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AN APPLICATION OF ENTERPRISE WLAN SYSTEM FOR A UNIVERSITY CAMPUS

Abstract

Installation of high quality and stable wireless systems is very essential especially for a University campus. In the market there are many brands of WLAN devices for home and small office use at various prices. Using WLAN devices designed for home in large networks will definitely decrease the performance of network traffic and may cause to enforce rebooting the devices. However Professional Enterprise WLAN systems are much costly to acquire them. This paper will investigate the affordability, quality, high performance and features as well as deployment of the Ubiquity WLAN systems in a university campus.

Keywords WLAN; *unifi;University; campus; Ubiquity; WiFi enterprise; VLAN; PAYPAL*

I. Introduction

WLAN devices for home use have been used widely in many areas, at home, in the offices even at some universities. In fact these WLAN devices are designed to work alone in a small network. When used a couple of them in larger networks, data traffic congestion, low data speed and crash is the usual result. We have experienced that every few day the devices needed to be rebooted to work. Among the others the home use WLAN devices makes the whole intranet traffic down when not used VLANs (Virtual LAN) or different network address via routers. All these encountered problems led us to replace the home use WLAN devices by WLAN systems designed for enterprise solution and long range coverage. However enterprise WLAN systems are high cost devices which cannot be purchased by every institution. After a company has visited us and presented the ubiquity WLAN systems, we researched in the internet and found that ubiquity would be an ideal solution for the university.

II. Ubiquity Enterprise WLAN systems

Ubiquity networks have entered the wireless market in June 2005. Ubiquity has over 10 million devices deployed overall the world in 180 countries. Ubiquity offers cutting-edge technology platforms, airMAX™, UniFi™, airFiber™, airVision™, mFi™ and EdgeMAX™ which combine innovative technology [1].

Ubiquity networks provide an official online forum at www.ubnt.com/forum which helps the customers to overcome any problems in aspects of installation and monitoring the ubiquity products. One can also register for a webinar which includes the outlines, introduction to unifi, customer examples and use case, software enhancements etc.

Unifi software is an easy to learn and very intuitive software. Once the software controller is installed, the Access Points can be managed and all other configurations can be done. Latest Unifi WIFI devices have powerful hardware are capable of latest technology, namely WiFi 802.11ac MIMO and offers a speed of 1 GBits/s and a range of up to 400 meters. Unifi is very scalable. A wireless network can start from one device and expanded up to thousands. Therefore Unifi can be deployed at home, in small companies, enterprise industry and university campuses. Unifi uses 802.11ac dual band or Gigabit Wi-Fi is the latest technology of 802.11 WLAN standards. It can deliver 3 times more speed than its predecessors. This is very suitable for transmitting HD video, videoconferencing, streaming media and VoIP. Unifi features the roaming technology which enables a user to switch seamlessly to nearest Access Point without interruption the connection. Unifi offers a comprehensive hotspot management and can be deployed on private or public cloud thanks the software controller.

Unlike traditional WLAN devices which utilize hardware, ubiquity comes bundled with a software controller which runs on a variety of platforms like Windows, Macintosh, UNIX, Linux and on cloud.

III. Deploying Unifi on University Campus

Unifi WLAN system can be deployed for outdoor as well as indoor use in a campus. Both combinations would be an ideal solution. In such a situation a Zero Handoff Roaming will take place (Fig. 1). The whole wireless network configurations and traffic can be managed solely through the controller software

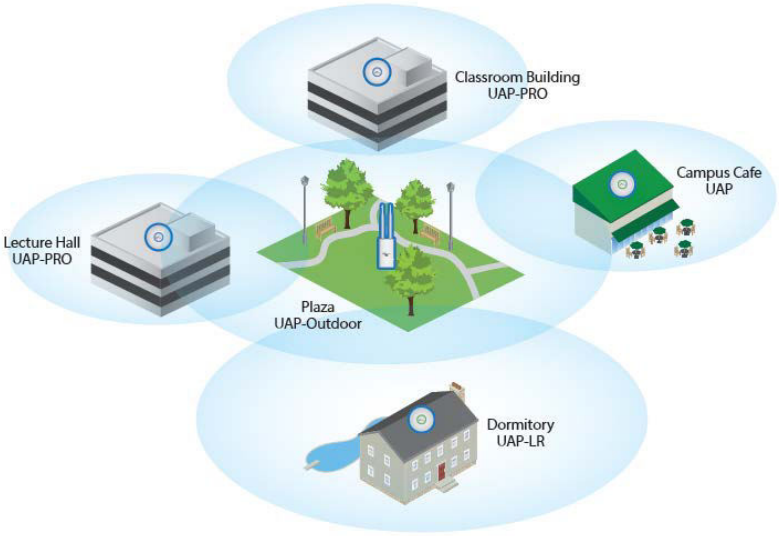

Fig. 1. Zero Handoff Roaming [1].

