Solutions Guide

Cisco Unified Wireless Network

A Guidebook for Cisco Solution Providers

MARKET EVOLUTION

Wireless LAN adoption in the enterprise has changed dramatically over the last five years. No longer a nice-to-have, almost half of surveyed enterprises report that they are "reliant or very reliant" on wireless LANs within their organization.[1] Even more exciting for Cisco® partners, the same study reveals that wireless LAN adoption is expected to increase dramatically across all industries in the short term, with up to an 83 percent increase in the average number of access points in the next two years.

Multiple factors have led to increased usage, including technology maturity, increased manageability, and higher-speed standards. Early deployments tended to be limited in their scope, but increasingly the trend is to create pervasive deployments as companies experience the benefits of mobility and realize its profound impact on productivity and customer and partner satisfaction. Changing employee demographics are also fueling this trend, as a new generation of workers, with an expectation of who expect instant connection anytime anywhere becomes a larger portion of the workforce.

These trends are combining to create a vast new market. Current estimates indicate that the wireless LAN market will reach $3.6 billion by 2009.[2]

A BETTER WAY TO DO BUSINESS

The New Baseline: Increasing Efficiency through Pervasive Mobility

In many enterprises, the first wireless LAN deployments were small islands of connectivity, typically conference rooms, executive offices, and other areas where guests and partners were likely to gather and require Internet access. With the heavy reliance on e-mail to get so much of business done today, the expectation for wireless Internet access is now almost as universal as being offered coffee, tea, or water.

However, a shift is now occurring and recent research from Gartner now indicates that "wireless LANs are becoming a standard part of enterprise networks, covering entire facilities, not just meeting rooms."[3] The top driver reported in the study is "to improve the productivity of knowledge workers through mobility." Typical examples include:

- Changing downtime to productive time during breaks in meetings
- Faster decision making through instant access to networked information
- Reducing the costs of moves, adds, and changes for rapidly growing organizations

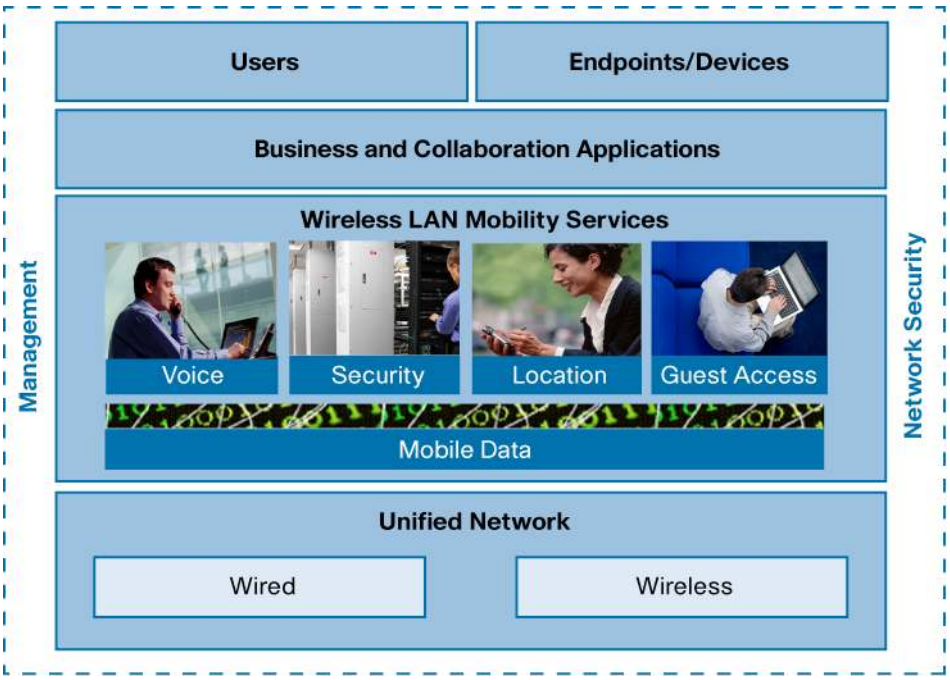
More and more, anytime, anywhere data and e-mail access within an organization is just a baseline. While the benefits of data mobility should not be overlooked, business managers are even more interested in how mobility can improve the efficiency of business processes.

