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Надійшла 3.4.2011 р.

UDC 004.72, 004.73

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CENTRALISED MANAGEMENT OF WIRELESS NETWORK

This paper describes some characteristic features of the optimisation of a wireless network. The results of the research concerning a real wireless network were presented as well as a centralised management of an extended wireless network by means of WLAN controllers.

Описано деякі характерні особливості оптимізації безпровідних мереж. Представлені результати дослідження, що стосуються реальної безпровідної мережі, а також централізоване керування розширеної безпровідної мережі за допомогою контролерів WLAN.

Ключові слова: безпровідна мережа, централізоване керування.

Introduction

In order to receive information about the signal of a given network, it is necessary to take some measures. A professional measuring of a signal power can be done by means of some professional, however, expensive spectrum analysers. We distinguish two types of analysers: stationary analysers such as Antrisu MT8801B or Aeroflex 328X and portable analysers such as PDA made by AirMagnet, EthesSkope or BumbleBee. Measuring attainable for an average user is based on a suitable software. This sort of software can be installed on a laptop fitted with a wireless network card. Exemplary programs of this kind are: Kimset, Wavemoon and Network Stumbler in particular.

Research on a wireless network

The wireless network measures were taken on the basis of Network Stumbler. This program was chosen because it is free of charge, easy to use and it can provide the user with a lot of interesting information about the examined network, MAC address, the channel on which it operates, signal power, signal-to-noise-ratio, signal level, the maximal signal level measured in a particular area, minimal level, etc. (Fig. 1).

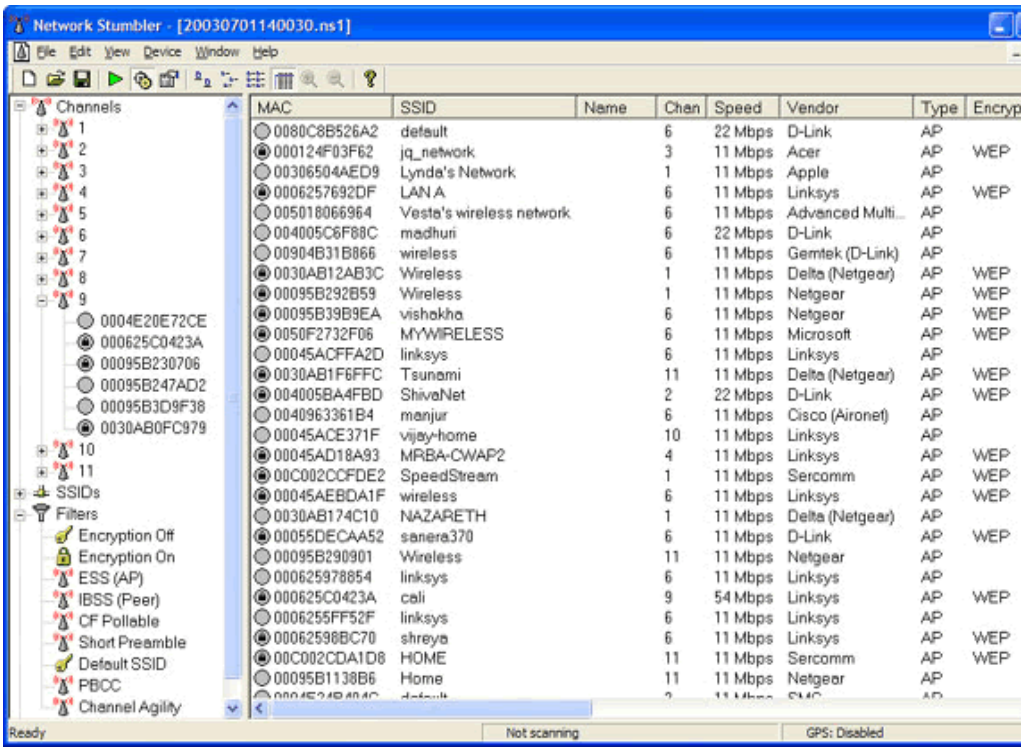

Fig. 1. The information about wireless networks found by Network Stumbler program

Network Stumbler had standard settings and it was installed on an ASUS F3F laptop fitted with a wireless network card I*ntel (R) PRO/Wireless 3945ABG Network Connection*. A maximal power of the wireless network card

was set for the time of measuring. The measures was taken in the University of Bielsko Biała and the State Higher Vocational School in Nowy Sacz in Poland.

