symbol®

Wireless for Beginners

(What you've always wanted to know about Wireless, but were afraid to ask!)

Welcome to a Wireless World

It's an environment where high-performance networking enables total business mobility. From any location within your enterprise, using your notebook computer or hand-held device, you can wirelessly gather information, connect with colleagues, interact with customers, and make informed decisions in real time. Studies show that organizations that integrate wireless networking into their systems see increased productivity, better customer retention, and lowered operating costs.

When you choose to go wireless, your company is making a sound investment in the future. Within the next few years, much computing will be done wirelessly, with organizations reaping the benefits of improved mobility, faster access to information and more interactive decision making. By integrating wireless systems into your computing environment, your company is laying the groundwork for a more cost-effective, powerful infrastructure that will lead to long-term success.

An Overview of Wireless Networks

There are three types of wireless connectivity currently available—personal area networks (PANs), local area networks (LANs), and wide area networks (WANs). Each is uniquely suited for different application and communication requirements.

Personal Area Networks (PANs)

Personal area networks are based on a global specification called Bluetooth™, which uses radio frequency technology to transmit voice and data. Bluetooth is being developed by the Bluetooth Special Interest Group established in 1998, and includes more than 1,500 member companies. The Group's intent is to form a de facto standard for the Bluetooth air interface and the controlling software. Over a short range, this cable-replacement technology wirelessly and transparently synchronizes data across devices and creates access to networks and the Internet. Bluetooth is ideal for mobile professionals who need to link notebook computers, mobile phones, PDAs, PIMs, and other hand-held devices to do business at home, on the road, and in the office. Its benefits include:

PERSONAL AREA NETWORK (WPAN)

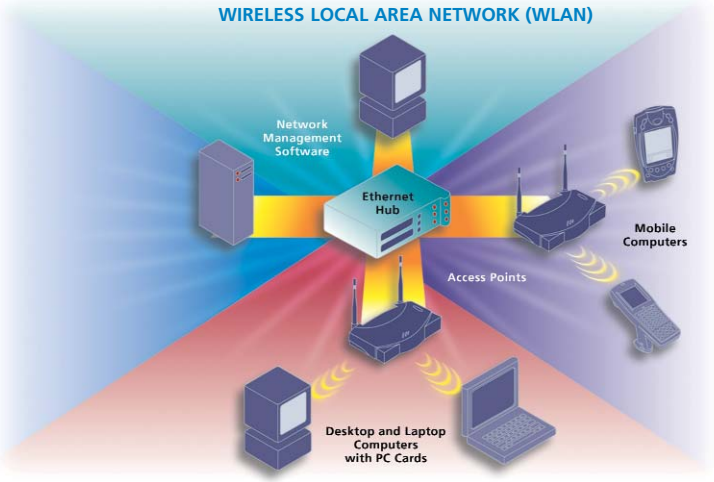
Bluetooth piconet consists of one hub and up to seven client devices.

- Convenience of automatic synchronization from device to device.
- Consistent data across devices, regardless of the point-of-data capture.
- Low cost of ownership with fewer cabling and networking appliance needs.
- Ease-of-use, once devices have been assigned and authorized for the PAN.
- Compatible data, devices, and multi-vendor technologies based on the Bluetooth standard.

Local Area Networks (LANs)

A wireless local area network is a flexible data communication system implemented as an extension to, or an alternative for, a wired LAN within a building or campus. A few of today's wireless LANs (including Symbol's) combine voice and data communications over the same backbone for lower costs and more effective and immediate information sharing; as well as high-speed networks for large file transfers and video streaming. Users can roam from cell to cell, capture and send data; access the Internet and the corporate intranet. LANs are currently the most common form of wireless networking for day-to-day business operations. Benefits include:

- Increased productivity through ongoing data access for any site location.
- Easier network reconfiguration and expansion through wireless installations.
- Lower cost of ownership through reduced cabling, especially in rapidly changing environments.
- Interoperability in multi-vendor environments based on the IEEE 802.11b standard.
- Reliability based on decades of use, starting in World War II.

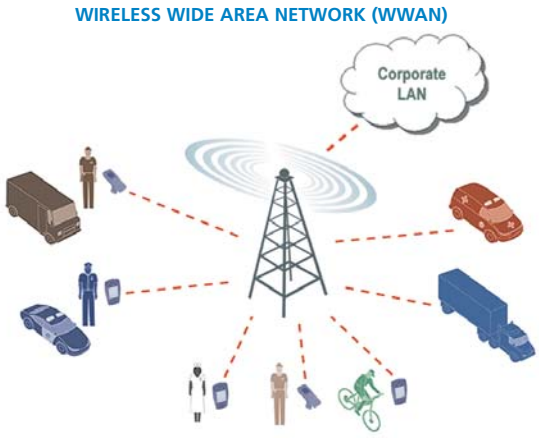


A Wireless LAN (WLAN) consists of access points connected to a wired network (or standalone) and devices with client adapters.

Wide Area Networks (WANs)

Wide area networks utilize digital mobile phone systems to access data and information from any location in the range of a cell tower connected to a data-enabled network. Using the mobile phone as a modem, a mobile computing device such as a notebook computer, PDA, or a device with a stand-alone radio card, can receive and send information from a network, your corporate intranet, or the Internet. It enables communications from a hotel, a conference center, an airport, or even a train. Truckers may use wireless WAN solutions to upload and download data to centralized databases without leaving their vehicles. Benefits include:

- Greatly improved communications between associates over long distances.
- Easy public access to e-mail, the Internet, and corporate intranets.
- Flexibility to respond to emergencies, security, and public situations.
- Rapid information sharing on critical multi-national projects.
- Lower costs over standard methods of distance communication such as phone, fax and express mail.