[1] *Wireless LAN Adoption Study*, Forrester Research, July 2006
[2] *1Q06*, Dell'Oro Group
[3] *User Survey Report: Wireless LANs*, Gartner, May 2006

Using Mobility Services to Go Beyond Basic Connectivity

With mobility services, wireless LANs are not just another way to connect, but a better way to do business. When wireless LANs are understood not just as a replacement for wired Ethernet access, but as a method to increase profits and improve customer satisfaction, pervasive adoption accelerates. The Cisco Unified Wireless Network is the first solution to provide true mobility services—guest, security, location and voice—that enable business process improvement (Figure 1).

Figure 1. The Cisco Unified Wireless Network Mobility Services Framework



- **Guest access service:** Allow customers, vendors, and other non-employees to wirelessly access network resources, with privileges based on user type and physical location, without compromising enterprise security.
- **Security service:** Unify wired and wireless security and ensure network information integrity by enabling location-based authentication and precise detection, identification, and prevention of wireless threats.
- **Location service:** Quickly locate any Wi-Fi device to support enhanced network security, management, and troubleshooting, as well as enable location-based applications through a rich, open API.
- **Voice service:** Extend the seamless mobility of the Cisco Unified Wireless Network to enable business communications using Wi-Fi enabled clients and Wi-Fi and cellular compatible smart phones with end-to-end Quality of Service (QoS) and manageability.

Mobility Services Pave the Way for Competitive Advantage

Unlike pockets of wireless LAN capability, a pervasive wireless LAN enables significant new capabilities. Guest, voice, security, and location services can all have a substantial impact on productivity, efficiency, and security when enabled organization-wide. Examples of how pervasive wireless LANs can create new services, or renovate existing business processes to be more efficient include:

- **Enhance decision making**—Provide guest networks for customers, system integrators, and vendors to help speed information gathering and as part of the company hospitality.
- **Track and secure assets**—Reduce spending and personnel time locating or repurchasing assets through location services.

- **Improve customer-facing services**—Deliver instant access to customer account records, reach the closest available service associate, and track product progress in a manufacturing or repair facility.
- **Improve logistics and maintenance**—Update transportation management systems with passengers served, fuel status, collected revenues, and video surveillance logs as passengers enter the airport or station.
- **Increase responsiveness and control over telecommunications—**Offer consistent call quality in-building, track expenses and integrate into existing voice PBX infrastructure through voice services.
- **Protect personnel and property**—Secure the campus or remote sites using wireless video surveillance to prevent theft or harm.
- **Engage customers**—Offer Internet access, online services, and Web portals to inform and amuse customers onsite, reinforcing brand loyalty.
- **Strengthen security systems**—Continuously monitor the entire work environment in order to detect abnormal wireless activity and automatically act upon it.

THE CASE FOR PERVASIVE WIRELESS LAN COVERAGE

For truly significant productivity gains from mobility, wireless LAN coverage must be pervasive throughout the enterprise. Islands of coverage will impede efficiency and frustrate mobile workers. Arguments for limited deployments based on infrastructure cost savings create a false economy as the true gains from mobility cannot be realized.

Security services, as an example, ensure that the enterprise network is protected against unauthorized access via the wireless LAN medium. Because rogue access points and other wireless threats may appear anywhere within the enterprise, pervasive RF monitoring is critical to maintaining enterprise security. Deploying the security service in marketing, but not in R&D, would not make sense because a rogue access point could just as easily appear in either place. Without pervasive RF monitoring, the rogue could remain undiscovered and expose the enterprise to malicious hacking or loss of confidential information.

Voice services must also be pervasive to truly impact profits. Whether improving customer satisfaction through improved responsiveness, taking control of telecommunications expenses, or integrating company PBX services, all of these goals will be only partially achieved without pervasive coverage. Because today's voice experience is dictated by the user's experience with cellular, dropped calls and spotty coverage inside the enterprise will lead to disappointment, and ultimately abandonment of the service. If the goal is improved customer satisfaction, but customers reach voicemail, the objective will not be reached.

