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In order to create true seamless roaming for the mobile user throughout the various wireless Hot Spots and Wireless Local Area Networks, we will see an evolution in wireless NIC cards enabling the association to multiple 802.11x- based networks, read more about it in the article below.

Within this issue we also emphasise the importance for a pre-installation site-survey when planning the installation of a WLAN.

The IEEE now embraced the Bluetooth technology, opening up new roads to co-existence of 802.11 and Bluetooth networks, we therefor also give a small overview of what is Bluetooth.

CONTENT

✓ Multimode Chips Advance Seamless Roaming

One of the primary benefits of standardisation is interoperability. With common standards, you can purchase a product and feel assured that it will work with other components based on the same standard. With 802.11, however, there are several flavours of the standard that are not interoperable, namely 802.11b and 802.11a.
As most of you know, 802.11b and 802.11g both operate in the 2.4GHz band; whereas, 802.11a functions in the 5GHz band. In addition, these two versions of the standard use different modulation and frame headers.

As a result, 802.11b and 802.11a are not interoperable. An end user equipped with an 802.11b radio NIC can't associate with an 802.11a access point.

This is a big problem with public wireless LANs, which depend upon open connectivity to attract the widest possible number of subscribers. It's likely that some hotspots will deploy 802.11b and some will install 802.11a. In order to operate on both types of networks, users need to change their radio NIC to match the network they want to communicate with. As an example, a user may use 802.11a in their office and then need to switch to 802.11b in order to check emails at an airport. A replacement of the radio NIC such as this is too cumbersome for typical users.

A similar interoperability problem exists if a company implements 802.11b throughout a facility for general wireless connectivity and installs 802.11a in conference rooms for higher performing multimedia applications. In this case, users also need to replace their radio NIC from time-to-time in order to operate on all parts of the network. This certainly kills the idea of seamless roaming.

In fact today, most IT managers are reluctant to deploy both 802.11b and 802.11a in the same facility because of the inherent lack of interoperability.

The solution: multimode 802.11

Semiconductor companies, such as Atheros and Synad, are solving the interoperability problem by including both 802.11a and 802.11b on the same chip, with mechanisms to automatically detect and change to the applicable version of the standard. This enables radio NIC and access point suppliers to feasibly implement 802.11b and 802.11a (referred to as "dual-mode") within the same radio NIC and access point.

Some companies, such as Atheros, are even offering "tri-mode," which includes 802.11g in addition to 802.11a and 802.11b. Chipsets are just now being released, and the corresponding radio NICs and access points should hit the market by the end of 2002.
Multimode 802.11 will dramatically improve interoperability. A user equipped with a dual-mode radio NIC can roam freely among wireless LANs having both 802.11a and 802.11b access points. With this technology, users don't need to worry over which radio NIC to have for public access before leaving on a business trip. They'll be assured access no matter what version of the standard the wireless hotspots implement. Likewise, users within a corporation can access their email from their desk through an 802.11b network and later, without changing their radio NIC,

participate in a multimedia presentation over an 802.11a connection within the conference room.
Of course multimode 802.11 doesn't totally satisfy interoperability for some of the installed base of 802.11 networks. For example, a public wireless LAN hotspot may deploy 802.11a access points, and users with the traditional 802.11b radio NICs will still not associate. Over time, however, it will be commonplace to use multimode radio NICs, similar to the use of 10/100 Mbps Ethernet NICs are today. This will get us much closer to the ubiquitous communications that everyone is talking about.

Source Article by Jim Geier on www.80211-planet.com
25 march 2002

✓ The Importance of a Site Survey

The actual LAN design - how many access points are placed - draws on all this data and research, and hinges on several factors: the type of materials used in building construction and furnishings, the number of users in a given area and whether that number changes, and the throughput those users need. The larger the deployment and the more demanding the applications, the more complicated the equation becomes.

