

INTRODUCING WI-NG FROM SYMBOL TECHNOLOGIES

ENABLING THE NEXT GENERATION OF ENTERPRISE-CLASS RF NETWORKING

TECHNICAL NOTE

September 2006

Symbol's Wireless Next Generation (Wi-NG) architecture offers the superior performance and scalability required for enterprise mobility. Beyond traditional wireless networking, Wi-NG will provide a single RF switching platform that allows administrators to easily deploy and manage both Wi-Fi and evolving RF networks from one central location. Wi-NG optimizes voice performance and enables seamless campus-wide roaming across subnets without the need to re-authenticate. It also offers enhanced security, including an integrated IPSec VPN gateway and advanced intrusion detection tools, making it ideal for enterprise deployments. Wi-NG lays the foundation to support emerging RF technologies including RFID, Mesh, WiMax and fixed/mobile convergence (FMC).

WI-NG — AN IDEA WHOSE TIME HAS COME

It's a problem as old as technology itself: as soon as you get the latest and greatest new equipment, later and greater technology comes along — and it doesn't ever seem to be compatible with what you just bought. That's troublesome enough when it's your MP3 player, but the problem is far more severe if that new technology purchase relates to your corporate network infrastructure.

Symbol Technologies understands that when it comes to enterprise networking devices, you need today's technology now, but you'll also need what will come later - and you want the same infrastructure devices to handle it all, today and tomorrow. This is precisely the thinking behind Symbol's new Wi-NG (Wireless Next Generation) architecture.

Optimized to work efficiently on a single processor, as well as multithreaded processors and multicore multithreaded processors, Wi-NG architecture provides scalable enhanced enterprise mobility, security, and manageability — now and in the future. With the addition of Wi-NG-based products to its wireless infrastructure portfolio, Symbol continues to simplify wireless network planning, deployment, management and troubleshooting; improve the quality of and access to mobile applications within the enterprise; and expand the boundaries of the WLAN beyond the physical and technological limitations of traditional networks.

To better understand how Wi-NG accomplishes this, it may be helpful to examine the challenges it addresses.

NETWORKING CHALLENGES IN AN EVOLVING ENTERPRISE ENVIRONMENT

Although each networking environment is unique, the most common network challenges in an enterprise environment revolve around mobility, manageability, and security.

Mobility

As technology advances and business competition intensifies, enterprises are finding that to be more efficient, workers need access to corporate networks and applications in more locations that can be difficult, inconvenient or cost-prohibitive to cable. Examples include manufacturing plants, warehouses, and processing facilities, and expanding campuses. These environments demand flexibility in deploying wireless networks, whether using Layer 2, Layer 3 or wireless bridging technology.

In addition to the need for more network access, today's mobile worker requires a robust network to support latency-sensitive wireless applications such as voice and video over IP as well as access to services such as locationing.

Management of complex networks

Enterprises also need scalable networks that can easily accommodate a distributed environment, such as headquarters, remote branch offices and multi-building campuses. Too often, each entity implements its own network, requiring additional personnel to administer regional pieces of that network, and complicating network management. In such fragmented environments, daily administrative tasks such as upgrading firmware, detecting unauthorized network access and applying network policies happen regionally, with little or no central visibility.

Even when the WLAN is centrally administered, other emerging RF technologies, such as RFID and Wi-Max, will soon become a regular part of doing business, and usually require their own networks.

Security

Security is a primary concern for all enterprises, and it is a growing challenge for companies with mobile workers.

While hard-wired networks enjoy some amount of security simply by being physically inaccessible to users not authorized to be on the premises, they lack the flexibility to support the mobility required by today's enterprises.

With the adoption of WPA2, which significantly enhances wireless security through stronger cryptographic algorithms, message integrity checks, dynamic key management, and strong user authentication, a wireless network can provide both the flexibility and the security necessary to allow a corporation to securely do business at the point of activity.

WPA2 by itself does not solve all security issues. As with wired networks, tools such as firewalls and network access policies are essential to network security. The enforcement of such policies through active monitoring and the ability to detect – and act on – intrusions are critical to maintaining network integrity. And to be truly effective, all of this must be done in a manner that is simple for the IT administrator to manage.

With any network, even when that network is secured, there is often the question of who constitutes an authorized user. Should visitors be allowed some level of Internet access, even if they are not given full access to the corporate network?

And what about mobile workers? As more wireless networks are becoming available and more workers travel or work from home offices, a corporation must be concerned with the security of enterprise data accessed via outside networks.

WHAT IS WI-NG?