INTRODUCING THE CISCO UNIFIED WIRELESS NETWORK

The Cisco Unified Wireless Network is the industry's only unified wired and wireless solution that increases employee productivity, enhances collaboration, and improves responsiveness to customers while cost-effectively addressing the security, deployment, management, and control issues involved in large-scale enterprise wireless LAN rollouts.

The Cisco Unified Wireless Network is designed for corporate and branch offices, hospitals, retail stores, manufacturing sites, warehouse environments, educational institutions, financial institutions, local and national government organizations, and any other location where mobile connectivity is needed. Designed as a multiservice solution, it supports general Wi-Fi enabled business applications such as e-mail and Internet access, as well as specialized applications, including mobile healthcare, inventory management, retail point-of-sale, video surveillance, and many others. To facilitate integration with business processes, the Cisco Unified Wireless Network offers four Mobility Services: guest access, location, voice, and security. In addition, Cisco Systems® works with a wide variety of tested and proven technology partners to deliver an even broader range of specialized applications.

Solution Components

Based on industry standards including IEEE 802.11, the Cisco Unified Wireless Network is an integrated end-to-end solution that addresses all layers of the wireless LAN, from client devices and access points, to the network infrastructure, network management, delivery of advanced wireless services and award-winning, worldwide, 24-hour product support. The Cisco Unified Wireless Network includes the following primary components:

- **Client Devices:** PC cards and other client adapters that connect desktop and mobile devices to the wireless network.
  - Cisco Compatible Extensions is a program that enables mobile client devices to simply and securely connect to a Cisco Unified WLAN.
  - Cisco Secure Services Client is a software supplicant that enables businesses of all sizes to deploy a single authentication framework across multiple device types to access both wired and wireless networks delivering simplified management, robust security, and lower total cost of ownership.
- **Access Points:** Cisco Aironet access points and bridges that connect wireless devices to wired networks, providing ubiquitous network access.
- **Network Unification:** A variety of platforms, such as wireless LAN controllers, integrated switches and routers that deliver comprehensive wireless network services such as dynamic RF management and self-configuration.
- **Network Management:** Cost-effective tools providing a complete view of the wireless LAN network for easier planning, configuration, and management from a central location.
- **Mobility Services:** Appliances and technologies that enable applications such as guest access, wireless voice over IP, location tracking, and wireless intrusion detection and prevention.

Figure 2 shows these components.

Figure 2. The Cisco Unified Wireless Network Components

Manageable and Scalable

Award-winning Cisco management allows from several to thousands of remote access points to be configured and monitored in a simple and efficient way. Automatic recognition of new access points results in correct configuration, ensuring remote offices have the same security protocols as large campuses. Centralized management relieves network administrators of once manual tasks, enabling the wireless LAN network to scale as fast as necessary.

Available and Reliable

The Cisco automatic RF management, tool, the Cisco Wireless LAN Controller clustering for redundancy and intelligent network monitoring ensure highly available wireless LAN solutions. Upon failure of an access point, the adjacent access points automatically compensate, increasing their radio power to avoid a coverage hole. To provide a better end-user experience, the Cisco Unified Wireless Network uses an intelligent algorithm that associates new users with the best access point based on a combination of traffic load and signal strength.

