

IS A WIRELESS LOCAL AREA NETWORK RIGHT FOR YOUR BUSINESS?

Wireless local area networks (WLANs) are much discussed these days. Millions of WLANs are already installed in homes, home offices, schools, public "hot spots" and businesses. Most new laptop computers come with WLAN capability built-in. Is it time for major businesses and institutions to consider mass deployment of WLANs?

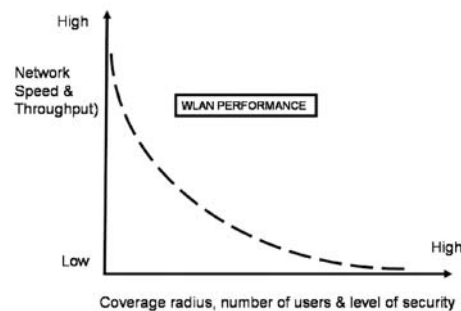
What WLANs do. WLANs simply use small radios to bypass the six feet or so of cable and the wall data jack that normally connect a personal computer to a network. A small receiver transmitter in the PC communicates with a nearby radio base station (called an "access point" or AP) which is typically located in the ceiling of the room where the PC is. This allows the PC to be placed anywhere within 100 feet or so of the AP and moved at will, without the costs and physical constraints associated with wired data jacks. Several PCs can share a single AP so an AP can replace several wired jacks. If a business has network-based telephone service (Voice over IP or IP telephony) a WLAN can support phone service and eliminate telephone jacks as well.

What WLANs don't do. WLANs only eliminate the hard-wired data jack and station cable; they do not replace the network "back-bone," Ethernet switches, file servers, routers and other conventional LAN infrastructure which must still be present and hard-wired together. (Perhaps WLANs should really be called "partially wireless LANs"). WLANs don't supply electrical power to the PC. PCs must be battery powered or plugged in to an electric outlet. Finally, WLANs cannot come close to matching the security, reliability and performance of conventional fully-wired networks. These issues are critical for most businesses:

- ❑ **Security.** WLAN products were originally designed as "open" systems, and are very susceptible to eavesdropping, hacking and "rouge" access by outsiders. WLAN operators must activate and conscientiously use the limited security features available. Worse, some WLAN products, when turned off, automatically default to a non-secure mode when reactivated!
- ❑ **Reliability.** Many variables in the physical environment degrade WLAN coverage. WLANs share unlicensed radio frequencies with many other uses including Bluetooth devices, cordless phones, remote controls and even microwave ovens. Interference from these devices and other nearby WLANs can degrade or completely disrupt a WLAN.

- ❑ **Performance.** The advertised speeds of WLANs are at least one order of magnitude slower than equivalent wired networks and the real-world data throughput is even lower. When several users share an AP they also share its bandwidth. Any attempt to increase the coverage radius, number of users or level of security also increases "overhead" and slows the network dramatically. Thus, a nominal 11 Mb/s network might provide only 1 Mb/s to or less to a typical user in the real world.

Newer generations of WLAN technology address some of these weaknesses, but the fundamental performance disparity between wired and wireless systems remains. The following table summarizes the characteristics of the most WLAN technologies the IEEE 802.11 series of standards commonly referred to as "Wi-Fi."



	802.11a	802.11b
Raw Data Rate	54 Mb/s	11 Mb/s
Actual Data Rate	20 to 30 Mb/s	1 to 6 Mb/s
Operating Range	About 50 ft	About 100 ft
Radio Band	5-6 GHz (U-NII)	2.4-2.4835 GHz (ISM)
Clear Channels	12 plus	3 maximum
Advantages	Higher data rate, more immune to interference, much more secure.	Widely available, built in to most laptops, less expensive.
Disadvantages	More costly, shorter range, less widely available.	Poor security, lower data rate, more interference, fewer channels.

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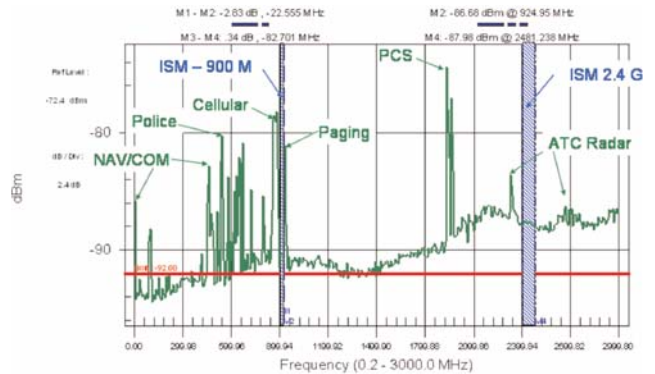
There is also an extension of 802.11b called 802.11g. It can theoretically operate at 54 Mb/s, but it shares most of the disadvantages of 802.11b and mixed 802.11b and g networks default to the lower network speed.

Clearly, the new 802.11a standard is becoming the wireless technology of choice for business. Businesses are installing WLANs in conference rooms, training rooms, class rooms, team work areas and other places where a variable number of people may need network access on a temporary or ad-hoc basis.

In the vast majority of cases, especially where security and network performance are of primary concern and mobility and flexibility are not key, businesses are retaining fully-wired networks and only supplementing them with wireless technology.

In summary, businesses contemplating deployment of wireless local area networks need to consider many and factors before investing in this technology. These can include:

- Electromagnetic Compatibility Studies
- WLAN Design Criteria
- WLAN Voice Service (VoIP)
- Antenna Selection
- Antenna Location
- Horizontal/Vertical Channel Assignment
- Client Server
- Peer-to-Peer and Roaming
- Building Characteristics
- Shielding, Interference Mitigation and Signal Containment
- Physical and Network Security
- Rogue User Shutdown Contingency Plans
- Network Management, Control and Performance Monitoring
- Dynamic Loading and Channel Assignment Standards Compliance and Migration Plans
- Radio Frequency Radiation Exposure Standards Compliance



A Spectrum Analysis Sweep from RF Compatibility Survey

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