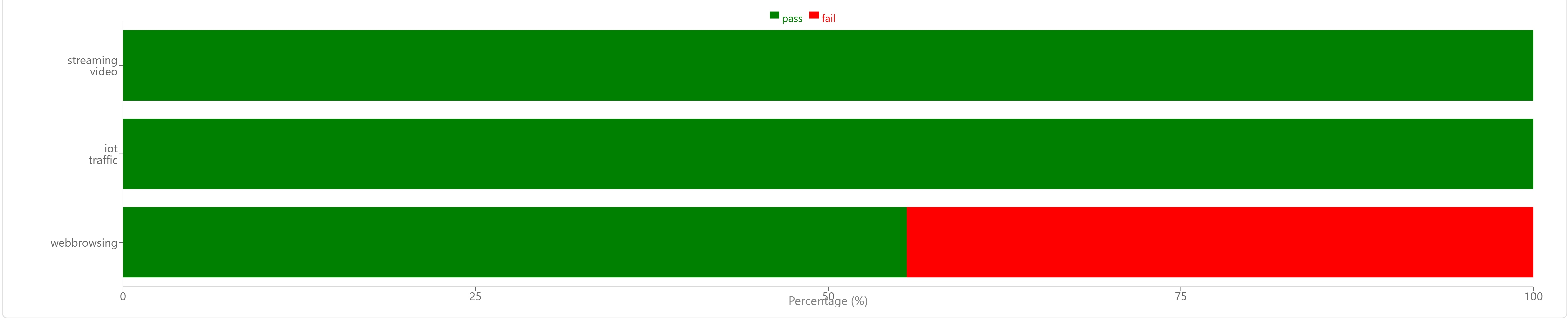
Performance with respect to device types

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.



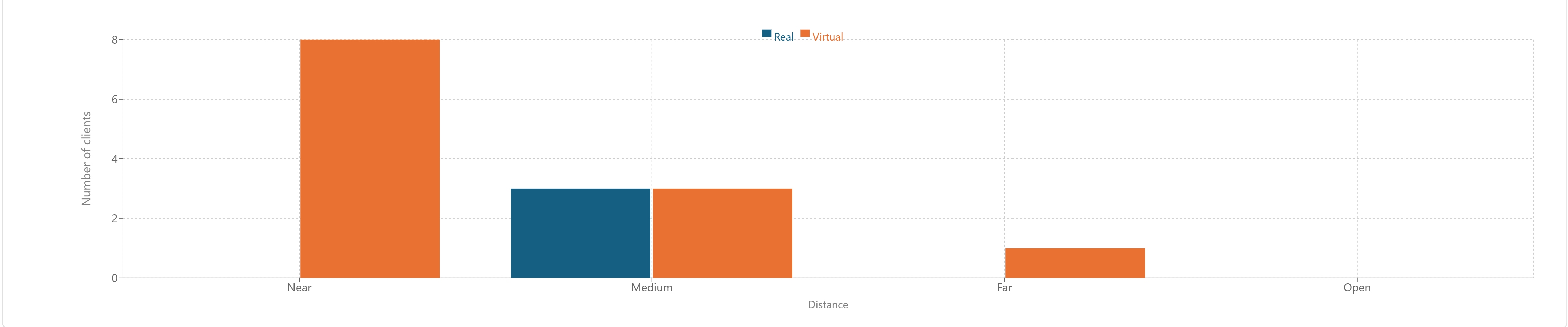
Performance with respect to traffic types

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.