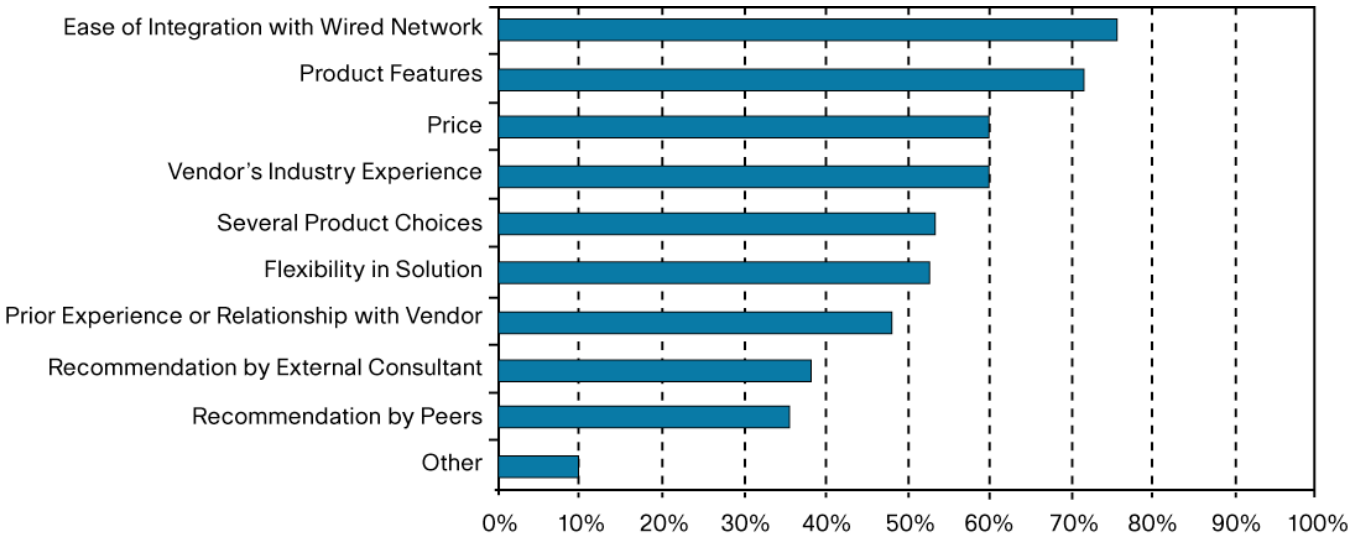
Investment Protection

Many Cisco Systems customers have purchased Cisco Aironet® access points that operate autonomously, that is, without benefit of centralized management from a Cisco Wireless LAN Controller and the Cisco Unified Wireless Network feature set. To protect customers' investments, autonomous Aironet access points can be upgraded using software to support the Lightweight Access Point Protocol (LWAPP). Autonomous access points are based on Cisco IOS® Software and may be upgraded in the field to lightweight mode, thereby providing customers with a smooth path from core to unified features. The Cisco Unified Wireless Network feature set is delivered by lightweight access points, wireless LAN controllers, and the Wireless Control System (WCS) management solution and delivers the most comprehensive set of capabilities in the industry, including guest access, wireless intrusion detection and intrusion prevention, scalable Layer 3 roaming, and location services. See "Why Migrate to the Cisco Unified Wireless Network?" for more details.

THE IMPORTANCE OF A UNIFIED ARCHITECTURE

The importance of a unified solution is magnified as wireless LAN deployments migrate from isolated areas supporting nice-to-have applications such as guest access to companywide, pervasive networks running mission critical applications like wireless voice over IP (VoIP), enterprise resource planning (ERP), and other back office and customer care solutions. The next natural phase of wireless LAN advancement centers on integration with the Layer 2 and 3 switching infrastructure. Customers understand this as well, with over 70 percent of those surveyed by Gartner citing integration with the wired network as the key criteria for selecting a wireless LAN vendor.

Figure 3. Key Selection Criteria for a Wireless LAN Vendor



Pervasive wireless LAN deployment across the entire enterprise is motivating this evolution to integrate wireless-specific capabilities within the Layer 2 and 3 wired infrastructure. Integrating this functionality uses the bandwidth, security, redundancy, and management capabilities of the network and provides a strong platform for expansion. Cisco is the first to introduce this next-generation wireless LAN solution with the Cisco Catalyst® 6500 Wireless Services Module (WiSM), the Cisco Wireless Controller Module for the Integrated Services Router and the Cisco Catalyst 3750G Integrated Wireless LAN Controller.

CISCO DIFFERENTIATORS

Cisco is the global leader in wireless LAN solutions with over 59.5 percent market share for enterprise products.[4] Acknowledged by Gartner Group as the Wireless LAN Magic Quadrant leader in 2005, only Cisco delivers a comprehensive, unified wired and wireless solution. The strength of Cisco wireless LAN solutions lies in the following areas:

Only Unified Wireless and Wired Solution

As wireless LANs become more pervasive in the enterprise, integration with existing wired networks becomes more and more important to simplify management and take advantage of the security and redundancy of the Ethernet infrastructure. Cisco market leadership in both wireless and wired networks enables the right solution to be designed for companies of any size.

