



NETBEEZ[®]

Network monitoring from the end-user perspective

NetBeez Quick Guide

Monitoring wireless networks from the client perspective

INTRODUCTION

With the number of wireless clients outpacing wired workstations, it is becoming a real challenge for network engineers and administrators to assure good performance and quality of service to wireless users. The problem exists across the board, but it is even bigger for enterprise environments like higher education, retail, or healthcare. In these sectors, the percentage of wireless users can reach 80% of total users and, consequently, performance degradation has a serious impact on business and mission critical operations. Hospitality is another sector that can suffer of considerable losses like bad customer reviews on Trip Advisors and other online resources that can bite into the bottom line.

“Serious wireless internet connection issues!”

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It's been many years since I stayed in a major hotel and had repeated problems with the signal strength of the hotel's internet service, so it goes without saying the aggravation I experienced during my stay. I was on the end on the top floor and it is easy to determine why I had connectivity problems: insufficient number of routers to handle the wireless traffic. I reported it when I left the hotel in the morning and the front desk person seemed liked she never heard of this before. I doubt that.

Having a good wireless performance is important to hotel guests.

In this quick guide we would like to go through some common use cases involving performance degradation issues in wireless networks. We will then discuss a deployment scenario that can be adopted by the network engineers in planning and deploying a system that monitors wireless infrastructure from the client perspective with the goal of reducing the detection and resolution time of wireless performance issues.

PERFORMANCE ISSUES IN WIRELESS NETWORKS

Compared to traditional wired networks, wireless infrastructure has more moving parts that can impact the end user experience. When a performance issue affects the end users, the engineer has to quickly understand if the problem is:

- The wireless client, specifically the device drivers
- The quality of the signal between the client and the closest access point
- The wireless infrastructure
- The wired infrastructure
- The application

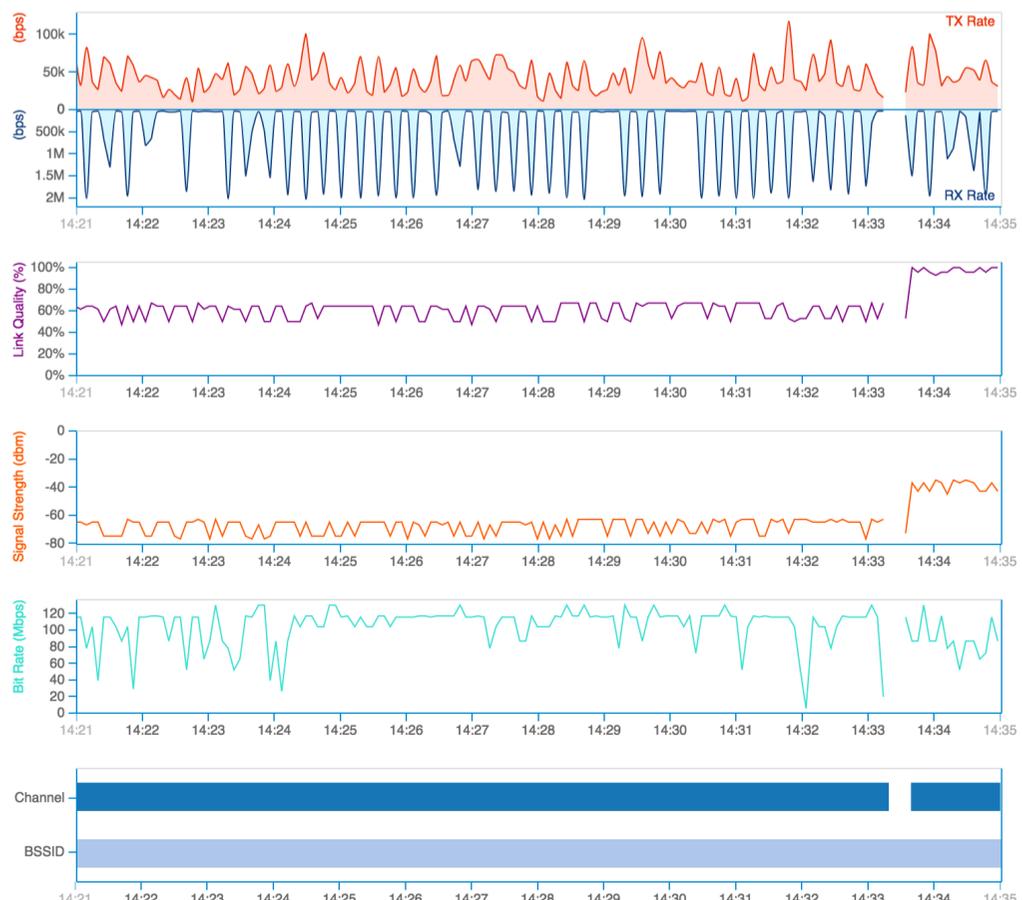
Wireless controllers and other monitoring systems that pull data from access points are indeed necessary, but not sufficient. Engineers need to complement metrics from the wireless infrastructure with signal strength, noise level, and Tx/Rx traffic from wireless clients. This data will help pinpoint the smoking gun that is impacting the end user experience as fast as possible.

In the end, monitoring a wireless network from the client perspective is like having a virtual engineer continuously walking around with a laptop taking measurements. Who wouldn't like that?

NETBEEZ WIRELESS AGENTS, A.K.A. WIRELESS BEEZ

The wireless BEEZ are capable of running the same tests of wired BEEZ, but on 802.11ac networks. That means that network and application performance data collected by wireless agents can be compared to the same data collected by wired agents and, at the same time, complement the information obtained by wireless controller. On top of the network and application performance tests, wireless BEEZ can retrieve real-time and historical data for the following metrics:

- Transmitted and received bits on the wireless interface
- Signal strength and quality as detected by the wireless NIC
- Associated channel and BSSID number
- Bit rate established with the access point



In addition to the wireless metrics, the user can have an agent perform a survey of SSIDs that are broadcasting in the area where the agent is installed.

