

Wireless Network Troubleshooting and Monitoring

Wireless Network Monitoring and Tools

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Outline

- Why Monitor?
- Types of Wireless Network Monitoring
- Key Metrics
- Tools
- Monitoring Techniques
- Tips for Effective Monitoring
- Q&A

Wireless Network Monitoring Defined



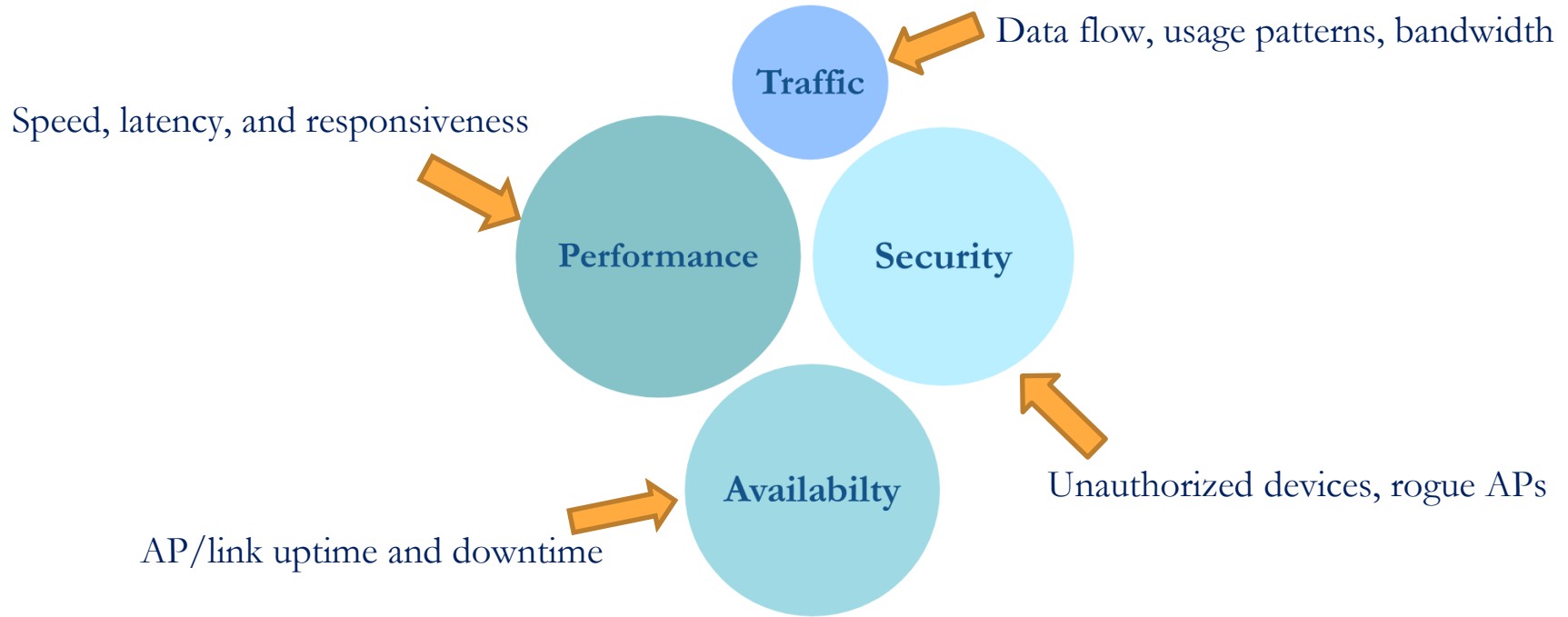
- Overseeing and analyzing wireless networks.
- Visibility into user behavior and device performance.
- Tools that proactively and continuously monitor the network.
- Devices to monitor can be access points (APs), wireless routers and more.

Why Monitor Your Wireless Network?



- Bandwidth analysis.
- Improving Wi-Fi signal strengths.
- Diagnosing AP-related performance issues.
- Monitoring uptime and downtime of APs.
- Generating performance and security insights.
- Understanding user experience.

Types of Wireless Network Monitoring



Key Metrics to Monitor

Signal Strength (RSSI)

Strength	Summary	Expected quality	Required for
-30dBm	Amazing	Reliable timely delivery of data	N/A
-67dBm	Great	Maximum signal strength	Real-time streaming
-70dBm	Average	Lightweight applications	Email and browsing
-80dBm	Poor	Basic connectivity	Connecting to a network
-90dBm	Unusable	Poor signal strength	N/A

WI-FI Signal Strength



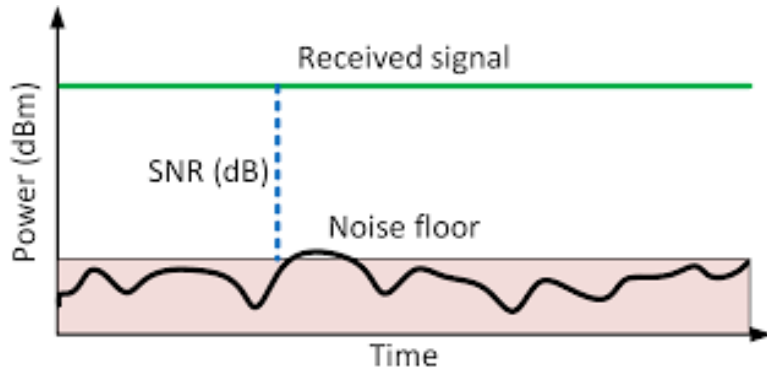
Implications

- Buffering during streaming of videos or music.
- Slow download and upload speeds.
- Dropped video calls or voice calls.
- Increased lag during online gaming sessions.

