The Age of the Wireless LAN

In today’s dynamic business environment, workers have come to expect seamless access: anywhere at any time. Wireless LANs (WLANs) are becoming more popular as an access vehicle because they free users from the need to be cabled to a physical network. A wireless LAN can provide access to shared information on the fly, enabling real-time connectivity to all types of network resources from anywhere within range of an Access Point (AP).

Wireless LANs use standards-based Radio Frequency (RF) technology to transmit and receive data over the air. Since they are RF-based, wireless LANs in operation are very similar to the model we’re familiar with as radio listeners. Anyone who is tuned in to the proper frequency can receive the information. Current wireless LAN standards create a shared medium in which all users associated with a specific wireless LAN transmission device share the transmission capacity in a secure fashion. A 256-bit Advanced Encryption Standard may be an option for businesses needing added security.

Businesses are finding that wireless LANs can support a general improvement in process efficiency, while also adding increased scalability to existing networks. Given the recent advances in security, wireless LANs have become a practical alternative to traditional wired networks. They can also solve some unique design problems that avoid cost-prohibitive investments in cabling, and reduce LAN administrative costs.

Benefits of Wireless LANs
Many benefits are realized through the use of wireless LAN technology, including: increasing productivity, realizing technology and operational efficiencies and improving employee satisfaction.

Foster Productivity
Increase Mobility
With wireless networks, workers can connect to the enterprise from many different locations: within a single physical space, within an extended office campus, or on the road in thousands of public venues (such as hotels, airports and coffee shops). Office users can be productive away from the office, and sales representatives can easily connect at work. This increased mobility adds value in terms of employee satisfaction, as well as in greater productivity.

Improve Inter-Team and Intra-Team Collaboration
Through the use of wireless LANs, team members can assemble and share information in a conference room, a cafeteria, or from an office cube. Multiple teams in different locations can collaborate real-time. Wireless LANs also support intelligent multi-tasking, allowing workers to check email during breaks in a training session.

Enable More Efficient Meetings and Decision Making
There is often a productivity gap during meetings when additional information is required to continue a meeting, make a decision or finalize a project. Once inside of a traditional conference room, workers are generally separated from the data they need to support decisions or ideas (even if it’s a decision as simple as scheduling the next meeting). That’s not the case with a wireless LAN. Employees can have immediate access to information they need to make quick, informed decisions. The meeting can continue with all decision makers present. This hands-on access to information fosters efficient and productive meetings.
Market Brief - Wireless LAN Technology

Realize Technology, Operational and Environmental Efficiencies

Improve Scalability and Deployment Times
Wireless LANs are easier and faster to deploy (and redeploy) since there is no need to run cable and install jacks. They can be expanded to include additional buildings and can extend connectivity to otherwise isolated LANs. Adding, moving or changing workstations is much faster, given the plug-and-play nature of the technology.

Foster Business Continuity
Because they can be installed or relocated quickly, wireless LANs enable faster repair in the event of a problem.

Reduce Structural Modifications
Some scenarios prohibit the installation of a wired physical plant. Protected structures such as historical monuments and buildings may not allow the physical structure to be altered to install cabling. Some facilities may suffer cosmetically from such modifications. Outdoor scenarios require linkages over terrain that is unsuitable for a wired connection. In both cases, wireless LANs can overcome the disadvantages offered by a wired infrastructure, and provide near ubiquitous coverage for workers and visitors.

Increase Workplace Safety
Some physical environments are not well suited for the use of physical cabling. Examples of such environments include manufacturing plant floors, warehouse floors and hospitals. In these scenarios, exposed cables can pose a hazard or obstruction that hinder, deter or even create a danger to workers. Wireless LAN connectivity enables employees to work safely in an environment free from such physical obstacles.