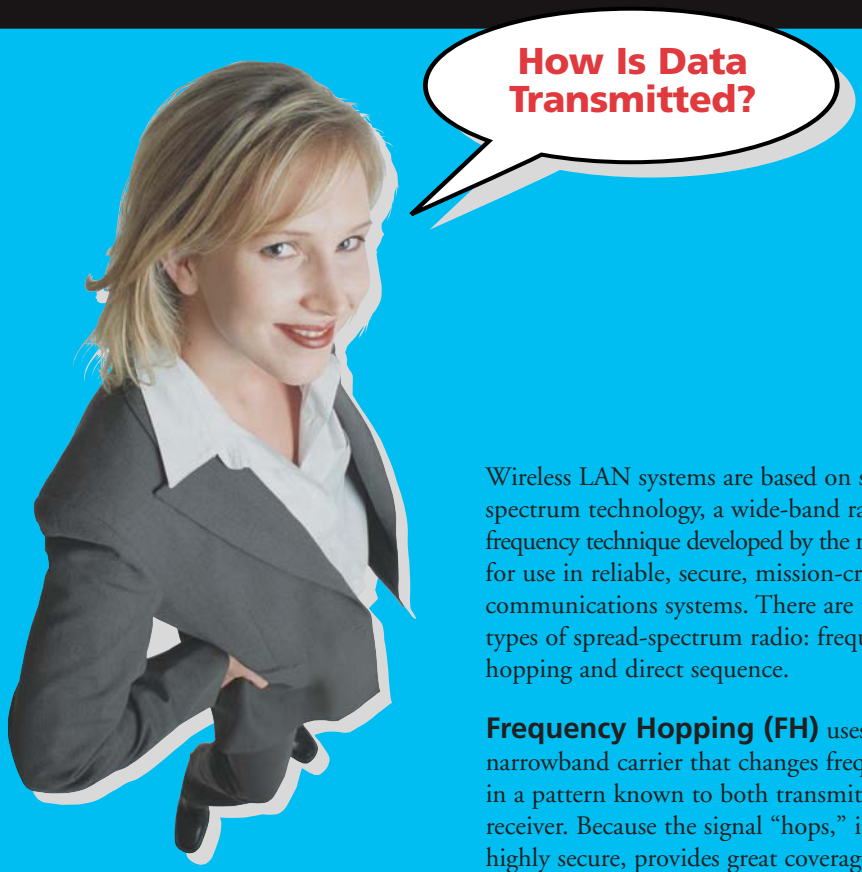
Wireless WAN-enabled mobile devices and vehicles with wireless WAN-enabled docking stations for mobile devices keep mobile workers connected to business critical applications—no matter where their workday takes them.

How Does a Wireless LAN Work?

On a pre-established radio frequency, wireless local area networks (LANs) transmit and receive data and voice over the airwaves. In a typical LAN configuration, a transceiver device called an access point connects to the wired network from a fixed location using standard Ethernet cable. At a minimum, the access point receives, buffers, and transmits data between the LAN and the wired network infrastructure. A single access point supports a number of users and functions within a specified range. The access point and its antenna are usually mounted on a ceiling or wall to obtain the best coverage. Each access point and its clients make up a cell.

End users access the wireless LAN through wireless LAN adapters, implemented as PC/CompactFlash™ cards in notebook computers and PDAs, ISA or PCI cards in desktop computers, or fully integrated hand-held devices. Wireless LAN adapters provide a transparent interface between the client and the LAN itself.

Based on these technologies, users roam freely from cell to cell—a good wireless system switches your personal device automatically from access point to access point without any interruption of service. Symbol products even offer international roaming for multi-national organizations.



Wireless LAN systems are based on spread-spectrum technology, a wide-band radio frequency technique developed by the military for use in reliable, secure, mission-critical communications systems. There are two types of spread-spectrum radio: frequency hopping and direct sequence.

Frequency Hopping (FH) uses a narrowband carrier that changes frequency in a pattern known to both transmitter and receiver. Because the signal "hops," it is highly secure, provides great coverage, and has robust throughput.

Direct Sequence (DS) generates a redundant bit pattern for each bit of data to be transmitted, called a "chip." This type of transmission enables high-speed transmission at 11 Mbps for applications such as wireless Internet access, video streaming, and large file transfers.

Speeds and Spectrums

Most wireless networks currently transfer data at up to one of two rates: 2 megabits per second (Mbps) or 11 Mbps.

- Symbol's Spectrum24® 2 Mbps wireless LAN provides high-performance data capture and transfer as well as voice communications, and can be used over an extended range.
- High rate networks at 11 Mbps use a wider bandwidth for large file and voice/data transfers over a shorter range. Symbol's Spectrum24® High Rate 11 Mbps system also allows the signal to scale down to 5.5, 2, and 1 Mbps to provide more range and continuous connectivity.

What is Voice-over-IP?

Voice-over-IP is a technique for sending real-time voice over data networks including the Internet or internal IP network.

Normal data traffic is carried between PCs, servers, printers, and other networked devices through a company's worldwide TCP/IP network. Each device on the network has an IP address, which is attached to every packet for routing. Voice-over-IP packets are no different.

Users may use appliances such as Symbol's NetVision® Phone to talk to other IP phones or desktop PC-based phones located at company sites worldwide, provided that a voice-enabled network is installed at the site. Installation simply involves assigning an IP address to each wireless handset.

