10 Reasons for Wireless Local Area Networking (WLAN) in a Desktop PC

TEXAS INSTRUMENTS

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Overview

High data rates, low cost, flexibility, easy installation, convenience, constant connections and other factors contribute to a persuasive argument for including wireless local area networking (WLAN) technology in desktop personal computers (PCs). For many environments, such as small and medium size businesses, small office/home office (SOHO), schools, universities and large global enterprises looking to expand their networking capabilities easily and efficiently, WLAN technology in desktop PCs makes eminent sense.

Desktop PCs with WLAN technology simplify life considerably. For enterprise IT executives, SOHO workers, telecommuters, home-based businesses and many others, a WLAN in the workplace, no matter where that may be, adds to the efficiency and effectiveness of the individual worker as well as the entire organization.

In addition, the various technical and business factors associated with WLAN technology make the decision to include it in desktop PCs an easy one indeed.

Here are a few of the more prominent reasons why it makes sense to equip desktop PCs with WLAN technology:

Reason 1: Moves, Adds and Changes

Most workplaces are reconfigured on a regular basis. Enterprises move departments and workers from one side of the building to the other. Small and medium size businesses expand and contract in an effort to adapt to the rapidly changing business environment surrounding them. Home workers change workspaces as the situation dictates, sometimes moving their work area to another room or a different area of the house. In every case, the reasons for the change are very real and quite compelling.

Unfortunately, wired networks do not lend themselves to this type of fluid environment. Running wire through ceilings and fishing it down through closed wall structures is labor-intensive and time consuming, if not structurally impossible in some cases. And once completed, a wired infrastructure acts as a deterrent to change or modification rather than encouraging a change for the better.

With a WLAN infrastructure and WLAN technology in PCs, moving an individual worker, a department or even an entire company no longer involves costly construction to install new networking wire. And the organization's productivity is unimpeded as change in the workplace can be accomplished in a fraction of the time. Workers are not inconvenienced or completely unproductive while construction has their workplace in turmoil.

Reason 2: Look! No Wires!

With WLAN-equipped PCs, a workplace can be maintained easily and efficiently. Wireless infrastructures eliminate or reduce the need for wires. Wires protruding from the ceiling or looping over partitions can be avoided. Unsightly wall openings for wired connection jacks are a thing of the past. Workers who simply want to move their computer from one side of the office to the other do not have to settle for lumpy wire under the carpet or exposed wiring running along

the baseboard. In a wireless environment with wireless-enabled desktop PCs, workers have more freedom. The workplace conforms to their workspace instead of the other way around.

Reason 3: Leveraging Your Existing WLAN

If a workplace already has a WLAN and a new desktop PC is joining the environment, it is much easier to add a desktop PC to a WLAN than it is to run wiring from a wiring cabinet to the workplace. In fact, in a matter of minutes a desktop PC with WLAN capabilities can quickly associate itself with an existing WLAN access point and become an effective and productive member of the workgroup's network. Time-consuming and laborious wiring projects that detract from the workgroup's or the individual's productivity are eliminated.

Reason 4: Why Is That LAN Connection Way Over There?

It happens all too often that the access wall jack for the wired network dictates how office furniture and equipment are arranged in a workspace. Desks where PCs will be located must be situated in close proximity to the wall jacks. Otherwise, unsightly wires will be found running across the space. Desktop PCs with WLAN capabilities give workers the freedom to rearrange their work areas to best meet each one's individual needs and to ensure an attractive work area. In addition, excessive or misplaced wires often pose a safety problem for workers who might easily trip or stumble over poorly installed wires.

Reason 5: Cost-Effective WLAN Deployment

The cost of implementing a WLAN is many times less than that of wired Ethernet LANs. For example, the cost of a Wi-Fi®-compatible access point (AP) is comparable to that of an Ethernet router. And when the cost of copper wiring is included in the calculation, the cost of a WLAN deployment becomes considerably less than a wired LAN.