Agent Tests		Wireless		Available SSIDs	
Name ↕	Signal Strength ^	Link Quality ↕	Frequency ↕	Channel ↕	
powerzone	-21 dBm	100.00%	2.41 GHz	1	
HOME-6A4C-2.4	-47 dBm	90.00%	2.46 GHz	11	
HOME-6A4C-5	-53 dBm	81.43%	5.76 GHz	153	
xfinitywifi	-53 dBm	81.43%	5.76 GHz	153	
HOME-77FA	-57 dBm	75.71%	2.41 GHz	1	
\x00\x00\x00\x00\x00\x00\x00\x00	-59 dBm	72.86%	2.41 GHz	1	
xfinitywifi	-59 dBm	72.86%	2.41 GHz	1	
IHaveInternet	-63 dBm	67.14%	2.46 GHz	11	
ishkibibble	-65 dBm	64.29%	2.44 GHz	6	
HOME-C225	-69 dBm	58.57%	2.41 GHz	1	
HOME-FDB1	-69 dBm	58.57%	2.41 GHz	1	
Green Light Wireless	-69 dBm	58.57%	2.45 GHz	9	
HOME-6812	-71 dBm	55.71%	2.44 GHz	6	
	-71 dBm	55.71%	2.44 GHz	6	
xfinitywifi	-73 dBm	52.86%	2.41 GHz	1	

Figure 2. Output of an SSID survey run on a wireless BEEZ.

Specifications

The wireless BEEZ are based on the Raspberry Pi platform, which is a small yet versatile microcomputer capable of simulating a real wireless client on the network. The agent can be installed in any area of the building whose signal has to be monitored



- **CPU:** 900Mhz ARMv7
- **RAM:** 1GB
- **Disk Drive:** 8GB
- **Ethernet NIC:** 10/100 Mbps (RJ-45)
- **Wireless NIC:** 802.11ac (dual-mode)
- **Power consumption:** 3W AC 110V and 220V
- **Power Supply:** External or PoE module available

Table I. Hardware specifications of the WiFi BEEZ.

Wireless BEEZ have two network interfaces: a wired one and a wireless one. The wired connection is used to establish the control channel to the server, while the wireless interface is used to run the measurement tests. Once the wireless interface has been configured, the user can also unplug the BEEZ from the wired connection and use the wireless interface for both the control and testing channel.

Security settings and authentication protocols

NetBeez supports a variety of wireless authentication settings to satisfy the security requirements of the modern enterprise. Below is a list of protocols that are supported by wireless BEEZ:

- Open authentication
- WEP 64/128/256
- WPA/WPA2 Pre-Shared Key
- WPA/WPA2 Extensible Authentication Protocol

The WPA EAP methods supported are: EAP-TLS, EAP-TTLS, LEAP, and PEAP.

USES CASES OF WIRELESS MONITORING FROM THE CLIENT PERSPECTIVE

In this section we would like to present three simple use cases that show how network engineers and managers can reduce time to detection and troubleshooting of performance issues that affect wireless clients.

Use case #1 - Tuning transmit power adjustment algorithms

A change, update, or tune of the transmit power adjustment algorithm can have unpredictable repercussions on wireless clients. Having permanent wireless monitoring agents that collect and store wireless data for real-time performance degradation detection or historical analysis can improve the management of large wireless infrastructures.

Benefit of monitoring wireless form the client perspective: Review wireless clients' performance to select the best transmit power adjustment algorithm.

Use case #2 - Performance measurement in high density areas

Another use case that is very common to higher education is associated when there's an increased demand of wireless resources during hot periods like mid-terms and finals. Students tend to congregate in high density areas such as libraries and cafeterias, and oftentimes they have with them up to three wireless clients (e.g. smartphone, laptop, tablet). To predict wireless demand and adjust the AP configuration is very difficult without real-time and historical performance data from the client perspective. Site surveys are too expensive in terms of time and resources required (e.g. dedicated laptop).

Benefit of monitoring wireless form the client perspective: Record wireless performance 24x7, 365 days per year, so you're prepared at adding wireless capacity when needed.

Use case #3 - SSID and wireless service availability after configuration changes

The 802.11 infrastructure is a complex system composed by multiple elements. Below is a list of the most common components of the modern 802.11 infrastructure:

- Access points
- Wireless controllers
- LWAPP tunnels
- Routers and switches
- RADIUS and DHCP servers

Each of these elements are configured with the purpose of providing wireless connectivity to users. When performing a configuration or maintenance change, many things can go wrong. The best way to validate the change is to connect a laptop to the network and make sure that connectivity to the network and applications is available. We all know that oftentimes, in distributed networks with dozens or hundreds of locations, this is a highly human-intensive task that is difficult to perform. Dedicated wireless agents at each location can automate the configuration change validation process and greatly reduce the time and efforts needed to perform such task.

Benefit of monitoring wireless form the client perspective: Decreased time and costs during configuration changes validation.

Read on InformationWeek how NetBeez enabled the event's organizers to monitor the wireless performance of the Interop 2015 trade show in Las Vegas.

<http://www.informationweek.com/interop/interopnet-live-behind-the-scenes-with-netbeez/d/d-id/1320431>

CONTACT US

Do you want to learn more about NetBeez? Schedule a demo via phone or email or request a trial online at netbeez.net/request-trial

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