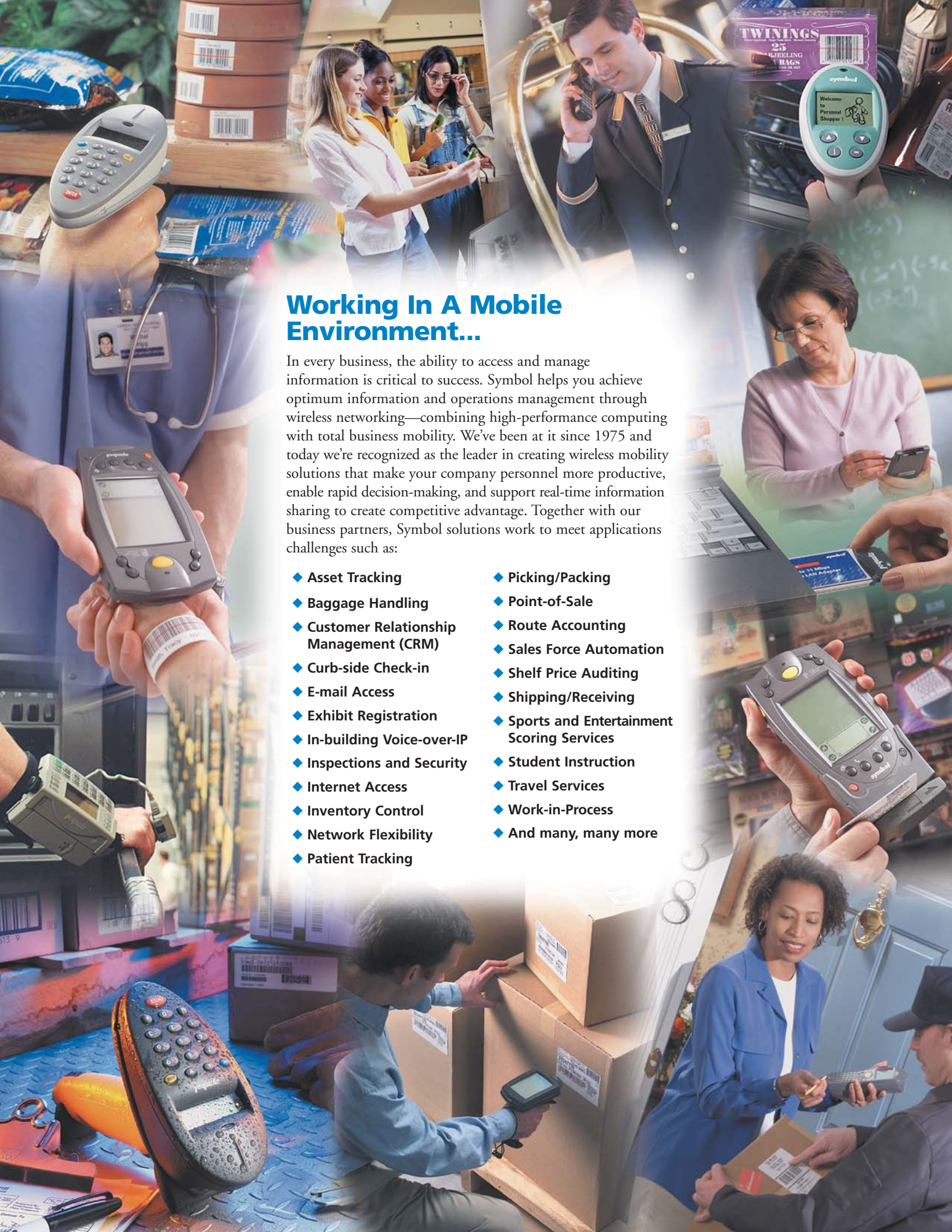
Wireless Standards

Symbol has been a leader in establishing wireless standards—for interoperability, multimedia transmission, and international connectivity. Our engineers sit on the committees of a number of trade organizations dedicated to creating and implementing these standards. Following are the key wireless technology standards in use today. Check the Glossary for full explanations of each standard:

- IEEE 802.11 interoperability standard
- IEEE 802.11a 5.4 GHz standard
- IEEE 802.11b high rate standard
- H.323 multimedia standard
- Wi-Fi™
- GSM
- CDMA and TDMA

Wireless Security

In today's information-critical world, maintaining tight network security has become one of business's most vital concerns. You want to be sure that your mission-critical information will not be exposed to eavesdropping or interference. Based on MIT's Kerberos standard, Symbol provides its customers with today's most secure encryption system for mobile environments. Symbol also supports the IEEE's Wired Equivalent Privacy (WEP) Standards at 40 and 128-bit encryption.



Working In A Mobile Environment...

In every business, the ability to access and manage information is critical to success. Symbol helps you achieve optimum information and operations management through wireless networking—combining high-performance computing with total business mobility. We've been at it since 1975 and today we're recognized as the leader in creating wireless mobility solutions that make your company personnel more productive, enable rapid decision-making, and support real-time information sharing to create competitive advantage. Together with our business partners, Symbol solutions work to meet applications challenges such as:

- Asset Tracking
- Baggage Handling
- Customer Relationship Management (CRM)
- Curb-side Check-in
- E-mail Access
- Exhibit Registration
- In-building Voice-over-IP
- Inspections and Security
- Internet Access
- Inventory Control
- Network Flexibility
- Patient Tracking
- Picking/Packing
- Point-of-Sale
- Route Accounting
- Sales Force Automation
- Shelf Price Auditing
- Shipping/Receiving
- Sports and Entertainment Scoring Services
- Student Instruction
- Travel Services
- Work-in-Process
- And many, many more

About Symbol's Spectrum24® Wireless LAN Solutions

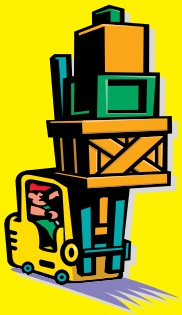
Spectrum24® is the premier wireless LAN for businesses who need high reliability, scalability, and flexibility in demanding environments. It's an advanced wireless LAN that facilitates both data and voice communications over a single network.

Symbol's Spectrum24® wireless LAN solutions extend the reach of your existing wired LANs. It is the wireless LAN of choice when you need mobile communications with maximum flexibility. It is a proven solution for demanding environments such as:

- Corporate Enterprise
- Education
- Distribution
- Healthcare
- Hospitality
- Logistics
- Manufacturing
- Retail
- Warehousing
- Transportation

The Benefits of Wireless

The widespread strategic reliance on networking among competitive businesses and the meteoric growth of the Internet and online services are strong testimonies to the benefits of instantaneous data capture, wireless voice, and shared resources. With wireless technology, users can immediately and continuously access shared information, while IT managers can set up or augment networks (such as temporary conference or work spaces) and devices (such as wireless cash registers, kiosks, and displays) without installing or moving wires. Just some of the benefits that wireless LANs offer include:



Mobility That Improves Productivity and Service: Wireless LAN systems can provide users with access to real-time information anywhere in their organization. This supports better productivity and service opportunities not possible with wired networks, leading to faster decision-making and lowered costs.

Installation Speed and Simplicity:
Installing a wireless LAN system is faster and easier than a wired implementation, as it eliminates the need for complex cabling and construction tasks. Installation can even take place without taking your current wired system off-line, allowing work to continue as usual.

Installation Flexibility:
Wireless technologies can go into spaces where wired systems cannot, such as historic sites or sites where new wiring cannot be undertaken for structural reasons.