Key Metrics to Monitor

Signal to Noise Ratio (SNR)

- Difference between the received signal and the noise floor.
- It's the quality of the connection.

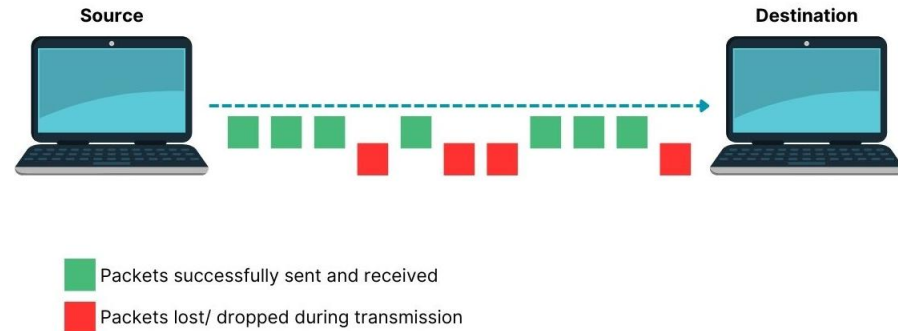


SNR(dB)	Signal Quality	Performance
40+	Excellent	High-speed, stable connections
25-40	Very good	Connections are stable.
15-25	Fair	Suitable for standard usage
10-15	Barely functional	Streaming, video calls, or large downloads will struggle in this range.
Less than 10	Unusable	Connectivity is unreliable, and data loss is common.

Key Metrics to Monitor

Other Metrics

- Channel Utilization.
- Latency.
- Packet Loss.
- Retransmission Rates.



Wireless Network Monitoring Tools




NetSpot - (<https://www.netspotapp.com/downloads.html>)

- Provides information on the networks' names and information like;
 - SSID, BSSID, signal strength, and frequency bands.

Networks around you

2 of 7 networks selected

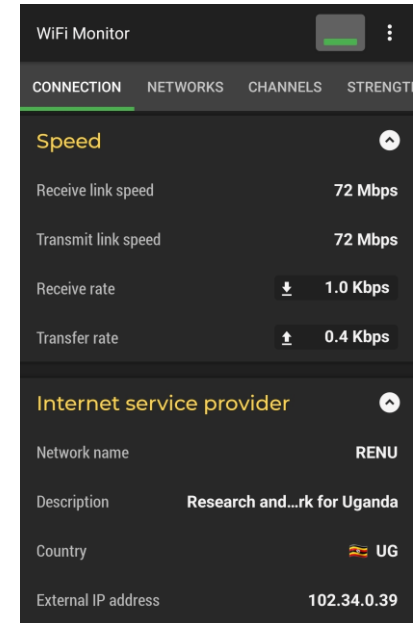
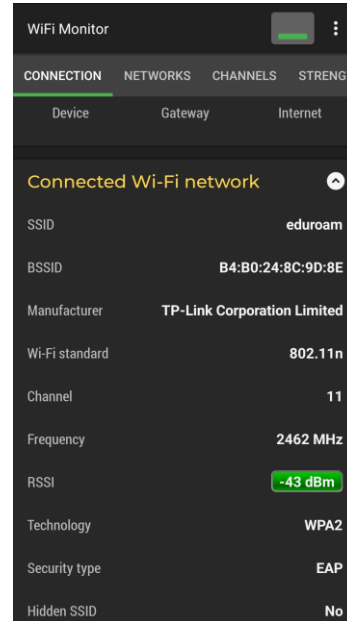
SSID	BSSID	Channel	Frequency	Channel width	Band	Security	Vendor	Mode	Level (Signal)	Signal	Signal %
<input checked="" type="checkbox"/> RENU	<input type="checkbox"/> B6:B0:24:9C:9D:8E	11, -1	2462	40	2.4	WPA2-Personal	-	n		-34	72
<input checked="" type="checkbox"/> eduroam	<input type="checkbox"/> B4:B0:24:8C:9D:8E	11, -1	2462	40	2.4	WPA2-Enterpri...	TP-Link Cor...	n		-36	70
<input type="checkbox"/> SwarmIntelli...	<input type="checkbox"/> C4:EB:FF:15:77:5B	7	2442	20	2.4	WPA2-Personal	zte corpora...	n		-90	7
<input type="checkbox"/> TECNO SPA...	<input type="checkbox"/> 2E:37:A5:CD:E6:D3	6	2437	20	2.4	WPA2-Personal	-	b/g/n		-88	9
<input type="checkbox"/> POCO C51	<input type="checkbox"/> 3A:59:F0:61:3E:B6	6	2437	20	2.4	WPA3-Person...	-	b/g/n		-	-
<input type="checkbox"/> GEH WiFi	<input type="checkbox"/> CA:CD:55:8C:97:...	1	2412	20	2.4	Open	-	b/g/n		-	-
<input type="checkbox"/> DIRECT-32-...	<input type="checkbox"/> EE:1A:28:7B:2B:8D	6	2437	20	2.4	WPA2-Personal	-	b/g/n		-	-

Wireless Network Monitoring Tools



WiFi Monitor

- Network parameters, such as;
 - Link speed, signal strength, frequency, and channel.
- Can be installed on mobile devices.










