

WHAT IS A WIRELESS SWITCH AND THE VALUE OF THE OVERLAY ARCHITECTURE?

TECHNICAL WHITE PAPER

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Today there is a new and better way to implement a wireless local area network in the enterprise—the Wireless Switch with overlay architecture. This approach involves overlaying a centrally controlled and managed wireless LAN switch and “thin” access ports onto an Ethernet foundation. Compared to the traditional “thick” access point wireless network, Symbol’s “thin” approach delivers greater scalability, manageability, accessibility, reliability, and a lower total cost of ownership.

EXECUTIVE SUMMARY

In today’s mobile and distributed enterprise, the “office” can be anywhere. Important work is accomplished in impromptu meetings in corporate hallways, in group strategy sessions over lunch in the cafeteria, and out on the factory floor reviewing marketing plans and budgets. In all these places and more, today’s executives, managers and employees need mobile connectivity to both local and enterprise networks to communicate, access data, and drive productivity and profits.

This exploding demand for mobile connectivity is driving enterprises to rapidly implement wireless networking. The question is, what is the best approach? Traditionally, the method of choice has been to add “thick” or intelligent wireless access points along the edge of an existing wired Ethernet network. But recently a new wireless networking technology arrived on the scene—the Symbol Wireless Switch with overlay architecture. This approach has been rapidly gaining favor because it’s SMART—Scalable, Manageable, Accessible, and Reliable, with a lower Total Cost of Ownership.

BACKGROUND

As just mentioned, the traditional enterprise wireless LAN infrastructure uses intelligent “thick” wireless access points. Typically, these “thick” access points are attached directly to an existing wired Ethernet network to maximize the use of previously installed hardware. In this approach, the access points do the work, maintaining configuration data and performing client authentication, among other tasks. It is a viable and proven approach, but it can be costly and complicated. Since each access point is a separate, standalone device, a network administrator must manage each individually. In a large wireless network, that can consume a lot of time, talent and expense.

In the “thin” approach, instead of “thick” intelligent and costly access points, there are “thin” access ports that simply provide wireless access. The intelligence in this architecture is concentrated in a centralized Wireless Switch. Through this Wireless Switch, the network administrator can manage and control all wireless network functions. While each approach has its benefits, the “thin” access port model is quickly gaining popularity because it’s easier to manage, provides more flexibility and is very cost efficient.

TECHNOLOGY OVERVIEW

“Thick” access points typically offer as many features as possible. That makes them initially more expensive and more costly to maintain since each access point must be managed individually. Network administrators typically use vendor-supplied or third party software to make configuration changes, install firmware updates and monitor network performance, which adds an additional burden to network overhead. Furthermore, “thick” access points typically don’t share their intelligence with other “thick” access points on the network, which can waste CPU cycles and memory.

Another issue with “thick” access points is that they sit on the edge of a wired enterprise Ethernet network that is typically quite complex. This means that wireless traffic competes with wired traffic, which can result in significant roaming delays when users are moving around an area and engaging different access points. This also makes traditional “thick” access point wireless networks poor candidates for Voice over Wireless LAN (VoWLAN) applications where such delays can result in dropped calls.

The “thin” approach is fundamentally different. Instead of placing a series of intelligent access points at the edges of an existing wired network, the Symbol Wireless Switch solution centralizes and integrates network intelligence and management functions in the Wireless Switch itself. This allows the access ports to be less intelligent—or “thin.” Installation is easy. The Symbol Wireless Switch infrastructure is simply “overlaid” on any existing wired Ethernet infrastructure that conforms to the wired “best practice” design and maintains the integrity of the mission-critical wired network.

The Wireless Switch solution also uses a Central Intelligence Packet Switched infrastructure to provide media-independent, switch-based wireless networking, while the “thin” access ports provide wireless client communication access. Besides access, the Wireless Switch system also provides an infrastructure for enforcing network policies, network security and Quality of Service. By sharing the same high-layer services as Ethernet switches, this approach delivers extensive wired LAN support, seamlessly integrating wireless traffic into the network. This ensures that all wireless users are subject to the same rigorous authentication procedures as wired users, allowing mobile devices to securely connect with enterprise applications, databases and services.



Access Ports are much leaner and only a fraction of the cost of traditional points.