The goal of Wi-NG is to provide comprehensive control and monitoring of the entire wireless and mobile user environment using a single scalable, modular and portable software source.

Because it is Linux-based code designed to run on an array of optimized wireless networking hardware, Wi-NG is a highly scalable, portable platform providing a common IT user experience across network devices. The key to Wi-NG is its RF and hardware abstraction, respectively enabling management of multiple RF protocols in a single network, and allowing the devices on that network to run the same code, regardless of the processor. Not only does this code run on multiple platforms, but it can also take advantage of high-performance multicore/multithreaded system capabilities.

This, in turn, provides support for additional wireless services and applications. External services can be combined to facilitate an "application-aware" user experience. For example, services such as locationing and applications such as asset tracking or fixed-mobile convergence (to manage Wi-Fi to cellular network handoffs) can easily be integrated in the Wi-NG framework – a "virtual backplane", so to speak. Wi-NG also supports L2 and L3 mobility for campus-wide roaming, and clustering for redundancy. Core wireless services, such as locationing, are available regardless of the underlying RF technology being used — whether it is Wi-Fi today or the emerging RF technologies of tomorrow.

Mobility

With its current support for enhanced mobility and future support for bridging and mesh networking, Wi-NG-based devices can easily provide network access across expansive manufacturing floors and between several buildings across a campus.

Wi-NG Architecture Overview

ARCHITECTURE	FEATURES	BENEFITS
Management	IDS/Wireless IPS	Enhanced enterprise security and management
	RF planning/management	High uptime
	Firmware/configuration management	
Applications	Enterprise connectivity	Reduced costs
	Asset tracking	Enforced compliance
	Fixed-mobile convergence	Voice cost savings
Services	Symbol client extensions	Enhanced mobility
	L2/L3 mobility	Seamless voice/video roaming
	Mesh	Extension of network outside corporate walls
	Locationing	Asset tracking, physical security Simplified wireless security
Infrastructure	Linux-based software	Driving increased business efficiency
	RF & hardware abstraction	High performance
	Services/diagnostics	

With this cutting edge technology, a wireless network taking advantage of the Symbol Wi-NG architecture provides an elegant solution to the key challenges previously mentioned.

Wi-NG allows you to deploy "thin" access ports in Layer 3 network designs, and enables campus-wide roaming of mobile clients across Layer 3 boundaries — without requiring additional client software or hardware. Used in concert with Symbol handheld devices, Wi-NG further enhances fast roaming capabilities and extends client battery life. WMM (Wi-Fi multimedia) with "power save" extensions and admission control also provides additional voice capacity.

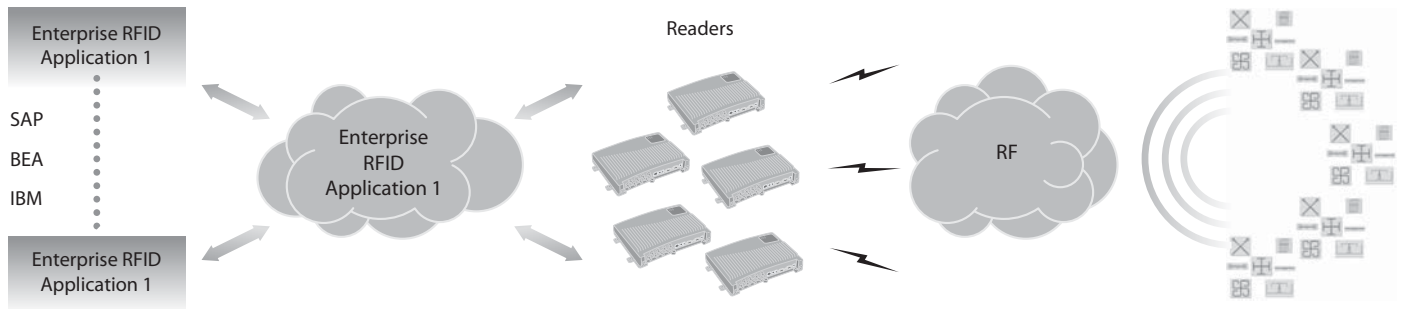
Wi-NG's support for locationing also enables asset tracking — a critical application in the mobile enterprise.