In addition, many in the industry predict that the rapidly decreasing cost differential between desktop PCs with WLAN capabilities and those without it will soon lead to greater inclusion of WLAN technology availability in most desktop PCs. The migration of the wired Ethernet market from 10Base-T Ethernet to multi-mode 10/100Base-T technology illustrates this point. When 100Base-T was first introduced, few PC network interface cards (NICs) were equipped with the technology because it had not been widely deployed yet and the cost differential between 10Base-T and 100Base-T was still significant. But, as the cost differential declined, the market migrated toward 10/100Base-T NICs even though 100Base-T networks were not prevalent yet. With a small cost differential between 10Base-T and 10/100Base-T, it was much easier to justify the purchase of 10/100 NIC cards over a 10Base-T card with a limited future. In a similar way, users will begin to choose desktop PCs with WLAN technology over those without it. This will contribute to the greater proliferation of WLAN infrastructure, increasing the number of users and further reducing the technology's overall cost structure.

Reason 6: High Data Rates

Today, the high data throughput rates for wireless networks are more than adequate for all current applications. In fact, the traffic pattern on most office networks is such that the throughput of the local network is rarely the source of any sort of bottleneck. Rather, the throughput at the access point to the wide area network (WAN), such as the Internet or the

public switched telephone network (PSTN), is where most bottlenecks occur. Intra-network communications between users on a particular WLAN can be maintained at very high speeds.

In addition, the future of the industry standards that govern WLAN technology bodes well for continuing the upward trend in WLAN data rates. For example, the WLAN standard body (IEEE's 802.11 working group) recently passed a new version of the standard, extending the data rate up to 54 megabits per second (Mbps), well beyond the current 11 Mbps rates. Since these higher data rates are compatible with currently installed WLAN technology, users of today's technology will have a clear-cut migration path to higher data rates once this technology becomes available.

Reason 7: Network Access Anywhere, Everywhere

In today's business environment, more and more workers are either bringing their work home from the office with them or they simply work out of a home office. For employees of global enterprises, working outside of the typical office hours has become a necessity because of the difference in time zones among wide-reaching operations across multiple countries or continents.

With a wireless network and WLAN-enabled PCs at home, enterprise executives have immediate access to all of their work files by accessing their company's virtual private network (VPN) through the Internet. And a home WLAN is an efficient way to share the residence's broadband access among several users without re-wiring the home. For example, teenagers doing research for a school project can share access to a high-speed Internet connection with their parents who are working after the typical business hours.

Reason 8: Fast, Easy Installation

Comparing the ease of installing a WLAN and a wired network is like comparing night and day. For example, a WLAN access point simply plugs into a broadband access point, such as a digital subscriber line (DSL) or a cable TV line, and, in a matter of minutes, any desktop PC within range of the access point becomes part of the network and has full access to the high-speed Internet connection.

This is particularly critical for small or medium size businesses that may be contemplating the installation of their first local area network. These types of businesses pride themselves on their ability to quickly adapt to changing conditions. Indeed, many such businesses rely on their agility for their very survival. They can't afford long installation times when office workers are often displaced from their usual workplaces and their productivity drops. A WLAN infrastructure with WLAN-enabled desktop PCs is the fast, easy and cost-effective solution.

Reason 9: Extending the LAN with a WLAN

In the real world, wired local area networks and wireless networks are mutually compatible and often are deployed in the same environment to achieve the organization's overall networking goals. In most cases, it is far easier and more cost-effective to expand an existing wired network by adding a WLAN than it is to install additional cables and wired routers. In fact, the number of users of an organization's network can be expanded by simply plugging a wireless access point into the wired network's router. Most WLAN access points have a conservative range of at least

30,000 square feet of floor space, where a significant number of new network users can be located. And if the WLAN must cover more floor space, additional access points can be quickly installed, increasing the coverage of the WLAN to 100,000 square feet or more. WLAN technology has been developed so that as many as three access points can be installed in close proximity to one another and the wireless transmission of any one will not cause interference for the others in the area.