A Complete End-to-End Integrated Network

Wireless LANs are a portion of the total network solution required by today's agile enterprises. Endpoint security compliance, comprehensive wired Intrusion Protection Systems/Intrusion Protection Systems (IDS/IPS) and mobile device management are all important components of a total network design that harnesses the power of mobility for the enterprise while maintaining appropriate security and cost controls. Vendors who focus solely on wireless LANs will not have the portfolio breadth or ability to deeply integrate with other solution components.

Unsurpassed Security

As the number of wireless devices (such as laptops, PDAs, smart phones) grows exponentially, securing just the wireless network is insufficient. The corporate network itself is at risk from threats introduced through the wireless medium. Securing both the wireless network and protecting the corporate network against threats introduced via wireless clients is accomplished through a rich set of defences, including IEEE 802.11i, IDS/IPS, and Cisco Network Admission Control, a key component of the Cisco Self-Defending Network initiative.

Feature-Rich and Standards-Based

Cisco Unified Wireless Network solutions offer advanced features, such as automatic RF management and multiple service levels for different user and client types, allowing differentiated QoS and security levels, voice over wireless LAN, and location tracking for Wi-Fi devices and Radio Frequency ID (RFID) tags. Cisco Unified Wireless Network services are built on a strong foundation of industry standards such as IEEE 802.11. By adhering to industry standards, Cisco wireless LAN solutions provide for easy integration with existing customer investments. For example, large-scale deployments utilizing the Cisco Catalyst 6500 Wireless Services Module or the Cisco Wireless Services Module for the Integrated Services Router take advantage of the powerful security, voice, and high-availability capabilities of your existing infrastructure. Where standards are not yet available, Cisco drives industry wide initiatives to enable new functionality that can be utilized in a multivendor environment. Cisco Compatible Extensions program (CCX) is one such area where new advances can be rapidly rolled out and reach over 90 percent of the Wi-Fi client market.

Tested and Proven

Cisco's end-to-end solution test labs help ensure that Cisco Unified Wireless Network solutions are manageable, scalable, available, and reliable. Using Cisco's comprehensive design guides, network operations personnel can easily and confidently implement and manage a Cisco Unified Wireless Network solution. With over three million access points shipped, tens of thousands of customers have already experienced the productivity benefits delivered by a Cisco wireless LAN solution.

[4] *1Q06 Enterprise Vendor Market Share*, Dell 'Oro Group

SOLUTIONS FOR HEALTHCARE

Industry Trends

Prompted by escalating costs, shrinking revenues, and expanding regulations, healthcare organizations are seeking every advantage that new information technology can offer. As early as the late 1990s when the first WLAN solutions emerged, healthcare organizations recognized the benefits of mobile applications and became early adopters. Using the proven ability of wireless IT applications to improve treatment at the point of care and to support clinical decisions by providing instant access to medical records, healthcare organizations have been able to improve responsiveness and treatment accuracy and to save lives as well as millions of dollars. In addition, recent improvements in wireless infrastructure security and advanced applications, such as location-based tracking and voice over WLAN, have provided further gains in productivity and patient care while simultaneously addressing government privacy regulations.

Improving Patient Care and Medical Staff Productivity with Cisco Unified Wireless Network

As the adoption of wireless LANs in healthcare organizations has grown, so has the number of ways in which mobile applications are used. Healthcare providers can use the Cisco Unified Wireless Network for:

- **Patient registration:** Simplification of patient registration through self-administered check-in.
- **Patient medical records:** Input clinical of data at the point of care, which reduces transcription errors while allowing other healthcare providers instant access to the most current patient medical history.
- **Prescription automation:** Immediate look up of adverse drug interactions, patient allergy information, patient-specific dose checking, coupled with accurate information from the latest medical reference guides.
- **Treatment verification:** Simple verification of patient identity using barcodes providing more accurate treatment, medicine delivery, and the additional benefit of streamlined insurance billing.
- **Real-time, mobile voice communication:** Improved access to the closest and most appropriate caregiver using wireless IP communications.
- **Materials management:** Ordering, distribution, and safe dosage monitoring of patient prescriptions through barcode scanning of new supplies to departments, minimizing errors, overstocking, or out-of-stock situations.
- **Hospital equipment tracking:** Active RFID tags provide real-time location tracking of critical medical equipment to gain better asset utilization.

