



Making Wireless an Indoor State of Mind

*Building a Pervasive WLAN with the
MobileAccess Universal Wireless Network*



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Virtually all large enterprises recognize that Wireless LANs (WLAN) have the potential to enhance the productivity of their employees and the profitability of their business. Many organizations have already engaged with WLAN at some level, often by providing basic WLAN data connectivity for internal “hot spots” such as conference rooms, lobbies, and other common areas. On the opposite extreme, some organizations are preparing to take WLAN to the next level by deploying the more advanced “Mobility Services” espoused by Cisco and other vendors in the industry. These services, which include Voice over WLAN (VoWLAN), Location applications, and Advanced Security (802.11x), can potentially transform the corporate WLAN from a “nice-to-have” convenience to an ROI generating business platform.

Making the leap is not easy. To deliver on the promise of these services, an enterprise must deploy a *pervasive* WLAN network – a system that provides consistently strong signal coverage throughout every square foot of their facility. A less comprehensive deployment will greatly diminish the viability of these mobility applications. Consider VoWLAN – IP phones must work reliably throughout the facility before employees will fully commit to them. Likewise, location services will be marginalized if coverage holes exist, and advanced security services are unreliable without complete access to the facility’s wireless airspace.

Barriers to a Pervasive WLAN

Implementing a pervasive WLAN is a major undertaking – one that can rapidly consume the resources and budget of an organization’s IT department. Consider that deploying a VoIP capable WLAN throughout a large enterprise could require hundreds of WLAN access points (APs). In addition to the initial equipment cost, the IT department will need to overcome other issues associated with a large-scale WLAN deployment:

Infrastructure Investment: The enterprise will need to install a facility-wide Cat-5/6 cabling plant to connect all of the ceiling-mounted APs back to the corporate IP network – an expensive proposition.

High Operational Expenses: Once deployed, the IT department faces the operational challenge of maintaining a multitude of ceiling-mounted devices that can be difficult to track, disruptive to access, and time-consuming to repair.

Security Risks: With a large number of active components deployed in public view, there is a serious risk of malicious tampering. Enterprises may need to install APs in secure (and expensive) “lock boxes” to keep them physically secure.

Aesthetics: Some organizations, such as hospitals, historical buildings and architecturally rich venues, often find the concept of installing many hundreds of ceiling-mounted APs visually unacceptable.

With a challenge of this magnitude, organizations need to develop a comprehensive wireless strategy that addresses these limitations and facilitates a pervasive WLAN deployment.

Enterprise Wireless goes beyond WLAN

While enterprise IT managers may be most familiar with WLAN, they are increasingly being asked to address a broader set of wireless services and technologies. Employees have grown accustomed to using wireless services while at home and on the road, and they now expect those same services to be available in the workplace.

Wireless Service	Core Applications
Wireless LAN (WLAN)	In-house high-speed data <ul style="list-style-type: none"> ▶ Portable laptops and PDAs ▶ Voice-Over-WLAN ▶ Asset tracking ▶ Building management
Multi-Operator Mobile Services	Fully mobile voice & data <ul style="list-style-type: none"> ▶ Internal/external voice ▶ Blackberry & mobile PDAs ▶ Paging ▶ 3G high-speed data
Public Safety	Reliable in-building coverage <ul style="list-style-type: none"> ▶ First Responders ▶ Building Ops, Security
Industry Specific	Industry specific applications <ul style="list-style-type: none"> ▶ Wireless Patient Monitoring

Enterprises are facing a growing requirement to support a broad range of wireless services to satisfy the needs and expectations of employees, clients, and guests. For instance, most mobile users expect to have adequate coverage for their cellular phones, PDAs, and 3G-enabled devices. In addition, many organizations are taking steps in the Public Safety arena to ensure reliable wireless coverage for first responders as well as for internal operations and security. Some jurisdictions are mandating coverage for public safety in all new buildings.

Beyond those requirements, certain industries are implementing specialized wireless services for specific applications, such as Wireless Patient Monitoring in healthcare.