Reason 10: A Simpler, Cleaner Networking Infrastructure

When a facility is wired for local area networking as well as telephones, electricity and maybe a close-circuit TV security system, the wiring closets and cabinets can become difficult to manage. A WLAN will not eliminate entirely the confusion that many spaghetti-like wiring closets and cabinets cause those that are responsible for their maintenance, but reducing one wiring infrastructure will certainly help networking personnel who frequently are faced with tremendous challenges on a daily basis. Aside from improving the aesthetics of central and intermediary wiring facilities, a WLAN infrastructure is much easier and simpler to maintain and manage.

A Note on WLAN Security

From its very beginning, the technical standard that defines the functionality of WLAN equipment and networks (called the 802.11 Standard of the Institute of Electrical and Electronics Engineers [IEEE]), has included provisions for the security of WLANs. These features were intended to protect two facets of wireless networking: first, the security of sensitive data stored on a WLAN; and second, access to the wireless network.

Since 1997, the security capabilities in the WLAN standard have been gathered under the rubric of Wired Equivalent Privacy (WEP). For the time when it was developed, WEP was quite capable and provided protection against all but the most sophisticated hackers using the most advanced computer technology. Even very sophisticated hackers would need several days of effort to break into a SOHO WLAN protected by WEP. And the security of enterprise deployments of WLAN technology was usually supplemented by proprietary security applications intended to protect virtual private networks (VPNs) and other sorts of enterprise networking applications. These factors made the security of WLAN technology quite strong.

Recently, the Wi-Fi Alliance, the international industry group that certifies the interoperability of WLAN products, has developed new technology to increase the strength of the security inherent in WLANs. The results of this effort are called Wi-Fi Protected Access™ (WPA). At the same time, the 802.11 standards working group of the IEEE has been developing an addition (802.11i) to the original WLAN standard that would include stronger security features. Both of these efforts are compatible with each other.

WPA is expected to begin appearing in Wi-Fi CERTIFIED™ products in 2003. It includes much stronger data encryption capabilities over WEP and adds new user authentication functions that will be especially effective for protecting enterprise deployments of WLAN technology. Existing WLAN equipment and products can be upgraded to include WPA security through a simple software download.

The additional security capabilities that are being developed by the IEEE 802.11 working group will be available later, probably in 2004. The security features of WPA will be forward compatible with the features being developed by the IEEE 802.11 working group.

Making a PC WLAN-Ready

Many PC users who may have feared removing the cover from their PCs to install equipment upgrades will find the installation of WLAN technology externally exceedingly simple. For those who are more adventurous and have upgraded their PCs in the past, they will find that adding a WLAN adapter card internally to a PC is about as easy as installing a modem.

Just like wired networks, PCs can be made WLAN-ready by adding either an internal wireless network interface card (NIC) or an external NIC in an enclosure that's connected to the PC through one of its Universal Serial Bus (USB) ports. In either case, the hardware is easily accommodated by practically all of today's popular PCs. And once the hardware is in place, a compact disk (CD) walks the user through several simple steps to add any needed software and re-configure the PC's operating environment for wireless networking operation. In a matter of minutes, the desktop PC is WLAN-ready.

Conclusions

It is safe to say that no matter whether users have desktop PCs or mobile laptop computers, wireless networking is efficient and effective for many different types of organizations, companies and work groups. In today's fast-paced business world, companies of any size, from SOHO businesses to small/medium size firms and even global enterprises, must maintain their flexibility and adaptability in order to make the most of market opportunities. Many times that means adjusting and rearranging workspaces. At other times, it may mean temporarily or permanently expanding the concern's networking capabilities. In any case, an organization with WLAN-ready desktop PCs and a wireless infrastructure in place have a decided advantage over those companies tethered to hard-to-move wires running through walls and ceilings.

In addition, wireless networking technology has made great strides. Costs have come down, WLAN network throughput performance has increased to rates as high as 54 Mbps and security concerns have been addressed by new, stronger features that effectively guard sensitive data and network access.

WLAN technology in desktop PCs just makes a lot of sense.

For more information, visit the Texas Instruments Web site:
www.ti.com/wlan

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