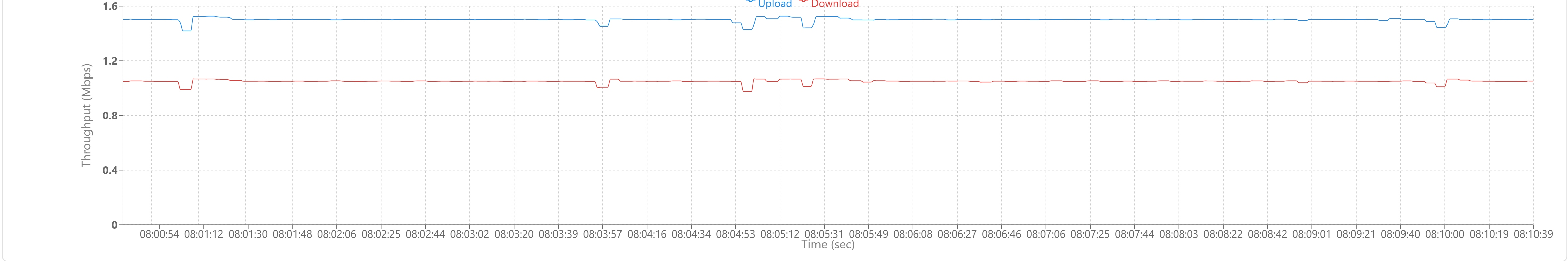
Number of Clients vs Distance

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



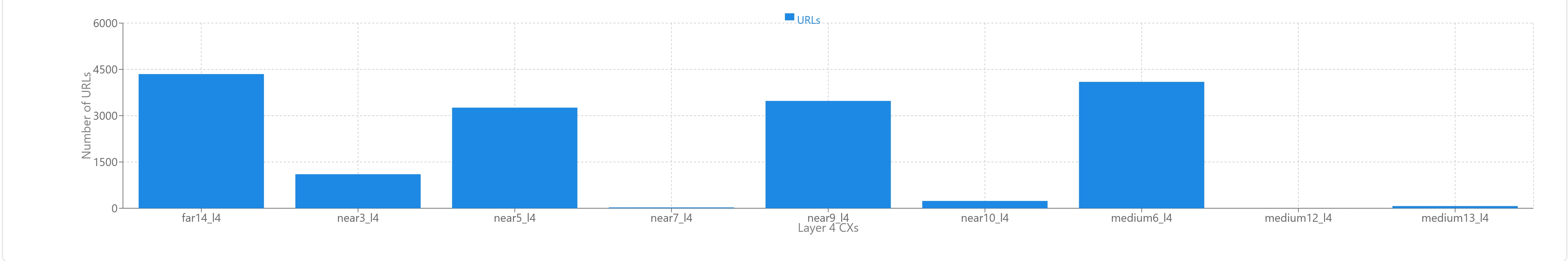
Realtime Graph of Layer-3 activity

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
Zoom_Tablet_Streamingvideo-UDP	near	iPad	Tablet	Virtual	streaming video	1170	UDP	BE	70%	1.00	1.00	BE	70%	0.50
SmartRefridgerator_Cloud_Controls	near	LG_smartFridge	SmartRefridgerator	Virtual	iot traffic	1500	TCP	BE	70%	0.05	0.05	BE	70%	1.00
SmartBulb_IOT_Controls1	near	Wipro Bulb	Smartbulb	Virtual	iot traffic	280	TCP	BE	70%	0.00	0.00	BE	70%	0.00
Layer4-7														
Traffic Profile	Distance	Profile Name	Device Type	Client Type	Traffic Type	Protocol	Max Speed	File Size/URL			SLA URLs	Total URLs	Result	
Staff_inventoryTablet_sync	far	Lenovo Tab	Tablet	Virtual	webbrowsing	HTTPS	1.00	https://www.bestbuy.com/site/searchpage.jsp?st=open+box			80	4348	Pass	
Intern_Browsing_Lite	near	HP	Laptop	Virtual	webbrowsing	HTTPS	0.50	https://www.amazon.com/			80	1103	Pass	
Customer_PaymentApp_Mobile	near	Oneplus 10	Mobile	Virtual	webbrowsing	HTTPS	0.30	https://sandbox.paypal.com			80	3260	Pass	
Kitchen-Display_Order_Tablet	near	Samsung Tab	Tablet	Virtual	webbrowsing	HTTPS	0.50	https://www.starbucks.com/menu			80	27	Fail	
Customer_PaymentApp_Mobile	near	OnePlus12Pro	Mobile	Virtual	webbrowsing	HTTPS	0.30	https://sandbox.paypal.com			80	3478	Pass	
Kitchen-Display_Order_Tablet	near	iPad	Tablet	Virtual	webbrowsing	HTTPS	0.50	https://www.starbucks.com/menu			80	237	Fail	
Chrome_Mobile_WebBrowsing	medium	Oneplus 10	Mobile	Virtual	webbrowsing	HTTPS	1.70	https://www.yahoo.com/			80	4095	Pass	

Chrome_Mobile_WebBrowsing	medium	iPhone 16	Mobile	Virtual	webbrowsing	HTTPS	1.70	https://www.yahoo.com/	80	0	Fail
Kindle_WebBrowsing	medium	Kindle	Ereader	Virtual	webbrowsing	HTTPS	0.12	https://openlibrary.org/works/OL7924103W/The_Eye_of_the_World_%28The_Wheel_of_Time_Book_1%29	80	71	Fail