This array of wireless services is going to expand rapidly. Today, all commercially-licensed wireless communication is contained within a relatively small amount of spectrum, about 190 MHz in total. These bands support service providers such as Sprint, Verizon, and Cingular as well as public safety communications. Today's frequencies include Cellular, SMR 800, SMR 900, and PCS bands. Moving forward over the next five years, spectrum policy is adjusting to make room for new, bandwidth-hungry applications. From the 190 MHz of existing spectrum, we will see the introduction of 568 MHz of new frequencies that have been or will be licensed and allocated, yielding an increase of nearly 300%, in the available spectrum. Most of these services will need to be enabled inside buildings as well.

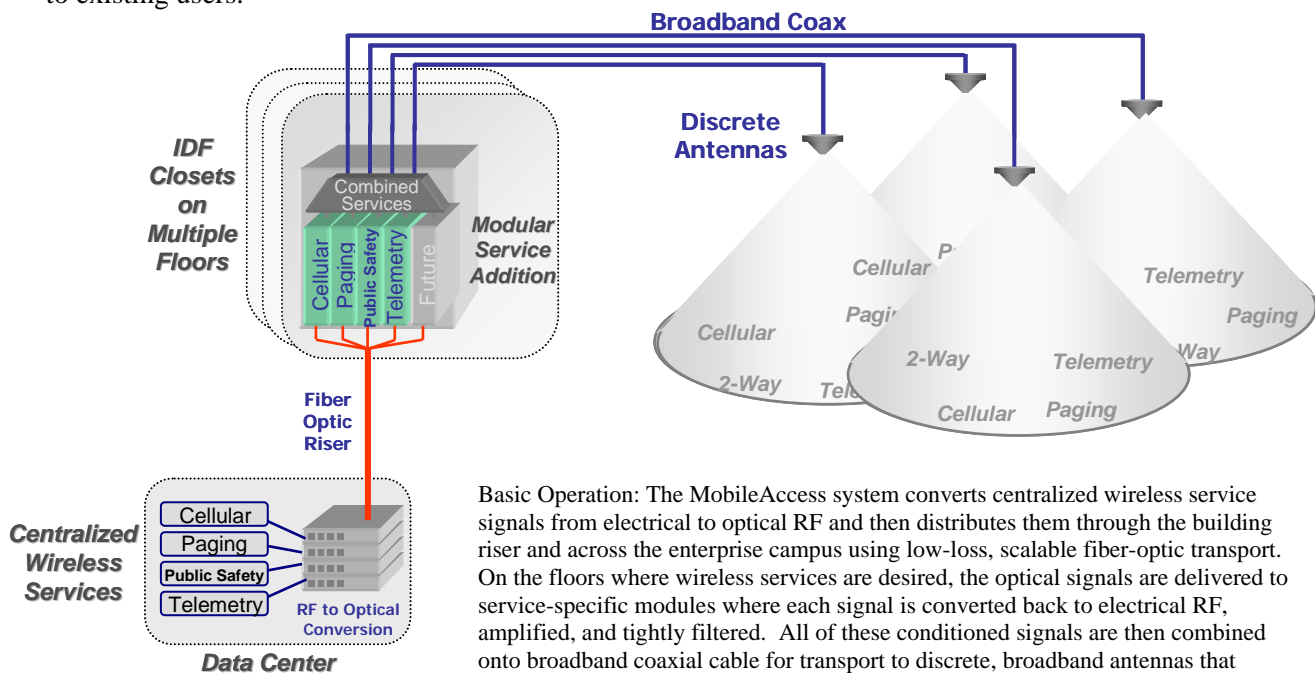
Somewhat ironically, wires are needed to make all these wireless services work inside a facility. The heavy construction materials used in most enterprise structures tend to impede the propagation of RF signals, resulting in weak signal coverage in some or all areas of a facility. To overcome these limitations, an enterprise must invest in an *in-building* wireless infrastructure – a cable-based transport facility that distributes RF signals from their sources, such as a carrier-provided base station or WLAN APs, throughout the desired areas of the facility.

The MobileAccess Universal Wireless Network is an adaptable, in-building wireless infrastructure that is ideally suited for the rapidly evolving wireless requirements of large enterprise environments. As discussed in the following sections, this multi-service wireless solution also offers a unique deployment approach for WLAN that can facilitate a pervasive WLAN deployment.

