REMOVAL OF DEAD ZONES IN WIFI NETWORK

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Abstract

Wireless communication has been an interesting subject for years. They represent the need of ease of use and flexibility of communications in the computer world without jeopardizing the communicated content. This is a site-survey report for Vishwakarma Institute of Technology Pune, where Wi-Fi strength of network "VIT campus" has been measured in different regions around the college for optimizing the efficiency of the same. The current wifi system is not effectively planned as there are various deadzones. We want to solve this problem and create a deadzone proof area so that we can access the internet wherever we want. We can solve this problem by changing the present position of the routers so that all the deadzone areas are covered. To achieve our goal we have used Acrylic Wifi home as our tool. With the help of this tool we have identified the deadzones and accordingly we can devise a plan to remove these deadzones.

I. INTRODUCTION

Wireless communication has been an interesting subject for years to come. They represent the need of ease of use and flexibility of communications in the computer world without jeopardizing the communicated content. In this report we have measured the strength of our college WiFi " VIT CAMPUS" in all 4 buildings and all common areas such as Canteen, Boat club, Fruit Centre, Parking Space, Auditorium, etc [1]. We first shortlisted few android applications from Google Playstore for fulfilling the purpose of this project. For higher accuracy of the results we tallied the readings using reputed computer software like Wifi Inspector by Xirrus . We also checked for Dead Zones and access -points within the college area so that, it can be notified to the authorities and corrective measures can be taken, accordingly.

Our main problem is deadzone which denies us from accessing the internet wherever we want and in order to ensure continuous access of internet it is important that we remove the deadzones.

Solving this problem is not easy as creating a plan which has no deadzones and that to without increasing the no. of routers in order to keep it cost effective is not easy.

It has not been solved before as people tend to focus on providing internet at high speeds at certain places without realizing that this creates deadzones at certain other locations and thus we are trying to make a plan that provides wifi access at all locations at a certain speed.

At the end we have found all the deadzones with the help of our tool Acrylic Wifi home and with help of this tool we also found the access points and thus with the help of this data we work on the plan to remove the deadzones by changing the positions of the routers.

II. WIFI HELPS US KEEP OURSELVES ENTERTAINED AND UPDATED WI-FI CHANNELS

A. ISM Bands:

There are various unlicensed spectrum bands in a variety of areas of the radio spectrum. These bands are called as Industrial, Scientific and Medical (ISM), which includes everything from microwave ovens to radio communications [2]. The main bands used for Wi-Fi are those in the table below:

Table .1 – ISM Wi-Fi Bands []

LOWER FREQUENCY MHZ	UPPER FREQUENCY MHZ	COMMENTS
2400	2500	Often referred to as the 2.4 GHz band.
5725	5875	This 5 GHz band or 5.8 GHz band.

There are several different 802.11 variants in use. Different 802.11 variants use different bands [3]. A summary of the bands used by the 802.11 systems is given below

Table .2- 802.11 Systems

IEEE I802.11 VARIANT	FREQUENCY BANDS USED
802.11a	5GHz
802.11b	2.4GHz
802.11g	2.4GHz
802.11n	2.4 & 5 GHz
802.11ac	Below 6GHz
802.11ad	Up to 60 GHz
802.11af	TV white space (below 1 GHz)
802.11ah	700 MHz, 860MHz, 902 MHz, etc. ISM bands dependent upon country and allocations.

B. Network selected for measurement:

The network selected for measurement is of Vishwakarma Institute of Technology

Table .3- Network Information

SSID	VIT_CAMPUS
MAC Address	00:1B:2A:23:BA:F0
Channel No.	4
802.11 Variant	b, g
Vendor	Cisco Systems. Inc

III. METHODOLGY

A. Software used for measurement

A large number of paid as well as free open source softwares and applications are available to measure various parameters of Wi-Fi signal. We have chosen Acrylic Wifi home. It is designed to run on Windows Vista, Windows 7, Windows 8, 8.1, 10.

Key Features include:

- Access points: Wi-Fi networks information and connected users.
- Channels: Wi-Fi channel scanner and Wi-Fi networks through channels in 2.4 GHz and 5 GHz.
- Security: Network authentication and security details for WEP, WPA, WPA2 and Enterprise (802.1X) Wi-Fi networks.
- Signal level: Signal quality charts for Wi-Fi channels and detected devices.
- Inventory: Naming known Wi-Fi devices.