Management of complex networks

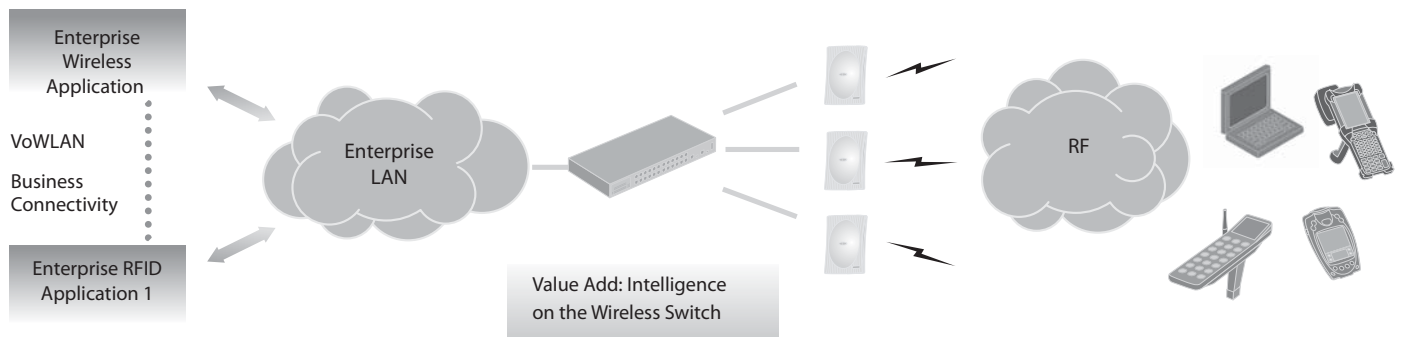
Wi-NG products provide unified management of network hardware, software configuration, and network policies, as well as built-in process monitors and troubleshooting tools. Symbol's MSP (Mobility Services Platform) offers both device-level management capabilities and centralized management of network infrastructure in distributed locations. With active/active failover and clustering capabilities, as well as mobile unit load balancing, Wi-NG maximizes network uptime while minimizing network latency.

RFID and WLAN: What Exists Today

Current RFID System



Current 802.11 Infrastructure

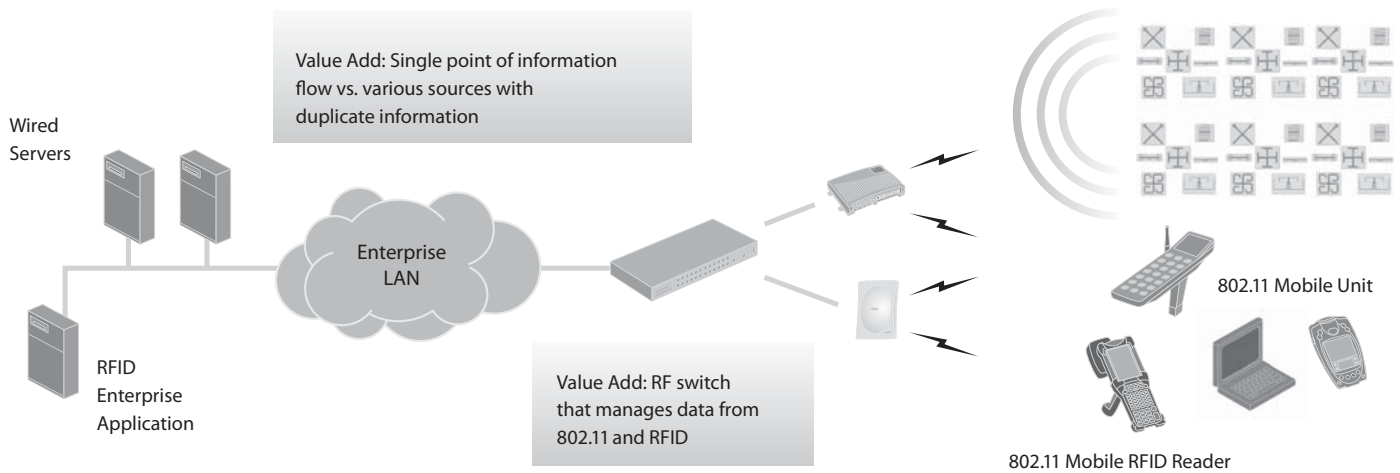


Additionally, as a result of the RF abstraction at the infrastructure layer, future Wi-NG-based products will be able to manage other RF technologies such as RFID, Wi-Max, FMC, as well as traditional Wi-Fi.

Consider the example of RFID technology. Until now, RFID and Wi-Fi have been managed on completely different networks. Not only does this require the administration of two different networks, it also means that the data from those two networks isn't being shared.

RFID integration means not only supporting the existing RFID reader and managing it through the same platform that supports Wi-Fi, but also being able to add some amount of business logic and data correlation capabilities to further streamline tag data flows to back-end business systems.