Reduced Cost-of-Ownership:
While there is an initial investment required for wireless hardware, overall installation expenses and life-cycle costs can be significantly lower. Long-term cost benefits are greatest in dynamic environments requiring frequent moves, adds and changes.

Scalability:
Wireless LAN systems can be configured and reconfigured in a variety of topologies to meet the needs of specific applications and installations. Symbol networks are also designed to adapt easily for corporate expansion—simply add more access points to grow your network.

Choosing a Wireless LAN Vendor

When choosing a WLAN vendor, be sure to keep the following issues in mind:

- Approach the planning of your wireless system recognizing its role as strategic infrastructure.
- When making a selection, consider all of the important characteristics that will determine its success, including robustness, manageability, scalability, value and supplier capabilities.
- Think carefully about the speeds and applications you will need now and into the future. High-speed systems are best in limited spaces where wide bandwidth applications are a priority; lower-speed systems provide better coverage and immunity. Select your systems to complement each other and optimize their strengths.
- Related to this, approach upgrade planning with accurate knowledge of differences in coverage range; simplistic schemes which talk about 1-for-1 access point upgrade or replacement will not yield the desired results. Higher speeds may require more access points.
- Insist on standards compliance in your design and implementation.
- Consider the capabilities, capacity and availability of your vendor to work with you throughout the life of your wireless system—from the initial planning, network analysis, design and site survey through integration and installation of the system to ongoing service and support.
- Before the initial installation, invest time in the plan and design of your system. While a wireless system will enable worker mobility, the supporting infrastructure is not mobile and its placement for performance and coverage must be carefully planned. The exact design steps you will need depend on your business critical requirements for performance coverage and future growth.
- Assess your requirements and develop a plan for day-to-day management, service, and support to ensure your wireless network investment will continue to meet the changing demands of your business.

Wireless LANs Protect Future Technology Investments

In a world where you need mobility and real-time control over your business, wireless technology is the answer. Over the next several years, technologies may change, product capabilities will be different, but wireless networking will remain fundamental to your business—making it a sound basis for planning new communications directions for your company.

Wireless is developing in three areas of technology, from personal area networking (PAN) to local area networking (LAN) to wide area networking (WAN). Symbol's vision is to continue delivering mobile computing solutions at all three layers of wireless technology, offering tightly integrated solutions on a wide variety of application-specific appliances.

In the process, Symbol is creating a host of new business opportunities for almost any enterprise. Your wire-free company is in a position to leverage every piece of data and each voice communication that comes into the system. Associates work more effectively, thanks to on-the-spot information updates; and share information by wireless voice and data transmission, staying in closer contact and maximizing their time. Customers gain up-to-the-minute responses to questions and concerns, helping them make better business decisions.

Mobility is changing the world in ways more fundamental than simply making your current projects move faster or work more efficiently. Wireless technology is shaping a world of ubiquitously connected mobile appliances that carry voice, data and multimedia into the hands of your workers, your colleagues and your customers.

When You Work With Symbol Technologies, You're In Good Company

Symbol Technologies, Inc., winner of the National Medal of Technology, is a global leader in mobile data transaction systems, providing innovative customer solutions based on wireless local area networking for data and voice, application-specific mobile computing and bar code data capture. Symbol's wireless information appliances connect the physical world of people-on-the-move, packages, paper and shipping pallets, to information systems and the Internet. Today, some 10 million Symbol bar code scanners, mobile computers and wireless LANs are utilized worldwide in markets ranging from retail to transportation and distribution logistics, manufacturing, parcel and postal delivery, government, healthcare and education. Symbol's systems and products are used to increase productivity from the factory floor to the retail store, to the enterprise and out to the home.

Visit Symbol at www.symbol.com for additional information on our products and services.

Handy Glossary Included!

(Simply tear out along perforation.)

Corporate Headquarters
Symbol Technologies, Inc
One Symbol Plaza
Holtsville, NY 11742-1300
TEL: 1-800-722-6234/1-631-738-2400
FAX: 1-631-738-5990

For Europe, Middle East and Africa
Symbol Technologies
EMEA Division
Symbol Place, Winnersh Triangle
Berkshire, England RG41 5TP
TEL: 44-118-9457000
FAX: 44-118-9457500

For Asia Pacific Area
Symbol Technologies Asia Inc.
(Singapore Branch)
Asia Pacific Division
230 Victoria Street #05-07/09
Bugis Junction Office Tower
Singapore 188024
TEL: 65-337-6588/FAX: 65-337-6488

For North America, Latin America and Canada
Symbol Technologies
The Americas
One Symbol Plaza
Holtsville, NY 11742-1300
TEL: 1-800-722-6234/1-631-738-2400
FAX: 1-631-738-5990

Symbol World Wide Web Internet Site
For a complete list of Symbol subsidiaries and Symbol Business Partners worldwide contact us at:
http://www.symbol.com
E-mail: webmaster@symbol.com

20112

Part No. 20112 Printed in USA 9/01

symbol®

A Glossary of Commonly Used Wireless, Networking and Voice-over-IP Terms

10BASE-T: IEEE 802.3 standard for a twisted-pair Ethernet network. 10 Mbps transmission rate over baseband using unshielded, twisted-pair cable.

802.11: The IEEE 802.11 standard defines both frequency hopping and direct sequence spread spectrum solutions for use in the 2.4-2.5 MHz ISM (Industrial, Scientific, Medical) band.

802.11a: The portion of the 802.11 specification that defines the 54 Mbps data rate.

802.11b: The portion of the 802.11 specification that defines the 11 Mbps data rate.

A

Access Point: Provides a bridge between Ethernet wired LANs and the wireless network. Access points are the connectivity point between Ethernet wired networks and devices (laptops, hand-held computers, point-of-sale terminals) equipped with a wireless LAN adapter card.

Analog Phone: Comes from the word "analogous," which means similar to. In telephone transmission, the signal being transmitted from the phone/voice, video or image--is analogous to the original signal.