B. Data Collection

With the help of our tool Acrylic Wifi home we collected various readings by individually going to each building and measuring the strength and availability of wifi at various spots on all the floors.

Table .4– Wi-Fi strength - Ground Floor

Building	**Place**	**Value(in dBm)**	**Strength**
1	Internet lab	-79	Good
1	TPO	-72	Good
1	Student Section	-65	Better
1	1809	-87	Moderate
4	4002	-90	Moderate
4	4004	-92	Weak
4	4009	XX	Dead-zone
-	Ground	-84	Moderate
-	Lawn	-72	Good
-	Library	-85	Moderate
-	Canteen	-81	Moderate
-	Nescafe	-90	Moderate
-	NPB	-85	Moderate
-	Boat club	-66	Better
-	Fruit Centre	-82	Moderate

Table .5 – Wi-Fi strength -First Floor

Building	**Place**	**Value(in dBm)**	**Strength**
	FY notice board	-85	Moderate
1	1116	-87	Moderate
1	1126	-86	Moderate
2	2104	-82	Moderate
2	2108	XX	Dead zone
3	3103	-94	Weak
3	3106	-87	Moderate
4	4104	-98	Weak
4	4109	XX	Dead zone
4	4111	XX	Dead zone

Table .6– Wi-Fi strength - Second Floor

Building	Place	Value(in dBm)	Strength
	1201	-92	Weak
1	1217	-88	Moderate
1	1224	-71	Good
1	lunch space	-90	Moderate
2	2204	-93	Weak
2		XX	Dead zone
3	Drawing lab	-93	Weak
3	CAD lab	-85	Moderate
4	4203	-94	Weak
4	4206	XX	Dead zone
4	4209	XX	Dead zone

Table .7– Wi-Fi strength - Third Floor

Building	Place	Value(in dBm)	Strength
	1301	-89	Moderate
1	1324	-88	Moderate
1	1326	XX	Dead zone
1	1320	-94	Weak
2	2304	-94	Weak
2		XX	Dead zone
3	3305	-87	Moderate
3	Heat transfer lab	-91	Weak
4	4304	-94	Weak
4	4306	-92	Weak
4	4309	XX	Dead zone

Table .8 – Wi-Fi strength - Fourth Floor

Building	Place	Value(in dBm)	Strength
	1409	-88	Moderate
1	terrace	XX	Dead zone
1	1413	XX	Dead zone

C. Data Analysis:

According to the samples collected, the data was plotted on the campus map. The final floor-wise plot showed the dead-zones at various locations. Also, the WiFi strength recorded were divided into different levels as shown in table below:

Table .9 – Wi-Fi Strength parameterized

Signal Value (in dBm)	Strength
-60 to -70	Better
-70 to -80	Good
-80 to -90	Moderate
-90 to -100	Weak
XX	Dead zone

There are five access points of Cisco Systems, model number 1310 installed in the campus [4]. The locations are:

1. Information Access Centre
2. Boat Club
3. Reading Hall
4. Auditorium
5. Design Laboratory

The following figure shows the location of Access Points on the campus map.

Figure I - VIT_CAMPUS Access Points locations

These access points covered a considerable amount of area in campus. But there are many dead-zones where there is no access to the network. This can be rectified by adding some more access points. The new added access points and the existing access points can be oriented properly so as to provide internet access with a better strength throughout the campus [5]. The same was studied and analyzed with the help of maps plotted and we arrived at conclusions.

IV. CONCLUSION

This survey provided us with valuable insight about the campus connectivity and we have devised few solutions for the same.

Thus from the above readings and measurements we can clearly see that VIT campus network has few flaws.

Buildings 4 and 3 are almost dead zones with no access points. So two access points should be on each floor of Building 4 and Building 3 comparatively being larger should have at-least three access points on each floor.

Auditorium "Sharad Arena" should have an access point of its own.

Further, there should be more number of access points in Building 2 and in the parking area under Building 1.

However, we should make sure that by adding too many access points, there should not be any destructive interference between two access points operating on the same channel, which can decrease the efficiency further [6].

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