Wireless LANs and advanced mobility applications, combined with the appropriate clinical information systems, staff support, and mobile computing devices, have the ability to significantly improve the accuracy and efficiency of medical treatment at healthcare organizations. Wireless technology that provides the proper security, manageability, and support for advanced applications can help ease the load on understaffed organizations and drive productivity gains in many areas.

SOLUTIONS FOR RETAIL

Trends Driving Retail Enterprise IT Buying

Retail is a behemoth among industry sectors. Across all major world economies, its size as a percentage of gross domestic product (GDP) ranges from 20 to 33 percent. Despite its size, the retail industry has some of the lowest net margins of any sector, at approximately 3 percent[5]. As a result, improvements and efficiencies are paramount and can mean billions of dollars in savings, avoided costs, or both. Until recently, a solid return on investment (ROI) case for data connections between stores and corporate offices was difficult to make in retail —especially in those with a store footprint of less than 10,000 square feet. The monthly cost for T1 or Frame Relay lines to individual stores was disproportionately high and was exacerbated by the requirement for up-front capital for hardware investments.

Today, however, connections to even the smallest offices or outlets cost a fraction of what leased lines cost and that has enabled retail stores and outlets to become integrated into the overall IT infrastructure. This has allowed retailers to take advantage of IT systems to become much more customer centric by gaining near real-time information from stores, employees, supply chains, and customers. A pervasive, secure wireless platform frees this information from the confines of desktop computers and allows this information to be used anywhere and anytime to improve the customer experience, improve store performance, reduce inventory shortages, and transform how retail enterprises conduct operations.

Benefits of Cisco Unified Wireless Network for Retail Enterprises

Retail enterprises are deploying the Cisco Unified Wireless Network pervasively throughout the organization as a critical component of the intelligent retail network architecture. Cisco Unified Wireless Network Mobility Services are the glue between business applications and the wireless infrastructure, allowing existing and new business applications to benefit from the immediacy of connections and collaboration delivered by mobility.

To improve operations and customer satisfaction, retail enterprises are going beyond simple hotspot or point wireless deployments, and moving to pervasive deployments. This allows Wireless LAN Mobility Services to create secure, anytime, anywhere access to critical business resources. With an infrastructure designed to support Wireless LAN Mobility Services, retail enterprises can:

- **Enhance the shopping experience**—Wireless-enabled kiosks can display new product promotions and be easily moved as stores are reconfigured.
- **Engage customers**—Retailers can allow online shopping or product information look up for customers carrying Wi-Fi enabled smart phones.
- **Boost productivity**—Retailers can connect associates with managers in real time through voice over Wi-Fi to approve store credits, offer rain checks, or update pricing without noisy overhead paging.
- **Improve customer satisfaction**—Retailers can enable line busting to move customers through check out faster with mobile point-of-sale (POS) terminals.
- **Protect brand image and assets**—Retailers can track high-value items using RFID to decrease loss.
- **Improve reaction time to market shifts**—Retailers can generate alerts on inventory levels of high-profit or seasonal items to store managers via integration with POS systems.

Integration with retail applications, store displays, and new mobile devices create many opportunities for improved profitability and brand loyalty. With a pervasive wireless LAN, vendors, customers, and employees can significantly improve the retail experience.

[5] *Advanced Comparative Statistics for U.S. based on 1997 NAICs*, 2002 U.S. Economic Census

SOLUTIONS FOR PUBLIC SECTOR

Trends Driving State and Local Government IT

Three trends point to the need for pervasive wireless LANs within government organizations. A 2005 Forrester Research study[6] of government IT executives found that the highest priority remains improving security and business continuity. While shoring up security has been a major theme for several years, 71 percent and 66 percent of respondents reported that improving security and business continuity, respectively, is still the highest priority for IT spending. The second-highest priority was the need to replace existing employee computing equipment, including laptops, with over 66 percent of government respondents indicating that this was a priority. Because over 90 percent of laptops today come equipped with wireless LAN capability, it's not surprising that this trend is closely coupled with the desire to enable employee mobility.

Government workers constitute one of the most mobile workforces. From maintenance personnel, to healthcare givers and transportation employees, thousands of government workers perform their jobs on the go every day. Like their private sector counterparts, government entities have discovered that wireless LANs are an important component of a mobility strategy to enable employees to be more productive. Not surprisingly, the Forrester Research study found that more than any private sector industry, government has the highest percentage of employees that require mobility, at 31 percent of the workforce.