BENEFITS

The Symbol Wireless Switch system is the first wireless LAN architecture with intelligence centralized at the switch. Through the overlay architecture, thin access ports connect to the Wireless Switch using an existing and trusted Ethernet Switching fabric. This represents a fundamental shift in wireless local area networking, bringing wireless LAN technology to parity with the wired network and providing an abundance of features and capabilities far beyond the traditional “thick” access point approach. As mentioned earlier, this approach has been rapidly gaining favor because of its SMART advantages—Scalable, Manageable, Accessible, and Reliable, while delivering a low Total Cost of Ownership.

Scalability

The Wireless Switch overlay architecture system can easily grow and adapt to changing network requirements and organizational needs.

Adding capacity is much easier than with traditional WLAN solutions thanks to its unified management and an architecture designed for flexibility. For example, to add more access ports, simply “plug-and-play.” Once an Ethernet cable is plugged into an access port, the Wireless Switch automatically recognizes and configures it with the correct settings. The complexity associated with managing a traditional access-point-based infrastructure is eliminated. Enterprises also enjoy immediate cost savings by reducing the need for skilled technicians during the installation phase.

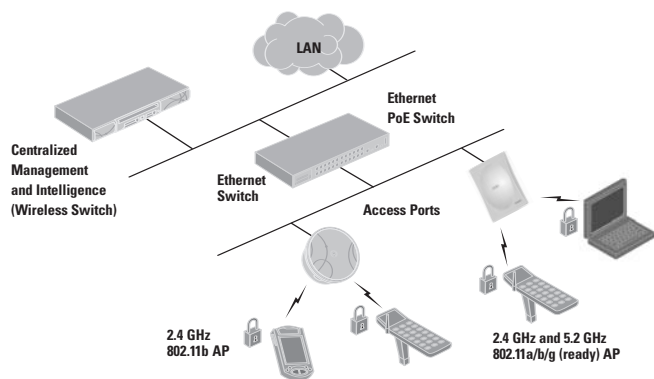
The Wireless Switch is radio-independent as well. As new technologies emerge and become standards, migrating is easy. Today, it supports multiple standards, including 802.11a, b and g. And tomorrow, it will support the future “n” standard. The ability of the Wireless Switch to grow with a wireless network as it evolves will protect the enterprise investment in wireless technology for years to come.



The Wireless Switch centralizes all wireless network features, functionality, security and management.

Manageability

Symbol's centrally managed Wireless Switch architecture seamlessly integrates with existing wired networks to manage both "thick" access points and "thin" access ports, with virtually no disruption to existing network traffic. Wireless network management is greatly simplified since the Wireless Switch serves as a central point of the WLAN for handling all wireless network activities. Through the Wireless Switch and a single IP, network administrators can access all system management functions using a simple XML-based GUI (graphical user interface). Administrators can control network access, provision and monitor all access ports, allocate wireless bandwidth, and manage all built-in WLAN connectivity services—including Security Servers, Log Daemons, DHCP servers, as well as all RF medium and RF devices. From the Wireless Switch, administrators can configure an Access Port Policy and apply it to all access ports with just a few mouse clicks, saving administration time and costs. To make administration even easier, the Wireless Switch handles many jobs automatically. For example, when an access port is connected to the Ethernet network, it automatically detects it and uploads the appropriate configuration and policy information.



The Symbol wireless network architecture easily and seamlessly integrates with existing wired networks, allowing network access to a wide range of wireless devices.

Availability

By concentrating control in the Wireless Switch and replacing complex "thick" access points with simple "thin" access ports, the Wireless Switch overlay architecture is inherently more reliable and available. The system automatically supports dynamic load balancing, moving users from a congested access port to one with more available capacity. It also has clear-channel detection for improved bandwidth utilization and provides "pre-emptive" roaming. As users move from one place to another, the Wireless Switch communicates with the client device and helps it transition to the next closest access port before connection speed degrades. All these features help ensure that network services are always available and of the highest quality.

Reliability

The Wireless Switch System ensures high system reliability and maximum uptime through unique, built-in auto-adoption and hot-sparing mechanisms. In addition, in the unlikely event of a Wireless Switch failure, the system automatically fails over to backup device, ensuring nonstop service.