Unifi hardware (Fig. 2) allows a very easy mounting design of ceiling and wall. It has a very nice aesthetic industrial design with a LED light which allows a controller based tracking of the Access Point. Unifi includes PoE (Power over Ethernet) functionality which makes possible to be carried both data and power over one Ethernet cable for simplicity of installation.

Fig. 2. AP point installed on campus building.

Unifi controller software can be accessed via any web browser. The software is written in Java and it is open source. No license for the management software is required. The controller allows the administrator to provision up to thousand Access Points, integrate them to one controller environment, map out the network, and manage the network traffic.

In the university building on each floor one Access Point, totally 7 APs have been installed on the ceiling (Figure 2). The installation was straightforward since the product design was very simple and handy and the user's manual was very informative.

Each AP is connected via PoE (Power over Ethernet) cable to a main switch in the system room. The computer which runs the controller software is also connected to the same intranet network with the same IP network address. The installation of up to thousand APs is supported.

After downloading the free Unifi Controller Software from www.ubnt.com and installation we login into the server controller. A map of placed APs is shown (Figure 3). A map of the location from Google can be downloaded or a private map can be uploaded as well for visual representation of the wireless network. Unplaced APs are still on the left pane waiting to be dragged onto the map.

At the top of the page (Fig. 3) is shown Access Points: 8 which indicate the total number of APs running on one controller. Stations informs about the number of active WLAN users connected to the WLAN network.

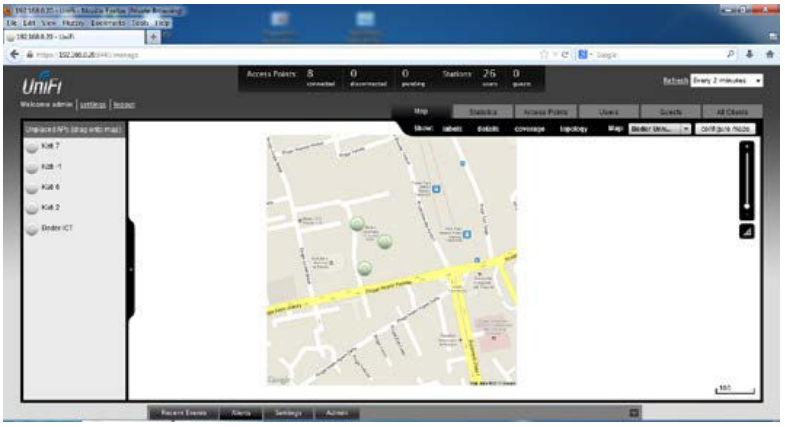

Fig. 3. Map ribbon of Unifi Controller.

The Statistics tab (Fig. 4) visualizes detailed analytics on data traffic in an easy way to read. This helps to manage large populations and expedite troubleshooting

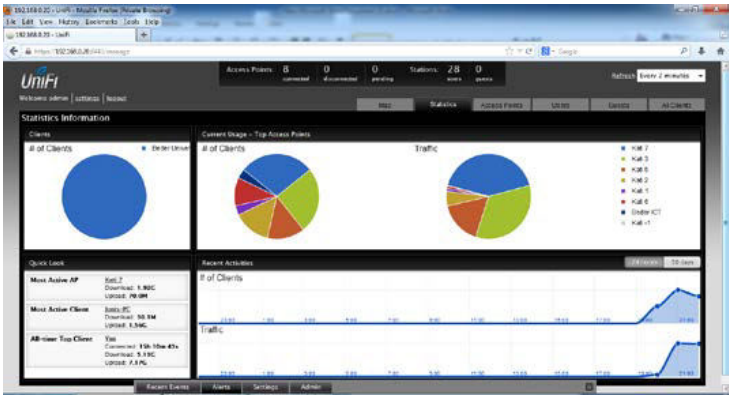

Fig. 4. Statistics ribbon of Unifi Controller.

