

Wireless# Guide to Wireless Communications

Chapter 12 Wireless Communications in Business

Objectives

- List the advantages of wireless communications for businesses
- Discuss the challenges of wireless communications
- Explain the steps needed to build a wireless infrastructure

Advantages of Wireless Technology

- Basic advantages
 - Mobility of data access
 - Easier network installation
 - Increased reliability
 - Better disaster recovery
- Business-specific advantages
 - Universal access to corporate data
 - Increased productivity
 - Ability for customers to access their own data
 - Data availability around the clock
 - Improved information technology (IT) support

Universal Access to Corporate Data

- Universal access can help a business generate more revenue
- Sales representative can use a WiMAX network
 - To access live data
- Wireless technology benefits anyone who needs to be mobile but needs access to data
 - Useful when all parties are in one location
- Industry experts agree that universal access is the greatest advantage of wireless technology

Increased Productivity

- Having universal access to corporate data
 - Leads to increased productivity by employees
- Survey by Cisco in 2001 showed that
 - By using a WLAN, employees could access data almost two additional hours each day

Increased Access to the Customer's Own Data

- Key factor in reducing business costs
 - Shift the burden of accessing a customer's data from the business to the customer
 - Customers can make better and more informed decisions
- Customers can use WLANs to access their data
 - Example: Airport hotspots

Data Availability Around the Clock

- Wireless technology can help make data available from almost anywhere at any time

Improved IT Support

- Significant advantages include:
 - Easier system setup
 - Decreased cabling costs compared to wired systems
- Troubleshooting a wireless network is often simpler than troubleshooting cabling problems
- Other improvements
 - Easier and faster moves of equipment
 - More efficient use of office space
 - Lower support and maintenance costs

Voice over Wireless LAN (VoWLAN)

- VoWLAN
 - Takes advantage of Voice over IP (VoIP) technology
 - Uses wireless infrastructure to carry voice and data
- Wireless VoIP phones
 - Telephone handsets that connect to a WLAN's access point
- Wireless VoIP SOHO routers
 - Can be connected to a DSL or cable modem
 - Provide both a WLAN and telephone services through the user's Internet connection

Challenges of Using Wireless Technology

- Challenges include:
 - Competing technologies
 - Data security
 - Privacy
 - User reluctance
 - Shortage of qualified staff

Competing Technologies

- Some wireless technologies are clearly based on approved industry standards
 - Other wireless technologies do not have standards

Competing Technologies (continued)

Table 12-1 Wireless technologies

Wireless Technology	Primary Applications	Pros	Cons
Bluetooth (IEEE 802.15.1)	Cable replacement	Wide availability	Low speed, limited range
ZigBee (IEEE 802.15.4)	Residential and industrial controls	Low-cost, low-power, mesh networking	Limited security (encryption), low speed
WiMedia (IEEE 802.15.3)	Multimedia distribution, interconnecting consumer entertainment equipment, telephones, and even data	Low-cost, low-power, high-speed (22 Mbps) and even higher possible with UWB (IEEE 802.15.3a) and mesh networking with IEEE 802.15.5, QoS	Some devices may have limited processing power and consequently limited security; limited range without mesh networking

Competing Technologies (continued)

Table 12-1 Wireless technologies (continued)

Wireless Technology	Primary Applications	Pros	Cons
WLANs—802.11a/b/g/n	Mostly data networking	Established technology; new enhancements to the standards allow it to support voice, QoS, mesh networking, faster handoffs, multimedia; good security with RADIUS or VPN; LOS required; up to 108 Mbps	Currently has limited ability to handle voice and multimedia; 802.11b/g/n has limited spectrum and range without mesh networking; 802.11a has limited range
WiMAX (IEEE 802.16)	Data, voice, video; fixed or mobile	40 to 75 Mbps fixed wireless shared-bandwidth with range of up to 35 miles; high-security; 2 Mbps+ for mobile applications; can be overlaid on cellular network; LOS or NLOS	Complex technology

Competing Technologies (continued)

Table 12-1 Wireless technologies (continued)