Security is also a vital component of system reliability. The Symbol Wireless Switch system meets this need with robust, multi-layered security through a comprehensive suite of security mechanisms consisting of access control, authentication, encryption and authorization measures. With the Wireless Switch, administrators have complete control over all security measures with the ability to set security policies and networking services by device, user, application and location. While security is strong, it is also efficient. Once users are authenticated on the network, they can roam seamlessly across all points controlled by the Wireless Switch without re-authenticating. Moreover, the Switch provides very fast handoffs as users roam from one access port to another, ensuring smooth and secure operation of VoWLAN systems.

The design of Symbol access ports also provides an additional layer of security. Network configuration parameters reside in the Wireless Switch itself and are only downloaded into the volatile memory of the access port when it is verified as an authorized network device and powered on. If an intruder takes an access port offline in an attempt to steal configuration information, the parameters are lost, eliminating the risk of tampering and theft.

Lower Total Cost of Ownership

The Wireless Switch system significantly reduces the cost of deploying network infrastructure, with a lower cost of managing, maintaining and upgrading the wireless infrastructure. Installation, maintenance and troubleshooting costs are decreased because “thin” access ports do not need manual configuration, firmware installation or maintenance. The system’s rich functionality, expandability, and centralized management eliminate all the administration time and costs associated with access point-based solutions.

With the system’s ability to support users, services and standards both today and tomorrow, a Wireless Switch system provides long-term protection of an enterprise’s wireless technology investment. No need to rip and replace hundreds of access points to gain the benefits of essential new features. The Symbol Wireless Switch makes it easy to migrate wireless technologies by preserving legacy wireless network designs and facilitating the move from one generation of 802.11-based products to the next.

CHALLENGES

Wireless network security is a paramount concern to network managers and users alike. Wireless LANs should be no less secure than their wired counterparts, providing that appropriate techniques are used to implement a flexible and transparent solution. “Thick” access points are inherently vulnerable in that they are packed with sensitive data such as user IDs and passwords, IP addresses, access control lists and more. Hackers can not only steal sensitive data remotely, in some cases they can steal the access point itself and extract data in the comfort of their homes.

The Symbol Wireless Switch System eliminates this security threat by providing centralized authentication and encryption that enables simpler and more cost-effective management of security functions and policies without compromising roaming performance. Based on MIT’s Kerberos standard, Symbol provides its customers with today’s most secure encryption system for mobile environments, including support for the IEEE Wired Equivalent Privacy (WEP) Standards at 40 and 128-bit encryption.

Network management is another challenge. Network administrators aren’t looking for greater complexity and demands on their time. Yet each “thick” access point requires individual care and attention, consuming precious administration time and talent. Conversely, with all management functions centralized in the Wireless Switch, managing a group of “thin” access ports—no matter how large—is as simple as managing a single access port. Centralized configuration in the Wireless Switch allows distribution of configuration changes and updates to all access ports, eliminating the hours required for configuring and managing individual devices in an access point-based wireless LAN network.

Scalability and upgradeability are also concerns with any technology investment. To be accepted as an enterprise technology, wireless networks must scale to meet enterprise requirements without forcing administrators to give up the tools they count on when building wired networks. To update access ports with new features and functionality, administrators simply update the software in the Wireless Switch. The new features and functionality are automatically distributed to each access port—without disrupting the wireless LAN and eliminating the need to update each access port.

Controlling both the initial and ongoing costs of a wireless network are also important challenges. The lengthy installation and ongoing expense of managing each access point individually is a major portion of the cost of a “thick” wireless network. In contrast, Symbol’s access ports can be installed nearly anywhere in minutes, even in areas where power is not available. They are operational right out of the box, and unlike traditional access points, there is no time consuming configuration required. Configuration data is automatically downloaded from the Wireless Switch, dramatically reducing installation time and complexity, and eliminating the need for ongoing management of individual devices.

THOUGHT LEADERSHIP/ADVICE

Many enterprises have installed wireless LANs using the traditional access point-based architecture while using add-on products to provide additional management and security features. The problem is that none of these add-ons deliver a complete, integrated solution for managing and securing a wireless LAN—nor do they provide switching functionality to integrate the wired and wireless network.