Reduce Infrastructure Cost
Wireless connections eliminate the cost of restringing cable every time the LAN is upgraded, or its configuration is changed. Cabling costs can be a significant part of the LAN administration budget, especially when networks span several floors or multiple buildings. The administrative cost of maintaining the cabling plant is reduced because the cost and effort of tracking and recording move/add/change activity is less than in a typical wired environment. In addition, wireless LAN hardware is relatively inexpensive.

Enhance Service/Satisfaction
Increase Employee Satisfaction
Wireless LANs enable employees to be more productive. Instead of having to go home and spend hours in email responding to customer inquiries, employees can use hot spots to respond to issues needing a timely resolution. This can save many hours of late night work that may have cut into personal time. In addition, customers are satisfied because they received quick responses. Satisfied customers lead to happy workers.

Improve Customer Service
When employees are out of the office, it is sometimes difficult to respond to customer questions. Many customers wait until later that evening or the next day to receive information they requested. Wireless LANs enable employees to respond to customer requests during meeting breaks, in alternate offices, or even in hotels or Internet cafes.

Issues to Watch
Although there are many advantages to wireless LANs, the technology is not a magic answer to every kind of network problem. There are several issues that need to be assessed while considering a wireless LAN implementation. As the technology evolves, these issues should have less of an impact on the network.

Security
Since wireless LANs are easy to hack if they’re not adequately protected, security should be a major consideration in the network design. Some traditional security technologies (Wired Equivalent Privacy, WiFi Protected Access and Light Extensible Authentication Protocol) may have already proven insufficient when used with wireless LANs. Rogue access points are a serious threat from outside the enterprise. In addition, there is a danger that legitimate users may inadvertently stray into unauthorized areas.

The wireless LAN industry is focused on improving security. New standards (802.1x, 802.11i, and IPSEC integration) have a number of security enhancements, and wireless security can also be augmented through additional encryption protocols. Extensible Authentication Protocol (EAP) with access control services can help secure transactions. Second-generation management tools are being developed to automatically detect and block the presence of rogue access points.

Bandwidth
In a converged voice/data environment, there is often a battle for bandwidth. Wireless LANs offer bandwidth that’s equivalent to wired counterparts, and can deliver QoS when designed properly. Wireless LAN channelization may be used to combine two channels to double the effective throughput. However, when using channelization, the maximum number of clients per access point is reduced by half. The available bandwidth is increased proportionally.

Bottleneck effects can also be a problem. Since access points are shared, maximum throughput is generally throttled back to match the lowest rate attainable among the users who are connecting through a given access point.

Interference
Natural interference can reduce wireless LAN transmission rates by up to 60%. Wireless APs have a limited range, so it’s important that they be placed with an understanding of bandwidth and range requirements. The RF signals that support wireless LANs are subject to interference.
from the same factors that effect any radio transmission, including natural topology, building structures, other RF sources (including cordless phones and microwave ovens) and even human bodies. Managing potential interference problems is ultimately a matter of good design and proper testing.

Roaming
Support for roaming within a wireless LAN is still evolving, but will hopefully become seamless and transparent. When moving through a wireless LAN space, users should not be dropped and forced to re-connect as they shift from one AP to another. There are some design issues that need to be addressed since not all APs play well together when it comes to connection hand-offs.

Management
Due to interoperability issues in matching different vendors and product lines, managing wireless LANs may be a challenge. The rapid pace of new developments can also make it hard to keep up with improvements and evolving standards. Finally, a wireless LAN is never totally wireless. At some point, it does need to be connected to the wired network. Some of the wireless devices will need local power connections. That means proper attention must be paid to redundancy and fail-over support, which is just as important as with any wired LAN.

Conclusion
Wireless LANs have the potential to add value to businesses. They can improve productivity, provide scalability, reduce infrastructure costs, contribute to customer and employee satisfaction and may help resolve business continuity issues. When considering a wireless LAN, it is important to understand some limitations and issues. Users should pay close attention to security. Bandwidth and interference need to be assessed. The network must be designed appropriately, and the solution needs to be managed effectively. The key for getting the most value with the least risk is to engage a partner with real field experience in wireless LAN design and installation.

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