Wireless Technology	Primary Applications	Pros	Cons
Cellular	Voice and data	EVDO network deployed; up to 2 Mbps nomadic, 300+ Mbps mobileHSDPA network deployed; up to 10 Mbps nomadic	High-cost per-minute/per-user
Satellite	Voice, data, video	Covers remote areas not available with other technologies; can achieve 1 Gbps in dedicated connections	Very high cost of deployment; requires high-gain directional antennas for most applications
RFID	Data for product identification only	Worldwide standard for product identification	Short range, low-security due to low processing power of tags

Data Security and Privacy

- Wireless technology's greatest strength
 - Roaming capability
 - Can also be its greatest weakness
- Broadcasting network traffic over the airwaves
 - Has created a concern for keeping that data secure

User Reluctance

- Change can be painful for users
 - Because it takes time and energy to learn a new system
- Human factor in implementing wireless technology is sometimes a significant obstacle

Shortage of Qualified Staff

- Need for information technology (IT) professionals has increased
 - To develop and implement wireless applications and provide support
- As technology improves and becomes easier to use
 - The life of a network administrator or a reseller can get more complicated
- WLAN networks must be constantly monitored
 - And IT staff must be trained in new technologies

Shortage of Qualified Staff (continued)

Table 12-2 Wireless advantages and challenges

Advantages	Challenges
Universal access to corporate data	New technology
Increased productivity	Competing technologies
Increased access by customers to their own data	Data security and privacy
Data availability 24/7	User reluctance

Building a Wireless Infrastructure

- Similar to adding a new network to the organization

Needs Assessment

- Question to be asked
 - “Do we really need it?”
- Evaluating the need for wireless technology
 - Time-consuming process
 - Involves
 - Looking at the organization and the current network
 - Gathering basic information
 - Determining costs

Look at the Organization

- First step in assessing the need for wireless networks
- Basic questions
 - What is the current size of the organization?
 - How much growth is anticipated?
 - How do employees in different positions and departments perform their daily activities?
 - How frequently does the company move staff to other offices and need to reconfigure the wiring setup?

Assess the Current Network

- Questions
 - How does the current network support the organization's mission?
 - What are the strengths and weaknesses of the current network?
 - How many users does it support?
 - What essential applications run on the network?
- Different industries have different network needs
- Helps identify why a new technology is needed

Assess the Current Network (continued)

Table 12-3 Sample current network table

Description	Data
Number of clients	55
Types of clients	35 – Windows XP 20 – Windows 2000
Number of servers	1 – Windows 2000
Type of network	Ethernet 100BaseT switched
Type of cable (medium)	Category 5e
Types of devices	5 – Laser printers 1 – scanner

Assess the Current Network (continued)

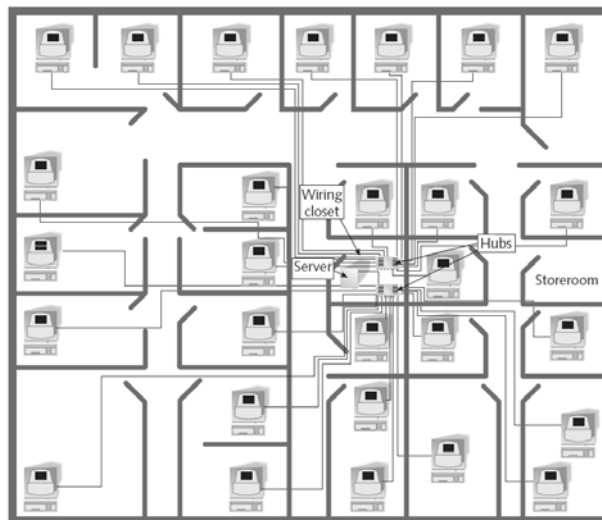


Figure 12-1
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Assess the Current Network (continued)

- Gather information
 - Expertise needed to gather the information may be beyond that of current IT staff
 - Request for information (RFI)
 - Document that seeks information about what vendors may have to offer
- Wireless site survey
 - Measures the strength and quality of the signal and the resulting transmission speeds and throughput
 - Achievable in all different locations around the office

Assess the Current Network (continued)

- Wireless site survey (continued)
 - Should ideally be performed using the same type and model of equipment that will eventually be installed
 - Factors identified by a site survey include:
 - Security features and policies required
 - Radio signal range (distance requirements)
 - Number of channels required (based on user/application load)
 - Throughput required
 - Location of AP radios and antennas
 - Location of client devices