Although a traditional wireless network with “thick” access points may look like a switched-wireless network with “thin” access points on paper, it does not work the same. “Thick” access points are still “smart” entities that require configuration, management and support. In addition, the few additional services that these devices provide adds significant time and labor costs because of the installation, configuration and administration that they require.

Thanks to its innovative architecture, the Symbol Wireless Switch with overlay architecture provides more functionality along with a variety of management and switching features—all without additional cost or network overhead. As the central point of aggregation for access ports on the network, the Wireless Switch lets a network administrator effectively manage and secure a WLAN while lowering the total cost of ownership.

THE FUTURE

Wireless networking is arguably one of the fastest growing sectors in technology. Wireless-enabled LANs are rapidly replacing wired local area networks in both businesses and homes. The technology is leading the way to a new “always on” world where people and businesses will be able to connect at any time, anywhere.

In the last few years, the global market for wireless Internet devices has skyrocketed, projected to reach \$73 billion by 2005, according to a study conducted by Strategy Analytics Inc. Today, individuals and businesses are accessing networks and the Internet through a wide variety of mobile devices, including handheld computers, wireless application protocol (WAP) phones, smart phones and next generation multimedia phones. Wireless services such as location-based services tied to GPS satellites and instant messaging using cell phones and personal digital devices are becoming increasingly vital to keeping employees connected and in serving customer and partner needs.

This new reality is empowering individuals and enterprises to access information and communicate faster and easier than ever before possible. Symbol is leading the way in this wireless revolution, working to extend its leadership with innovative technologies and products that deliver lower costs while maintaining compatibility with industry standards.

With nearly a 75% market share in enterprise wireless networking, the Symbol Technologies' Wireless Switch system delivers the scalability, manageability, accessibility, reliability and low total cost of ownership that enterprises need. Today, Symbol is a global leader in wireless networking and 802.11 standards—and in providing long-term value and future proofing for new standards. When new 802.11 standards are established, the Symbol Wireless Switch will be ready to accommodate them.

SUMMARY

Symbol's Wireless Switch and overlay architecture offer a fundamentally superior approach to wireless local area networking. This technology centralizes intelligence, control and management functions for the wireless network and provides an easy and cost effective way to add users and features. Intelligence previously designed into the access points of a WLAN is now integrated within the central switch enabling significant improvements in functionality, scalability, flexibility and extensibility. The Wireless Switch system is the optimum way to unify network access, security, policy management and QoS at the switch level, while delivering the highest level of wireless security to protect network, data and devices without compromising service.

ABOUT THE SYMBOL PRODUCT FAMILY

Symbol Technologies, Inc., The Enterprise Mobility Company™, is a global leader in mobile data management systems and services with innovative customer solutions based on wireless local area networking for voice and data, application-specific mobile computing and bar code data capture. Symbol delivers products and solutions that capture, move and manage information in real-time to and from the point of business activity. Symbol's wireless LAN solutions are installed at more than 45,000 customer locations, and more than seven million Symbol scanners and application-specific scanner-integrated mobile computer systems are in use worldwide. Symbol and its global network of business partners provide solutions for retailing, transportation and distribution logistics, parcel and postal delivery, healthcare, education, manufacturing and other industries. Symbol enterprise mobility products and solutions are proven to increase workforce productivity, reduce operating costs, drive operational efficiencies and realize competitive advantages for the world's leading companies.

For more information on wireless networking and the Wireless Switch and overlay architecture, please go to www.symbol.com. For global sales contact information, phone numbers and web site addresses around the world, you can also visit the Symbol “How to Buy” pages at www.symbol.com/howtobuy.

About Symbol Technologies

Symbol Technologies, Inc., The Enterprise Mobility Company™, is a recognized worldwide leader in enterprise mobility, delivering products and solutions that capture, move and manage information in real time to and from the point of business activity. Symbol enterprise mobility solutions integrate advanced data capture products, radio frequency identification technology, mobile computing platforms, wireless infrastructure, mobility software and world-class services programs under the Symbol Enterprise Mobility Services brand. Symbol enterprise mobility products and solutions are proven to increase workforce productivity, reduce operating costs, drive operational efficiencies and realize competitive advantages for the world's leading companies. More information is available at www.symbol.com



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 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: +65.6796.9600
FAX: +65.6337.6488

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 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 Website

For a complete list of Symbol subsidiaries and business partners worldwide contact us at:
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