Benefits of Cisco Unified Wireless Network for State and Local Governments

Unlike pockets of wireless LAN capability, a pervasive wireless LAN enables significant new capabilities for government organizations. Guest, voice, security, and location services can all have a substantial impact on productivity, efficiency, and security when enabled organization-wide. Examples of how pervasive wireless LANs can create new services or make existing government processes more efficient, include:

- **Improve logistics and maintenance**—Update transportation management systems with passengers served, fuel status, collected revenues, video surveillance logs as they enter airport or station or throughout the city using an outdoor WLAN network.
- **Increased responsiveness and control over telecommunications**—Offer consistent call quality in-building, track expenses and integrate into existing voice PBX infrastructure through voice over Wi-Fi.
- **Enhance decision making and increase digital inclusion**—Utilize guest networks for constituents, system integrators, and vendors in public buildings.
- **Track and secure assets**—Reduce spending and personnel time locating or repurchasing assets through location services.
- **Improved patient services**—Deliver instant access to medical records, reach the closest caregiver, and track critical assets or at-risk patients through a pervasive wireless LAN.
- **Engage citizens**—Offer online city services guide and Web portals both in public buildings and outdoors.
- **Protect the community**—Secure highly trafficked thoroughfares and business districts with wireless video surveillance.

[6] *"State and Local Government Data Center Spending Trends: 2005"*, September 20, 2005, Forrester Research

SOLUTIONS FOR EDUCATION

Trends Driving Education Network Investments

At today's colleges and universities, the academic network has become an integral component of the learning environment, supporting everything from basic communications to innovative coursework and teaching tools. As student and faculty increasingly rely on network applications, institutions must find ways to extend network access to every corner of the campus. In addition, with the explosion of mobile computing and wireless Internet access over the past several years, many prospective college students are now accustomed to having near-constant access to e-mail and the Internet. To attract prospective students—as well as compete for top faculty—colleges and universities must demonstrate that they are state-of-the-art learning environments, and can provide the ubiquitous network access users expect.

Many colleges and universities face major challenges extending network access throughout a campus environment that can encompass hundreds of buildings. For many institutions, dormitories and classrooms are housed in older facilities that were not designed with modern technologies in mind. Asbestos or other environmental considerations can make it extremely difficult to rewire such buildings, and even if hardwiring is possible, the costs can be prohibitive.

A reliance on conventional wired networks poses other challenges as well. Wired infrastructures are difficult to scale as bandwidth and usage demands grow. The traditional model of providing students with network access through fixed physical computing labs is also extremely inefficient. Computing labs require continuous investment in new equipment, as well as high ongoing maintenance and management costs. Such facilities also were designed for a time when most students did not have their own PCs—much less for today's students, who arrive on campus not only with laptops, but frequently with laptops that are already wireless-enabled.

The Benefits of Cisco Unified Wireless Network Mobility Services for Educational Institutions

Educational environments have long been pioneers in new ways of learning and making information available. From e-mail to browsers to wireless access, universities and their graduates around the world have driven new ways of learning. Once again, education is leading the way with more pervasive wireless networks than any other industry. The young demographic and their expectation of immediacy coupled with a natural collaborative environment have fostered the demand for wireless access. Pervasive wireless networks are now being taken to the next level in education, with new applications including:

- **Differentiated guest services**—Multileveled wireless access for the community, visiting researchers, conference attendees, students and faculty.
- **Lower-cost communication**—Voice over wireless LAN using Skype or other software clients helps students reduce the cost of staying connected to relatives and friends back home.
- **Making new connections**—Finding people with similar interests combines Wi-Fi location services and social networking sites to help students make connections, especially on large campuses.
- **Ensuring student and faculty safety**—Wireless video surveillance keeps students and faculty safe as they travel in and around campus and the community.
- **Protecting campus assets**—RFID tags on valuable computing devices and other important research tools helps ensure that their location is known and deters theft.

A pervasive wireless LAN provides many benefits to the entire educational community. Unfettered mobility further increases the collaborative and creative environment already in play on campus.

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