Assess the Current Network (continued)

- Wireless site survey (continued)
 - Factors identified by a site survey include (continued):
 - Type of client adapters (WNICs) and whether external antennas may be required
 - Power requirements (Power over Ethernet or line?)
 - Growth requirements and impact on current design
 - Potential interference sources and their location
 - Standards and frequencies to be implemented (802.11a or g)
 - Requirements for integration with the company's wired network

Assess the Current Network (continued)

- Return on investment (ROI)
 - Determines the cost in relationship to the benefits
 - ROI is the profit divided by the investment
 - ROI is best expressed over a specific period of time
 - Types of costs
 - Upfront costs: necessary to start a project
 - Recurring costs: costs that a user may continue to pay over an extended period of time

Assess the Current Network (continued)

- Develop a plan
 - Developing a sensible, workable plan is perhaps the most critical piece of the entire process
 - Request for proposal (RFP)
 - Detailed planning document sent to potential vendors
 - Contains precise specifications for the products and services that the organization intends to buy
- Whom to involve
 - Organization's IT team
 - Users themselves
 - External consultants

Assess the Current Network (continued)

- Request for proposal
 - Some of the key elements in an RFP include:
 - Statement of value
 - Description of operations
 - Current network and applications
 - Timetable
 - Vendors will respond with their proposal
 - Wireless application service provider (WASP)
 - Can design and create a wireless application to run on a specific range of devices
 - May know how to get the project up and running quickly

Assess the Current Network (continued)

Table 12-4 Sample RFP timetable

Proposed Date	Activity
May 1	Date RFP is issued
May 15	Last date that written questions must be submitted by vendors
May 30	Date RFP responses are due
June 15	The week that initial cuts will be made
July 1	The week that presentations will be made by the finalists
July 15	Date the contract will be awarded
August 15	Date the contract will be finalized
September 10	Date work is to begin
February 12	Date work is to be completed

Perform a Limited Trial

- Pilot project
 - Borrow sample hardware and software from the vendor who won the bid
 - IT staff should be thoroughly involved in the trial
 - Along with a select group of users
 - New wireless technology should be thoroughly tested
 - Including its security aspects
 - IT department should also learn how to troubleshoot the new technology

Begin Training

- Training helps users and support specialists
 - Knowledge to effectively operate and support the new wireless technology
- Can save time and costs during the transition
- Types of training
 - Small group sessions
 - Detailed written instructions
 - Web-based training
 - One-on-one sessions

Rollout to All Users

- Most efficient way to do a widespread rollout is in phases
 - Start with just one department or unit of the business
- IT staff will be able to deal with problems more easily
- If project is not finished, users should be alerted
- Confer and identify problems that may have arisen
 - Before additional units are brought on

Provide Support

- User support functions can be organized as follows:
 - Establish informal peer-to-peer support groups
 - Create formal user support groups
 - Maintain a help desk center
 - Assign support to the IT department
- Help desk
 - Central point of contact for users who need assistance using technology
 - Manages customer problems and requests
 - Provides support services to solve the problem

Provide Support (continued)

- Suggestions regarding a help desk
 - Have one telephone number for the help desk
 - Plan for temporarily increased call volume after the new network is installed
 - Create a method to track problems effectively
 - Use surveys to determine user satisfaction and to identify any remaining issues
 - Periodically rotate network personnel into help desk
 - Use information from the help desk to organize follow-up training

Summary

- Wireless technology can positively impact an organization in many ways
- VoWLAN uses IP phones and VoIP on the same network the company uses for data
- Wireless technology faces various challenges
- Once a business has decided to invest in wireless technology
 - Must build a new wireless infrastructure
- Security needs may increase the cost of the project significantly

Summary (continued)

- Some organizations may send out a request for information (RFI)
- Next step is to create an implementation plan
- After RFPs have been received and vendor selected
 - The company performs a limited trial or pilot project
- Training provides all users and support specialists the knowledge to operate and support the new wireless technology effectively

Summary (continued)

- As the training nears completion
 - Business rolls out the technology to all users in phases
- Support is continued follow-up and consists of answering questions and assisting users
 - Help desk is one of the most effective support systems