The MobileAccess Universal Wireless Network

The MobileAccess Universal Wireless Network provides an extremely flexible in-building wireless platform that supports virtually any combination of wireless services - cellular and paging from multiple operators, public safety, telemetry, and more. Its hybrid fiber/coax backbone is inherently broadband, so it supports today's wireless offerings and can readily accommodate future, perhaps unanticipated, wireless service requirements.

The Universal Wireless Network's modular system can easily evolve and scale to accommodate changing and unpredictable enterprise wireless requirements. With the MobileAccess Wire-It-Once™ philosophy, IT managers can selectively turn up new wireless services simply by adding the appropriate service modules. There is no need for rewiring, no need to manage multiple parallel networks, and no disruption to existing users.



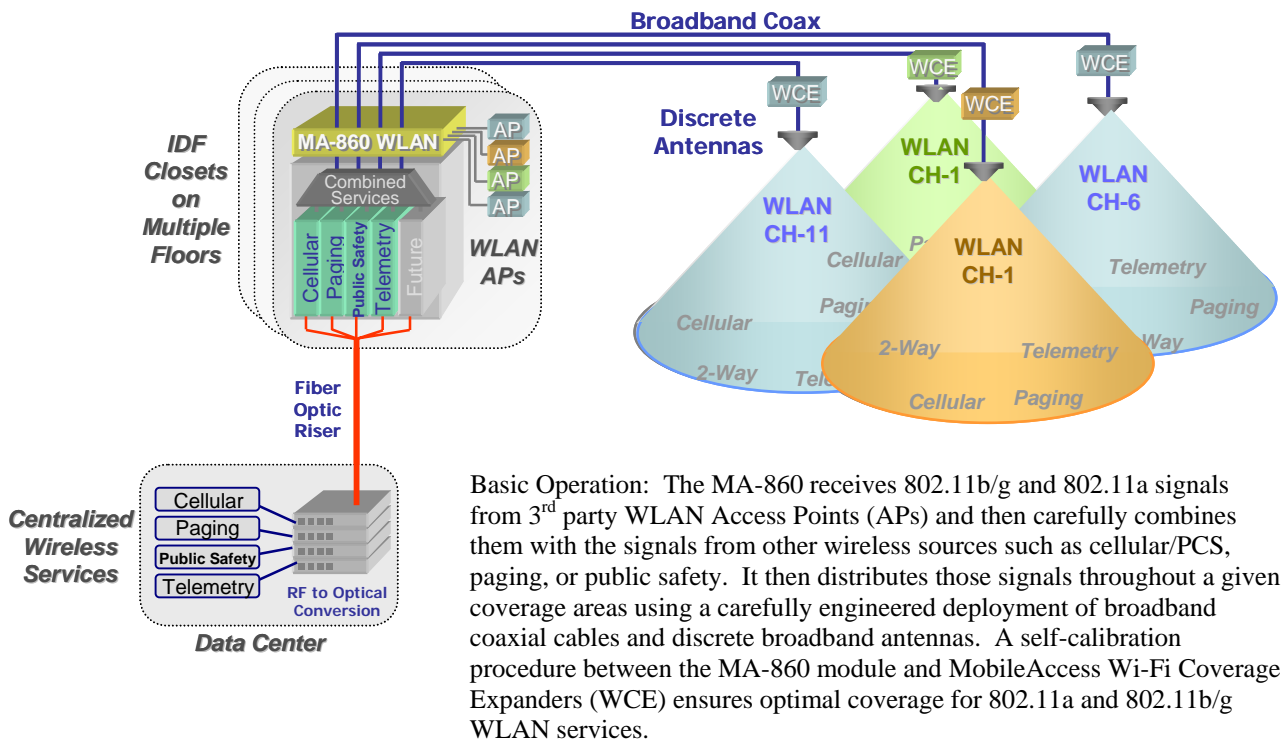
The core features that differentiate the Universal Wireless Network in the marketplace include:

- Broadband, Multi-Service Solution:*** Use of broadband elements throughout ensures support for current and future wireless service requirements
- Scalable in Breadth and Depth:*** It can accommodate virtually any mix of services and scale to extremely large sizes without compromising signal integrity
- Adjustable:*** The modular packaging enables wireless services to be added or changed at any time without disturbing or re-engineering the active deployment.
- Proactive Management:*** A MobileAccess deployment can be managed and controlled proactively on an end-to-end basis.