Antenna-Directional: Transmits and receives radio waves off the front of the antenna. The power behind and to the sides of the antenna is reduced. The coverage area is oval with the antenna at one of the narrow ends. Typical directional antenna beam width angles are from 90° (somewhat directional) to as little as 20°(very directional). A directional antenna directs power to concentrate the coverage pattern in a particular direction. The antenna direction is specified by the angle of the coverage pattern called the beam width.

Antenna-Omni-directional: Transmits and receives radio waves in all directions. The coverage area is circular with the antenna at the center. Omni-directional antennas are also referred to as whip or low-profile antennas.

Association: The process of determining the viability of the wireless connection and establishing a wireless network's root and designated access points. A mobile unit associates with its wireless network as soon as it is powered on or moves into range.

ATM: Asynchronous Transfer Mode. A type of high-speed wide area network.

B

Backbone: A network that interconnects other networks, employing high-speed transmission paths and often spanning a large geographic area.

Bandwidth: The range of frequencies, expressed in hertz (Hz), that can pass over a given transmission channel. The bandwidth determines the rate at which information can be transmitted through the circuit.

Bandwidth Management: Functionality that allocates and manages RF traffic by preventing unwanted frames from being processed by the access point.

BC/MC: Broadcast frames; Multicast frames.

Beacon: A uniframe system packet broadcast by the AP to keep the network synchronized. A beacon includes the Net_ID (ESSID), the AP address, the Broadcast destination addresses, a time stamp, DTIM (Delivery Traffic Indicator Maps) and the TIM (Traffic Indicator Message).

BFA Antenna Connector: Miniature coaxial antenna connector manufactured by MuRata Manufacturing Corporation.

Bluetooth: See Wireless Personal Area Networks.

Bridge: A device that connects two LANs of the same or dissimilar types. It operates at the Data Link Layer, as opposed to routers. The bridge provides fast connection of two collocated LAN segments that appear as one logical network through the bridge.

Buffer: A segment of computer memory used to hold data while it is being processed.

C

CAM: Continuous Aware Mode: Mode in which the adapter is instructed to continually check for network activity.

Card and Socket Services: Packages that work with the host computer operating system, enabling the wireless LAN adapter to interface with host computer configuration and power management functions.

Cellular Phone: Low-powered, duplex, radio/telephone that operates between 800 and 900 MHz, using multiple transceiver sites linked to a central computer for coordination. The sites, or "cells," cover a range of one to six or more miles in each direction.

Centrex: Business telephone service offered by a local telephone company from a local telephone company office. Centrex is basically a single line phone system leased to businesses as a substitute for a business that is buying or leasing its own on-premises phone system or PBX.

CDMA and TDMA: The Code Division Multiple Access and Time Division Multiple Access standard for wireless communications on wide area networks (WANs) in North America.

Circuit Switching: The process of setting up and keeping a circuit open between two or more users so that users have exclusive and full use of the circuit until the connection is released.

Client: A computer that accesses the resources of a server.

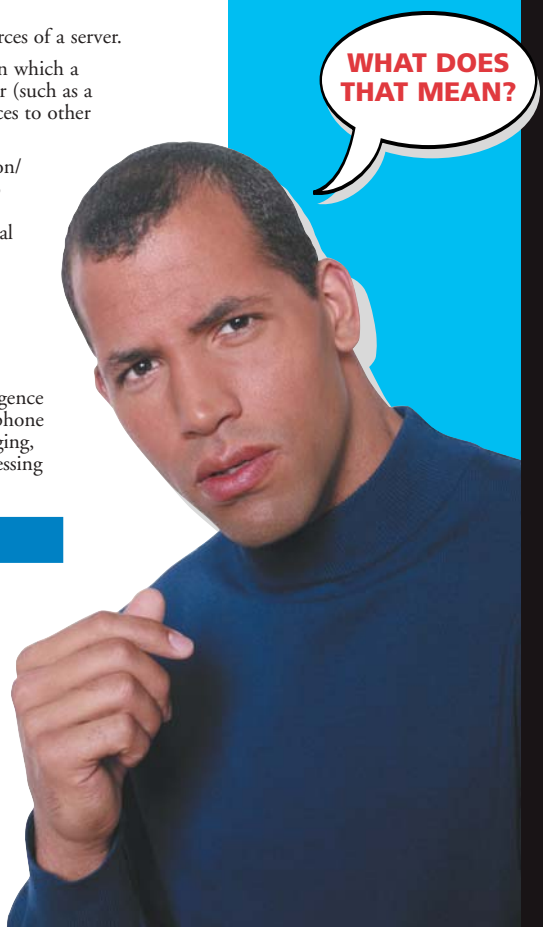
Client/server: A network system design in which a processor or computer designated as a server (such as a file server or database server) provides services to other client processors or computers.

CODEC: Coder-Decoder. Audio compression/decompression algorithm that is designed to offer excellent audio performance. Converts voice signals from their analog form to digital signals acceptable to modern digital PBXs and digital transmission systems. It then converts those digital signals back to analog so that you may hear and understand what the other person is saying.

Computer Telephony Integration: Technology that integrates computer intelligence with making, receiving, and managing telephone calls. Computer telephony integrates messaging, real-time connectivity, and transaction processing and information access.

D

Data Terminal: Computer transmit and receive equipment, including a wide variety of dumb terminals or terminals without embedded intelligence in the form of programmed logic. Most data terminals provide a user interface to a more capable host computer, such as a mainframe or midrange computer.



symbol®

Decryption: Decryption is the decoding and unscrambling of received encrypted data. The same device, host computer or front-end processor, usually performs both encryption and decryption.

Desktop Conferencing: A telecommunications facility or service on a PC that permits callers from several diverse locations to be connected together for a conference call.

Digital Phone System: Proprietary phone system provided by a vendor, such as AT&T, Mitel, Nortel, and so on. The signal being transmitted in a digital phone system is the same as the signal being transmitted in an analog phone system. The system can consist of a proprietary PBX system that converts voice signals from their analog form to digital signals, and then converts those digital signals back to analog. Alternatively, the conversion from analog-to-digital can occur in a digital phone.

Direct Inward Dialing (DID): The ability for a caller outside a company to call an internal extension without having to pass through an operator or attendant. In large PBX systems, the dialed digits are passed from the PSTN to the PBX, which then completes the call.