Wireless Network Monitoring Tools



Acrylic WiFi Analyzer - (<https://www.acrylicwifi.com/en/wifi-analyzer/>)

- Captures and analyzes packets to diagnose link issues.
- Identifies connectivity patterns like packet losses, latency, throughput, and link capacity.
- Information on link quality using parameters such as SNR, RSSI, and security.

Access Points

SSID	#	MAC Address	RSSI	SNR	Channel	Band	Width	802.11	Max. Rate	Retries	WEP	WPA	WPA2	WF
 TECNO SPARK Go 2020	6	CE:11:05:12:0A:14	-89	N/A	1	2.4GHz	20	b, g, n	72.2	0			PSK-CCMP	
 Redmi 10	5	DA:5A:31:0F:F0:59	-90	N/A	1	2.4GHz	20	b, g, n	72.2	0			PSK-CCMP	
 SwarmIntelligence-2G	3	C4:EB:FF:15:77:5B	-84	N/A	7	2.4GHz	20	b, g, n	144.4	0			PSK-CCMP	
 eduroam	2	B4:B0:24:8C:9D:8E	-35	N/A	11 [9 to 13]	2.4GHz	40	b, g, n	300	0			MGT-CCMP	
[Lan Client] - 192.168.45.1		B4:B0:24:8C:9D:8E												
[Lan Client] - 192.168.45.101		9E:BD:9A:E1:77:FF												
 RENU	4	B6:B0:24:9C:9D:8E	-37	N/A	11 [9 to 13]	2.4GHz	40	b, g, n	300	0			PSK-CCMP	
 HUAWEI-B310-F5A6	7	AC:07:5F:B7:F5:A6	-94	N/A	8 [6 to 10]	2.4GHz	40	b, g, n	300	0			PSK-CCMP	
 Jalia	1	A0:A3:F0:5F:84:58	-68	N/A	2	2.4GHz	20	b, g, n	144.4	0			PSK-CCMP	

Wireless Network Monitoring Tools

Other Tools



- inSSIDer.



- SolarWinds NPM WiFi Analyzer.



- PRTG Network Monitor.

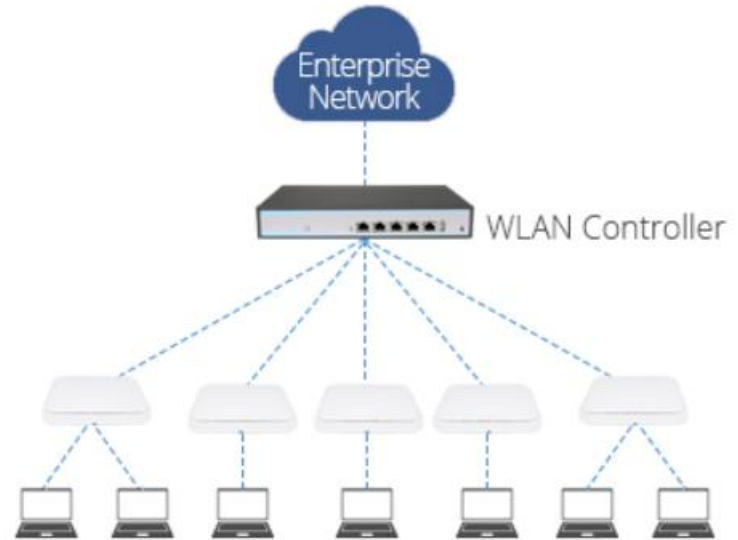


- Nagios.





Wireless Network Monitoring Tools

Access Point Controller






- A centralized device or software in a wireless network.
- Manages and coordinates the activities of multiple access points (APs).
- Provides unified management interface.

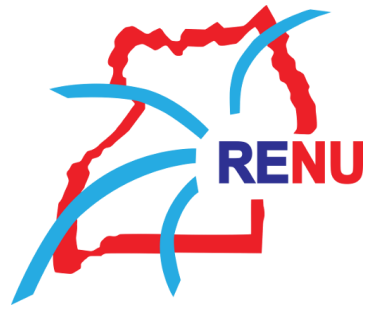


Monitoring Techniques

-  Network Analyzers.
-  Log Analysis.
-  Packet Analysis.
-  Availability monitoring.

Tips for Effective Monitoring

-  Choose the right tools.
-  Update firmware regularly.
-  Monitor network trends.
-  Establish benchmarks.
-  Implement automated alerts.



Q&A