For analysing the spectrum, you can use handheld spectrum analysers to detect radio interference and the same laptop applications many wireless LAN vendors offer for the site survey. You plug in an access point, then walk around with a wireless laptop and the programs show signal strength and throughput at different locations and different distances.
If you're doing this design work yourself, watch out for a common mistake: using one brand of interface card and access point for the initial design then a different brand in the final deployment. Doing so can lead to surprises stemming from different radio-frequency propagation characteristics, which leads to dead spots and lower bandwidth.

One consideration sometimes overlooked is aesthetics: do you want the access points to be visible or hidden behind ceiling tiles? And then there's the basketball factor: FedEx had to raise the access points in its sorting bays higher off the ground because college-age part-timers were leaping up and slapping at them to practice slam-dunks.
The site survey is essential for dealing with one of the most confusing design issues: 802.11b access points have a maximum of three non-overlapping channels for users. Too many access points, haphazardly placed, will overlap these channels and users will see a serious drop in performance because of contention for the channel. Proper channel configuration can let you stack three access points atop each other giving users maximum available bandwidth.

The just-emerging 802.11a products (US) have eight indoor channels and four more for outdoors, which means that more access points can be packed into the same area, to support more users at higher bandwidth - and, for now, at a higher cost compared with 802.11b LANs.

In theory, the higher bandwidth of 11a means the radios cover less distance, so two to four times more 11a access points will be needed to cover the same area as with 11b. But this will vary greatly by site. Therefor practical experience and on-site testing will provide the one and only secure answer.

Source : Article **By John Cox /** Network World, 03/25/02

✓ Bluetooth Now Under IEEE Umbrella

In a bid to bring more acceptance and compatibility, the IEEE Thursday standardised Bluetooth under 802.15.1. The new standard for Wireless Personal Area Networks was adapted from the Bluetooth v1.1 specification.

"The new standard gives the Bluetooth spec greater validity and support in the market and is an additional resource for those who implement Bluetooth devices," says Ian Gifford, IEEE 802.15 Working Group Vice Chair.

The Bluetooth SIG trade group receives backing from wireless firms including Nokia and Ericsson. The short-range technology envisioned as a way to replace cables, has only recently caught on with the public. Unlike 802.11, which can transmit up to 100 meters at speeds up to 54 Mbps, Bluetooth has a 10 meter range at a much slower speed.

✓ What is Bluetooth anyway?

The Bluetooth wireless technology comprises hardware, software and interoperability requirements. It has been adopted by many major players in the telecom, computer and home entertainment industry, but also in such diverse areas as the automotive industry and health care, automation and toys, etc.

It is a global standard that:

- eliminates wires and cables between both stationary and mobile devices
- facilitates both data and voice communication
- offers the possibility of ad hoc networks and delivers synchronicity between all your personal devices

Harald Bluetooth was a Viking and King of Denmark between 940 and 981. One of his skills was getting people to talk to each other, and during his rule Denmark and Norway were christianised and united. Today, Bluetooth wireless technology enables devices to talk to each other, but this time by means of a low-cost short-range radio link.

Bluetooth wireless technology fills this important communication need, with its ability to communicate both voice and data wirelessly, using a standard low-power, low-cost technology which can be integrated in all devices to enable total mobility. The price will be low and result in mass production. The more units around, the more benefits for the customer.

The Bluetooth Specification defines a short (around 10 meters) radio link capable of voice or data transmission up to a maximum capacity of 720 Kb/s per channel.

Radio frequency operation is in the unlicensed industrial, scientific and medical (ISM) band at 2.40 to 2.48 GHz, using a spread spectrum, frequency hopping, full-duplex signal at a nominal rate of 1600 hops/sec. The signal hops among 79 frequencies at 1 MHz intervals to give a high degree of interference immunity. RF output is specified as 0 dBm (1 mW) in the 10m-range version and -30 to +20 dBm (100 mW) in the longer range version.

As you probably noticed, the operating frequency of Bluetooth is the same as the 802.11-networks. Given the difference in throughput and range, both technologies focus towards different applications and implementations, therefore complementing instead of competing with each other. ◆