Direct-Sequence (DS) Spread Spectrum: Direct sequence transmits data by generating a redundant bit pattern for each bit of information sent. Commonly referred to as a "chip" or "chipping code," this bit pattern numbers 10 chips to one per bit of information. Compared with frequency hopping, direct sequence has higher throughput.

Diversity Reception: The use of two antennas attached to a single access point to improve radio reception. The second antenna is used only for receiving radio signals, while the primary is used for both transmitting and receiving.

Driver: A program routine that links a peripheral device, such as a mobile unit's radio card, to the computer system.

E

Element-level Management: Level of technologies aimed at small or medium-sized businesses.

Encryption: Entails scrambling and coding information, typically with mathematical formulas called algorithms, before the information is transmitted over a network.

Ethernet: A local area network used for connecting computers, printers, workstations, terminals, servers, and so on, within the same building or campus. Ethernet operates over twisted wire and over coaxial cable at speeds up to 100 Mbps, with 1 Gbps speeds coming soon.

F

Filtering: Prevents user-defined frames from being processed by the access point.

Fragmentation Threshold: The maximum size for directed data packets transmitted over the radio. Larger frames fragment into several packets this size or smaller before transmission over the radio. The receiving station reassembles the transmitted fragments.

Frame Mode: A communications protocol supported by the OEM Modules. The frame protocol implements asynchronous serial Point-to-Point (PPP) frames similar to those used by serial Internet protocols.

Frequency Hopping (FH) Spread Spectrum: Hedy Lamarr, the actress, is credited in name only for inventing frequency hopping during World War II. As its label suggests, frequency hopping transmits using a narrow band carrier that changes frequency in a given pattern. There are 79 channels in a 2.4GHz ISM band, each channel occupying 1MHz of bandwidth. A minimum hop rate of 2.5 hops per channel per second is required in the United States. Frequency hopping technology is recognized as superior to direct sequence in terms of echo resistance, interference immunity, cost and ease-of-installation.

FTP (File Transfer Protocol): A common Internet protocol used for transferring files from a server to the Internet user. It uses TCP/IP commands.

G

Gain, dB: Gain (a ratio of output divided by input) expressed in decibels; in antennas, the Directive Gain in a given direction.

Gain, dBd: Antenna gain, expressed in decibels referenced to a half wave dipole.

Gain, dBi: Antenna gain, expressed in decibels referenced to a theoretical isotropic radiator.

Gain, dBic: Antenna gain, expressed in decibels referenced to a theoretical isotropic radiator that is circularly polarized.

Gatekeeper: Software that performs two important functions to maintain the robustness of the network: address translation and bandwidth management. Gatekeepers map LAN aliases to IP addresses and provide address lookups when needed.

Gateway: Optional element in an H.323 conference. Gateways bridge H.323 conferences to other networks, communications protocols, and multimedia formats. Gateways are not required if connections to other networks or non-H.323 compliant terminals are not needed.

GHz: International unit for measuring frequency is Hertz (Hz), which is equivalent to the older unit of cycles per second. One Gigahertz (GHz) is one billion Hertz. Microwave ovens typically operate at 2.45 GHz.

GSM: The Global System for Mobile Communications standard for worldwide wireless communications on wide area networks (WANs).

H

H.323: An umbrella standard from the International Telecommunications Union (ITU) that addresses call control, multimedia management, and bandwidth management for point-to-point and multi-point conferences, as well as interfaces between LANs and other networks. The most popular standard currently in use.

Hand-held PC (HPC): The term adopted by Microsoft and its supporters to describe hand-held computers employing Microsoft's Windows CE operating system.

I

Interactive Voice Response: System used to access a database access application using a telephone. The voice processing acts as a front-end to appropriate databases that reside on general purpose computers. For instance, DTMF (touch tone) input of a Personal Identification Number can be required for access, or more unusual and expensive techniques such as voice recognition and voice print matching.

Internet: World's largest network, often referred to as the Information Superhighway. The Internet is a virtual network based on packet switching technology. The participants on the Internet and its topology change on a daily basis.

Internet Commerce: Electronic business transactions that occur over the Internet. Samples of Internet commerce applications include electronic banking, airline reservation systems, and Internet malls.

Internet Phone: Device used to transmit voice over the Internet, bypassing the traditional PSTN and saving money in the process. An Internet phone can be a small phone (such as Symbol's NetVision Phone) or a multimedia PC with a microphone, speaker, and modem.

Interoperability: The ability of equipment or software to operate properly in a mixed environment of hardware and software, from different vendors. Enabled by the IEEE 802.11 open standard.

IP (Internet Protocol): The Internet standard protocol that defines the Internet datagram as the unit of information passed across the Internet. Provides the basis of the Internet connectionless best-effort packet delivery service. The Internet protocol suite is often referred to as TCP/IP because IP is one of the two fundamental protocols.

International Roaming: Ability to use one adapter worldwide.

Intranet: A private network that uses Internet software and Internet standards. In essence, an intranet is a private Internet reserved for use by people who have been given the authority and passwords necessary to use that network.

ISDN: Integrated Services Digital Network. Emerging network technology offered by local phone companies that is designed for digital communications, computer telephony, and voice processing systems.

ISM Band: ISM bands—instrumental (902-928MHz), science (2.42.4835GHz), and medical (5.725-5.850 GHz)—are the radio frequency bands allocated by the FCC for unlicensed continuous operations for up to 1W. The most recent band approved by the FCC for WLANs was the medical band in January 1997.

ITU: International Telecommunications Union. Standards body that defined H.323 and other international standards.

J

Jitter: Noise on a communications line which is based on phase hits, causing potential phase distortions and bit errors.

K

Kerberos: A widely deployed security protocol that was developed at the Massachusetts Institute of Technology (MIT) to authenticate users and clients in a wired network environment and to securely distribute encryption keys.

Key Telephone System: A system in which the telephone has multiple buttons permitting the user to directly select central office phone lines and intercom lines. Key phone systems are most often found in relatively small business environments, typically around 50 telephones.

L

Layer: A protocol that interacts with other protocols as part of an overall transmission system.

LPD (Line Printer Daemon): A TCP-based protocol typically used between a Unix server and a printer driver. Data is received from the network connection and sent out over the serial port.