Fig. 2 shows the intended level of SNR/Signal (signal-to-noise-ratio as well as the signal level). Access points and the intended signals are indicated with the same colour in order to make them easier to notice. The list of the access points which cover a given floor is presented next to Fig. 2.

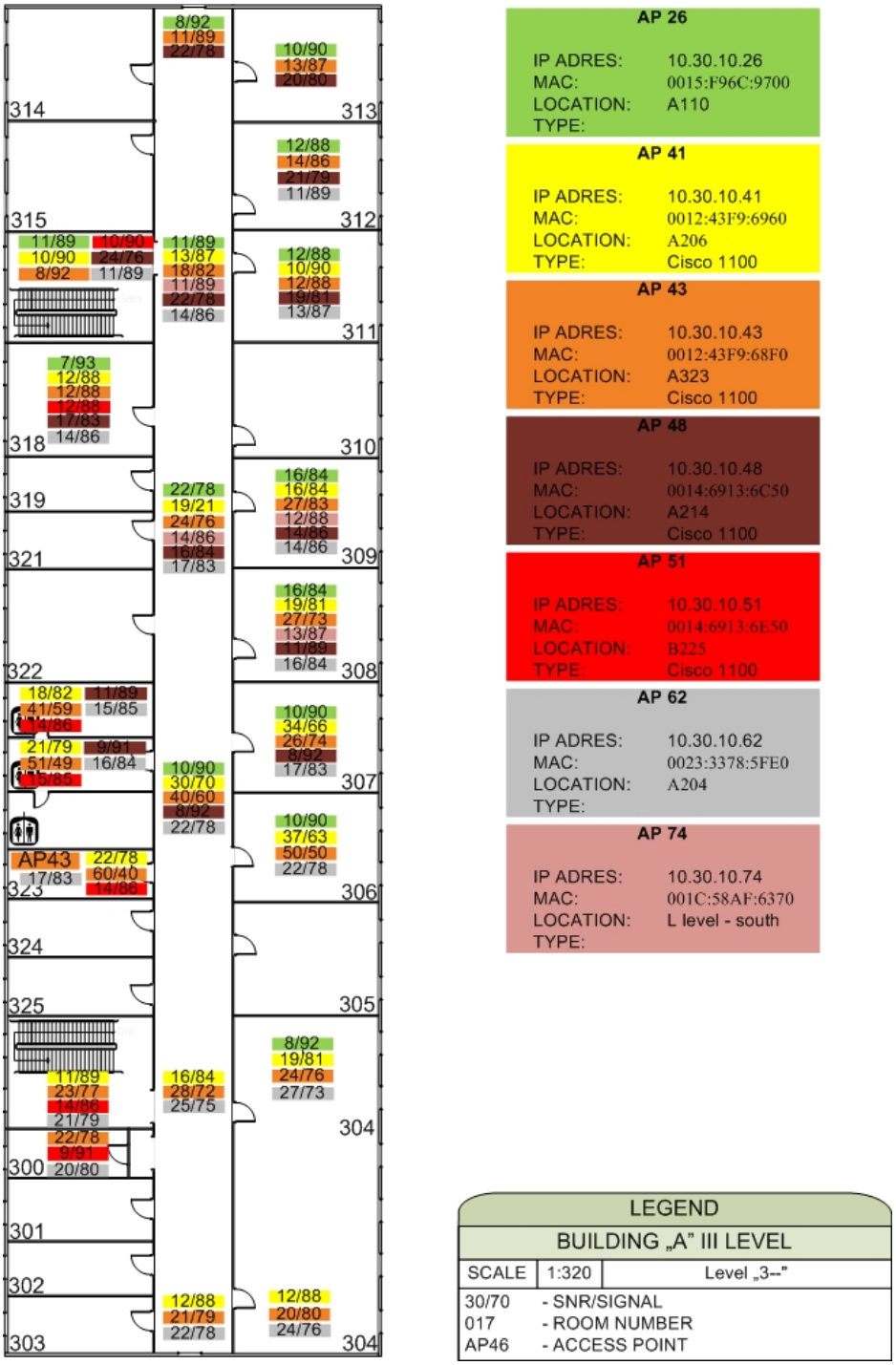

Fig. 2. The results of SNR/Signal measures on the A building particular floor

According to the IEEE 802,11 b/g technology, the frequency band is divided into 14 channels of which only three do not overlap [1, 2]. In order to optimise WLAN network manually it would be necessary to set each access point individually. As we can see in Fig. 2, in many places there are more than three signals. Therefore we can conclude that some of the signals may interfere with one another. In order to avoid this, it is necessary to reduce the power of the access points. In the first place we should reduce the power of the access points placed in the neighbouring buildings such as AP51 and AP74. Another thing which needs to be done is reducing the signals in the access points placed on the second floor. After introducing these modifications it would be necessary to take measures once again and consider what to do next. The problem will return together with the extension of the network and adding new access points.

For instance, Fig. 3, presents the results of measures of the signals taken between the university buildings A and B. This figure shows the multiplicity of the signals interfering with one another and the difficulty connected with the choice of the best channels.