The Access Points tab (Fig. 5) shows all APs which have been installed. This software controller makes it easy to install, configure and manage the APs. The Status column points out if a unique AP is connected and installed correctly to the wireless network and can communicate with the software. Each AP is assigned a name and IP address. When clicking on locate the corresponding location of the AP on the map will be shown. To configure the AP, we click on the name under the column Name/MAC Address. The configuration of AP also allows us to rename the AP and overwrite the SSID.

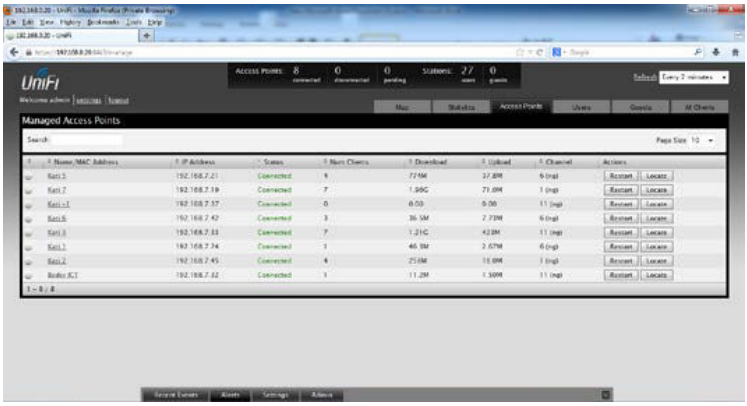

Fig. 5. Access Point ribbon of Unifi Controller.

The Users tab (Fig. 6) list all the active WLAN users. These users can be filtered by each AP to which they are connected. Each users IP address, MAC Address is given. Users can also be blocked or reconnected. These features allow the flexibility of controlling and monitoring the users.

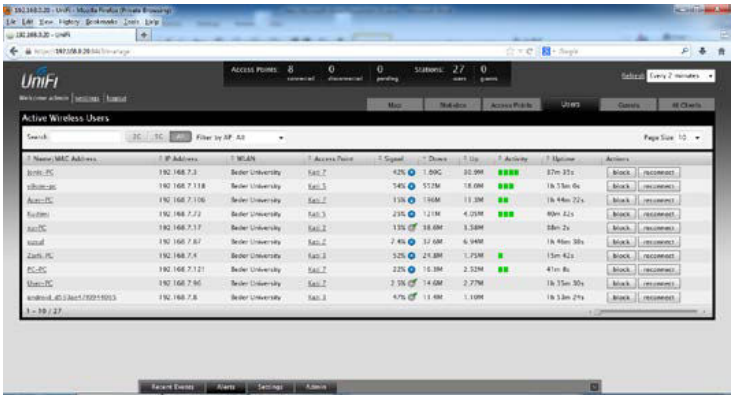

Fig. 6. Users ribbon of Unifi Software.

Under Setting there is user group management which features the control of large deployments. For example, two user groups can be created for Staff and for Students. The bandwidth of each user group can be limited.

Under Settings, Guest Control, we can enable the guest portal. This includes authentication, hotspot and external portal server setup. We can apply different bandwidth rates, total data usage and limit the time of usage. Hotspot functionality supports voucher based authentication, payment option via PayPal and customization and branding of portal pages.

IV. Conclusion

The simple installation, attractive design, powerful hardware and software and disruptive pricing highlights and makes the Unifi WLAN the choice of purchase. Other products in the market are addressed to customers with high budgets.
Ubiquity networks offer high tech equipment with the latest technology. Unifi WLAN confirms the security requirements.

The number of features combined in Unifi is the reason of choice of adaption. Unifi offers Radius server integration (every student needs to enter his own username and password to access the WLAN), Guest Hotspot, Portal customization, billing system via PayPal, one unique SSID and roaming technology, VLAN (Virtual LAN) and Wireless mesh which enables the wireless connection between APs and extends the range of Wireless coverage.

After successfully installation and running the WLAN system we have seen the difference between the home use WLAN devices and the Unifi system. We have experienced a longer coverage, grater performance and much more stability. Finally, we are satisfied with the Unifi WLAN system.
The installation was for house-in deployment. Taking the benefits of Unifi, in a new campus with a number of buildings, an ideal combination of indoor and outdoor deployment of Unifi WLAN system can be taken into consideration or planne

References

[1] “Ubiquiti Networks, Inc.” 2003. Jun. 2013 <http://www.ubnt.com/>.