M

MAC (Media Access Control): Part of the Data Link Layer, as defined by the IEEE, this sub-layer contains protocols for gaining orderly access to cable or wireless media.

MD5 Encryption: An authentication methodology when MU is in foreign subnet.

MIB (Management Information Base): An SNMP structure that describes the specific device being monitored by the remote-monitoring program.

Microcell: A bounded physical space in which a number of wireless devices can communicate. Because it is possible to have overlapping cells as well as isolated cells, the boundaries of the cell are established by some rule or convention.

Modem: Equipment that converts digital signals to analog signals and vice versa. Modems are used to send digital data signals over the analog PSTN.

MMCX Antenna Connector: Miniature coaxial antenna connector in use by several major wireless vendors.

Mobile IP: The ability of the mobile unit to communicate with the other host using only its home IP address, after changing its point of attachment to the Internet and intranet.

Mobile Unit (MU): May be a Symbol Spectrum24® terminal, PC device with a wireless adapter, bar code scanner, or other mobile computing device.

Mobile Unit Mode: In this mode, the WLAN adapter connects to an access point (AP) or another WLAN installed system, allowing the device to roam freely between AP cells in the network. Mobile units appear as network nodes to other devices.

Modulation: Any of several techniques for combining user information with a transmitter's carrier signal.

Multipath: The signal variation caused when radio signals take multiple paths from transmitter to receiver.

Multipath Fading: A type of fading caused by signals taking different paths from the transmitter to the receiver and, consequently, interfering with each other.

N

Node: A network junction such as a switch or a routing center.

P

Packet Switching: Refers to sending data in packets through a network to some remote location. In a packet switched network, no circuit is left open on a dedicated basis. Packet switching is a data switching technique only.

PBX Phone System: Private Branch eXchange. Small version of the phone company's larger central switching office. An alternative to a PBX is to subscribe to a local telephone company's Centrex service.

PCMCIA (Personal Computer Memory Card International Association) PC card: A credit card-size device used in laptop computers and available as removable network adapters.

PCS: Personal Communications Service. A new, lower powered, higher-frequency competitive technology to cellular. Whereas cellular typically operates in the 800-900 MHz range, PCS operates in the 1.5 to 1.8 GHz range. The idea with PCS is that the phones are cheaper, have less range, and are digital. The cells are smaller and closer together, and airtime is cheaper.

Peer-to-peer Network: A network design in which each computer shares and uses devices on an equal basis.

Ping: A troubleshooting TCP/IP application that sends out a test message to a network device to measure the response time.

PLD (Data Link Protocol): A raw packet protocol based on the Ethernet frame format. All frames are sent to the wireless network verbatim—should be used with care as improperly formatted data can go through with undesirable consequences.

Plug and Play: A feature that allows a computer to recognize the PCI adapter and configure the hardware interrupt, memory, and device recognition addresses; requires less user interaction and minimizes hardware conflicts.

Pocket PC: The term adopted by Microsoft® and its supporters to describe hand-held computers employing Microsoft's Pocket PC operating system.

Point-of-Sale Device: A special type of equipment that is used to collect and store retail sales data. This device may be connected to a bar code reader and it may query a central computer for the current price of that item.

POTS: Plain Old Telephone Service. The basic service supplying standard single line telephones, telephone lines, and access to the public switched telephone network.

Power Management: Algorithms that allow the adapter to sleep between checking for network activity, thus conserving power.

PSP (Power Save Polling): Stations power off their radios for long periods. When a mobile unit in PSP mode associates with an access point, it notifies the AP of its activity status. The AP responds by buffering packets received for the MU.

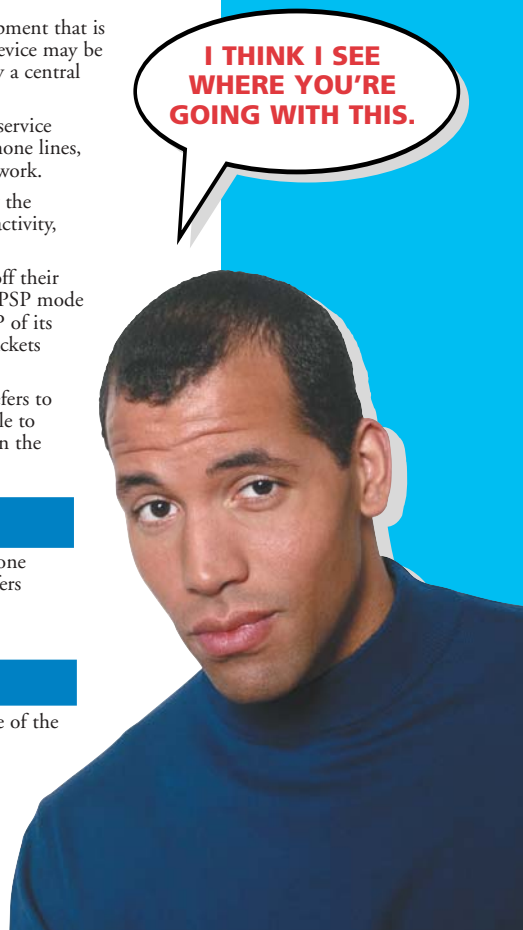
PSTN: Public Switched Telephone Network. Refers to the worldwide voice telephone network accessible to all those with telephones and access privileges. In the U.S., the PSTN is provided by AT&T.

Q

QoS: Quality of Service. Measure of the telephone service quality provided to a subscriber. QoS refers to things like: Is the call easy to hear? Is it clear? Is it loud enough?

R

RBOC: Regional Bell Operating Company. One of the seven Bell operating companies set up after the divestiture of AT&T, each of which own two or more Bell Operating Companies (BOCs).



Roaming: Movement of a wireless node between two microcells. Roaming usually occurs in infrastructure networks built around multiple access points.

Repeater: A device used to extend cabling distances by regenerating signals.

Router: The main device in any modern network that routes data blocks from source to destination using routing cables and determining the best path dynamically. It functions as an addressable entity on the LAN and is the basic building block of the Internet.