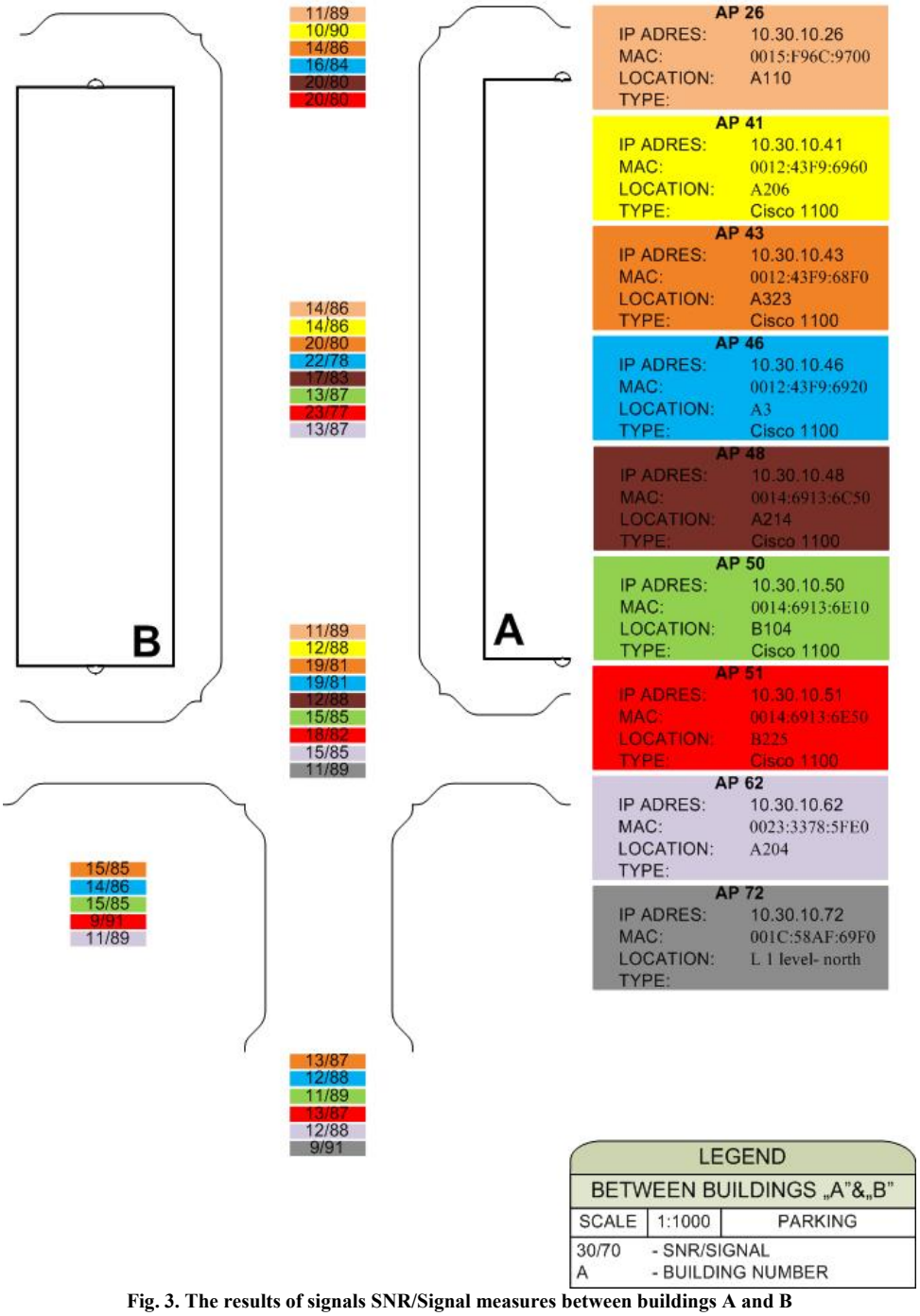

Fig. 3. The results of signals SNR/Signal measures between buildings A and B

In case of optimisation of a wireless network we need to consider the problem of the number of users from one place that can be connected to the access point. First we need to check which station is the closest one then we have to move the access point in order to shorten the distance to the clients.

In a modern extended WLAN network of the University, the management has been centralised by means of WLAN controllers. These controllers make the administrator's work much easier. They reduce the time connected with the extension of the network and what is more they reduce the costs. Moreover the controllers automatically set the power and the channel in order to avoid the APs interference.

For WLAN optimisation Cisco Works WLSE Express controller has been used (Fig. 4).

Conclusions

An integrated server of the WLAN controller facilitates authentication and authorisation of its users. WLAN ISD finds and eliminates any treats connected with external hacks and eliminates unauthorised users. *WLSE Express Deployment Wizard* enables fast network extension.

Self-Healing regulate particular network devices in order to maximise the signal and network coverage. *Assisted* examines the network in order to reduce the costs and the time necessary for the optimal frequency set-up. Automatic monitoring keeps the network on a highly efficient level and maintain its optimal set-up. Errors and alarms monitoring in the access points and security bridges improves the security level and resistance to attacks. Moreover, it checks the integrity of the network