Beyond these capabilities, the Universal Wireless solution also offers a unique deployment alternative for delivering WLAN services.

An Innovative Approach for WLAN

The MobileAccess Universal Wireless infrastructure, with its use of broadband transport media and discrete broadband antennas, offers enterprises an innovative approach for deploying WLAN services. With the MobileAccess MA-860 WLAN Module, enterprises can deliver their WLAN services over the same cabling and antennas used to distribute their other wireless services.



The MA-860 solution uses a different physical layout than a conventional “APs-on-the-ceiling” WLAN implementation, but it remains transparent to the over-riding WLAN applications and AP features.

WLAN Application Transparency

The MA-860 solution maintains a direct 1-to-1 relationship between the APs located in the wiring closet and the discrete antennas mounted on the ceiling. This approach replicates the behaviors of a conventional “APs-on-the-ceiling” WLAN environment, so advanced WLAN features, such as location services, dynamic power control, and rogue detection function properly.

Standard WLAN Design Practices

The MA-860 solution uses the same WLAN design practices as used for traditional APs-on-the-ceiling WLAN deployments. With its use of discrete radiating



MA-860 WLAN Solution

points, an MA-860 deployment uses the same channel management schemes and capacity planning philosophies as used in traditional deployments.

❑ ***Simplified Operations and Maintenance***

The MA-860 solution clusters APs and other intelligent modules in easily accessible and secure telecom closets rather than in hard to reach ceiling locations providing shorter MTTR, easier upgrades and eliminating unnecessary disruptions of employee operations.

❑ ***Familiar LAN-like Management***

With SNMP-based management and an intuitive graphical user interface (GUI), MobileAccess provides familiar, proactive control of the WLAN infrastructure.

Setting the Stage for Pervasive WLAN

With the MobileAccess solution, enterprises can overcome the barriers to a pervasive WLAN deployment and set the stage for more advanced WLAN mobility services.

❑ ***Enhanced WLAN Business Case***

One of the barriers that can limit the scope of a WLAN deployment is the initial expense for installing the necessary cabling infrastructure. By supporting multiple wireless services, the MobileAccess infrastructure addresses the wireless requirements of multiple stakeholders within an organization. Rather than segmenting budgets across separate wireless projects, departments can pool their budget resources together to satisfy the wireless requirements of multiple constituents with a broader deployment than they could obtain on their own.

❑ ***Reduced Operational Expenses***

Using the MobileAccess MA-860 WLAN Module, IT managers can cluster APs together in secure telecom closets alongside existing LAN internetworking equipment. This design improves the physical security of APs, while keeping them out of public view. The MobileAccess architecture is also more easily maintained, giving IT staff easy access to WLAN equipment and minimizing inconvenient disruptions. The ability to “touch” APs in minutes rather than in hours is especially important in pervasive WLAN deployments involving hundreds of APs. Without the APs in the telecom closet, buildings with 24x7 operations will require expensive maintenance windows to effect repair or replacement of the ceiling or wall-mounted equipment – not a desired situation in many large enterprises.

❑ ***Pervasive Coverage - Ready for WLAN Mobility Services***

A MobileAccess Universal Wireless deployment provides facility-wide wireless coverage; enterprises can leverage this pervasive footprint to deliver “wall-to-wall” WLAN coverage needed for mobility applications like VoWLAN and real-time location services. MobileAccess has a long history and proven reputation for providing enterprise-wide, in-building coverage solutions on behalf of all the major wireless operators. For the operators, their business depends on the reach of their wireless signal, so consistently strong signal coverage throughout every square foot of a customer’s facility is required – the MobileAccess network allows the enterprise to leverage this proven wireless infrastructure to decrease cost and operational expenses for a pervasive WLAN deployment.

Conclusion

Enterprises interested in deploying a pervasive WLAN to support advanced mobility services should evaluate the capabilities of the MobileAccess Universal Wireless Network. The unique characteristics of the MobileAccess solution naturally lend themselves toward a broad, facility-wide WLAN deployment that is cost-effective and easy to manage. Rather than investing in a dedicated, WLAN-only solution, organizations should pursue a more strategic, multi-service wireless infrastructure that can facilitate a pervasive WLAN deployment while also accommodating a broad range of current and future wireless requirements.