S

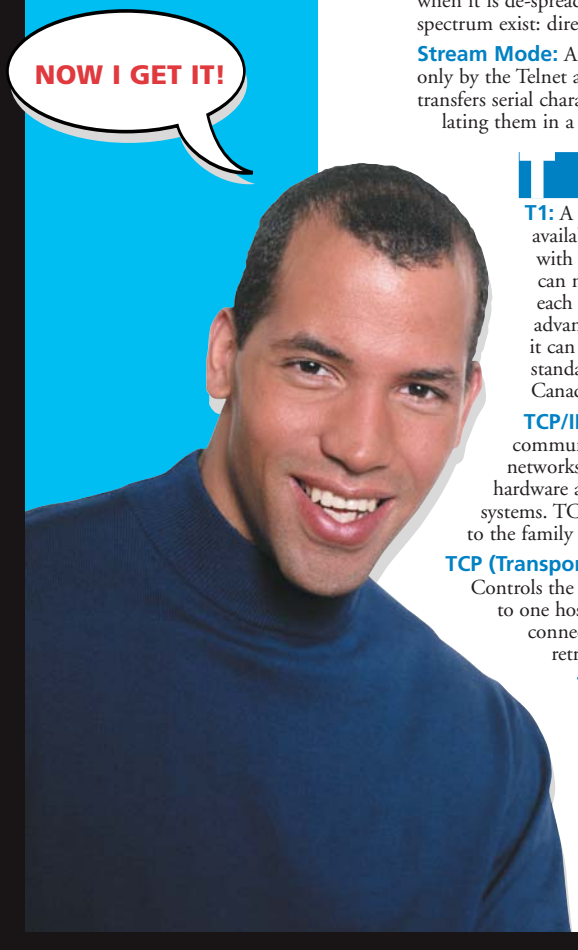
SNMP (Simple Network Management Protocol): The network management protocol of choice for TCP/IP based intranets. Defines the method for obtaining information about network operating characteristics, change parameters for routers and gateways.

Scanning: A periodic process where the mobile unit sends out probe messages on all frequencies defined by the country code. The statistics enable a mobile unit to re-associate by synchronizing its frequency to the access point. The MU continues communicating with that access point until it needs to switch cells or roam.

Site Survey: Physical environment survey to determine the placement of access points and antennas, as well as the number of devices necessary to provide optimal coverage, in a new or expanding installation.

Spread Spectrum: A transmission technique developed by the U.S. military in World War II to provide secure voice communications, spread spectrum is the most commonly used WLAN technology today. It provides security by "spreading" the signal over a range of frequencies. The signal is manipulated in the transmitter so that the bandwidth becomes wider than the actual information bandwidth. De-spreading the signal is impossible for those not aware of the spreading parameters; to them, the signal sounds like background noise. Interference from narrowband signals is also minimized to background noise when it is de-spread by the receiver. Two types of spread spectrum exist: direct sequence and frequency hopping.

Stream Mode: A communications protocol supported only by the Telnet and TCP protocols. Stream mode transfers serial characters as they are received by encapsulating them in a packet and sending them to the host.



T

T1: A type of dedicated digital leased-line available from a public telephone provider with a capacity of 1.544 Mbps. A T1 line can normally handle 24 voice conversations, each one digitized at 64 Kbps. With more advanced digital voice encoding techniques, it can handle more voice channels. T1 is the standard for digital transmission in the U.S., Canada, Hong Kong, and Japan.

TCP/IP: Networking protocol that provides communication across interconnected networks, between computers with diverse hardware architectures, and various operating systems. TCP/IP is used in the industry to refer to the family of common Internet protocols.

TCP (Transport Communication Protocol): Controls the transfer of data from one client to one host, providing the mechanism for connection maintenance, flow control, retries, and time-outs.

Telnet (Terminal Emulation Protocol): A protocol that uses the TCP/IP networking protocol as a reliable transport mechanism. Considered extremely stable.

Terminal: An endpoint, which provides for real-time, two-way communications with another terminal, gateway, or mobile unit.

Token Ring: A ring type of local area network (LAN) in which a supervisory frame, or token, must be received by an attached terminal or workstation before that terminal or workstation can start transmitting.

U

UDP (User Datagram Protocol): UDP/IP is a connection-less protocol that describes how messages reach application programs running in the destination machine; provides low overhead and fast response and is well suited for high-bandwidth applications.

V

Video Conferencing: Video and audio communication between two or more people via a video CODEC (coder/decoder) at either end and linked by digital circuits.

Voice Mail System: Device or system that records, stores, and retrieves voice messages. The two types of voice mail devices are those which are "stand alone" and those which offer some integration with the user's phone system.

W

Wi-Fi: A logo granted as the "seal of interoperability" by the Wireless Ethernet Compatibility Alliance (WECA). Only select wireless networking products possess this characteristic of IEEE 802.11b.

Wi Fi
The Standard for Wireless Fidelity.

Wireless AP Support: Access Point functions as a bridge to connect two Ethernet LANs.

Wireless Local Area Network (WLAN): A wireless LAN is a data communications system providing wireless peer-to-peer (PC-to-PC, PC-to-hub, or printer-to-hub) and point-to-point (LAN-to-LAN) connectivity within a building or campus. In place of TP or coaxial wires or optical fiber as used in a conventional LAN, WLANs transmit and receive data over electromagnetic waves. WLANs perform traditional network communications functions such as file transfer, peripheral sharing, e-mail, and database access as well as augmenting wired LANs. WLANs must include NICs (adapters) and access points (in-building bridges), and for campus communications building-to-building (LAN-LAN) bridges.

Wireless Personal Area Network (WPAN): Personal area networks are based on a global specification called Bluetooth™ which uses radio frequency to transmit voice and data. Over a short range, this cable-replacement technology wirelessly and transparently synchronizes data across devices and creates access to networks and the Internet. Bluetooth is ideal for mobile professionals who need to link notebook computers, mobile phones, PDAs, PIMs, and other hand-held devices to do business at home, on the road, and in the office.

Wireless Wide Area Network (WWAN): Wide area networks utilize digital mobile phone systems to access data and information from any location in the range of a cell tower connected to a data-enabled network. Using the mobile phone as a modem, a mobile computing device such as a notebook computer, PDA, or a device with a stand-alone radio card, can receive and send information from a network, your corporate intranet, or the Internet.

symbol®