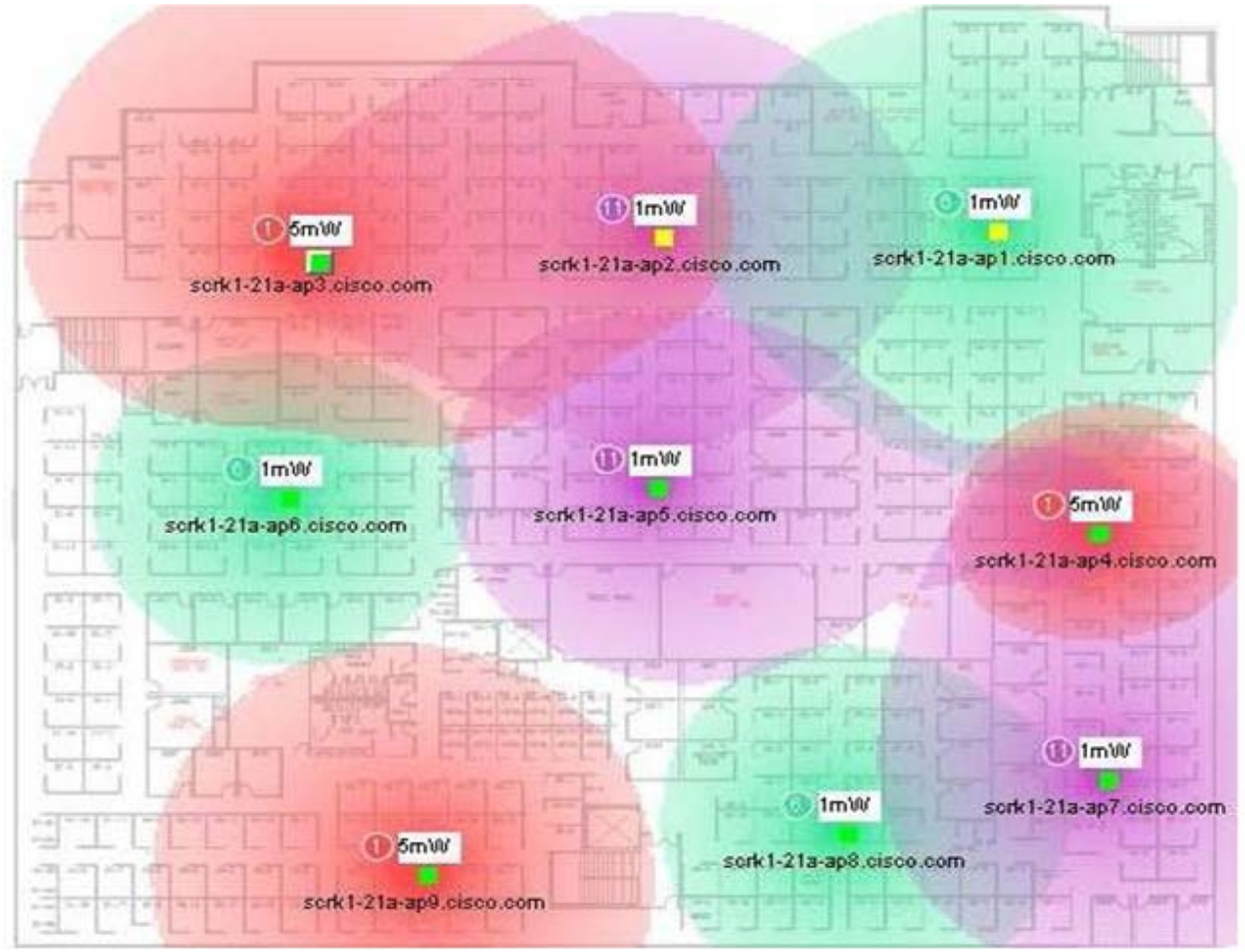

Fig. 4. Network coverage on map in the controller

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Надійшла 26.4.2011 р.

УДК 004.652.5

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ПРОБЛЕМИ ТА ПЕРСПЕКТИВИ ОБ'ЄКТНО-ОРІЄНТОВАНИХ БАЗ ДАНИХ

У статті зроблена спроба огляду досягнень технологій об'єктно-орієнтованих баз даних, а також обговорюються недоліки, які повинні бути вирішеними, щоб об'єктно-орієнтовані бази даних стали настільки ж поширеними, як реляційні бази даних.

This paper serves as an overview on the achievements of object-oriented database technology, and also discusses the weaknesses that have to be yet resolved by the object-oriented database community before object-oriented database technology can become as widespread as relational databases.

Ключові слова: моделі даних, об'єктне програмування.

Вступ

Об'єктно-орієнтовані системи керування базами даних (ООСКБД) повстали як результат симбіозу