"RF Switching" Concept



This integration provides numerous advantages:

- Centralized management - the switch manages the RFID readers and the WLAN access ports
- Increased efficiency of information management - significantly reduces duplicate reads, and enables filtering and correlation of data
- Streamlined connectivity with back end applications
- Ability to provide secure information flows

Security

Wi-NG provides comprehensive network security, including integrated features such as enhanced MAC-based authentication, intrusion detection, an IPsec VPN gateway, AAA/Radius server (for WPA/WPA2 termination on the box) and "hotspot" provisioning capabilities for secure guest access. The stateful packet inspection firewall offers protection against denial of service attacks while optimizing network traffic.

These features ensure network security, validating authorized users and alerting administrators to potential intruders. Additionally, hotspot provisioning allows a designated user (such as a receptionist) to grant temporary Internet access to visitors without compromising the security of the corporate network. Upon initial login, visitors will be redirected to a customized login page.

The location awareness feature can ensure the guest has Internet access while in the lobby, but not in the executive conference room or other potentially sensitive areas.

But what about those mobile workers? With the integrated VPN gateway, authorized users can securely access the network from home, hotels, hotspots — anywhere they need access.

WHY SYMBOL?

The goal of Wi-NG is to provide comprehensive control and monitoring of the entire wireless and mobile user environment using a single scalable, modular and portable software source.

Symbol technology

The introduction of its Wi-NG architecture is yet another in an ever-growing list of industry firsts for Symbol Technologies. Symbol introduced the first WLAN in 1989, the first IEEE 802.11-based WLAN in 1994, the first 802.11 wireless VoIP phone in 1998, and the first WLAN switch in 2002.

Holder of over 900 patents in mobile technology, Symbol continues a long tradition of innovation and global market leadership in mobile computing, RFID solutions, enterprise WLAN and wireless switching. The Symbol wireless infrastructure products available today embody over a decade of RF expertise and superior performance in industrial deployments.

Symbol vision

Business-critical wireless applications require three elements: mobility, security and management - and this is where Symbol's strength in enterprise wireless infrastructure lies. Unlike other manufacturers who provide only pieces of enterprise mobility, Symbol offers the

switching architecture, the infrastructure and the mobile devices necessary to provide seamless, reliable communications to a mobile workforce, as well as the management tools to administer the whole solution. Symbol truly understands mission-critical enterprise applications, and enables them at the point of activity.

With emerging RF technologies such as RFID, and broadband connectivity options such as Wi-Max just around the corner, IT departments will face new challenges in terms of integrating and managing these new networks. Symbol's vision is to develop a centralized management framework for all these RF technologies and deliver unparalleled business benefits and efficiencies to IT administrators everywhere.

Symbol Wi-NG-based products

The Symbol WS5100 Wireless Switch (v3.0) is the first product to take advantage of Wi-NG architecture, which will also be available on new versions of switch platforms in 2007. The WS5100 (v3.0) supports enhanced roaming through Layer 3 deployment, improved mobile client battery life, integrated security features such as intrusion detection, a stateful packet inspection firewall, an IPSec VPN gateway, hotspot provisioning, enhanced voice capacity, active/active failover and clustering capability, a simplified user interface, automatic update of configuration files and firmware, and built-in process monitors and debugging tools.

A next-generation, high-performance switch designed for very large network deployments, whose hardware will enable it to take advantage of all of Wi-NG's capabilities will also be available in early 2007.

Wi-NG will continue to evolve and to promote and enhance enterprise mobility for enterprises and for Symbol partners. Enterprises benefit from Wi-NG's superior voice support, security, mobility and manageability

features. Partners benefit from the platform-agnostic hardware abstraction that allows the Wi-NG code to run on multiple platforms including high-performance multi-core, multi-threaded processors.

Additional enhancements, via software updates, will include centralized management of enterprise mesh networks, and support for 802.11n and outdoor access points. After that, the RF switching functionality, merging RFID and Wi-Fi networks will be introduced, and will run on the high-performance switch.

IN SUMMARY

Wi-NG architecture from Symbol Technologies is an evolving technology for the support and management of evolving enterprises. It simplifies wireless network planning, deployment, management and troubleshooting; improves the quality of and access to mobile applications within the enterprise; and expands the boundaries of the WLAN beyond the physical and technological limitations of traditional networks.

To learn more about Wi-NG and the products it supports, visit www.symbol.com/Wi-NG. For assistance with the challenging needs for wireless network design and deployment – for today and tomorrow – contact a Symbol PartnerSelect partner or visit <http://www.symbol.com> to contact a local Symbol representative.

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 technology, mobile computing platforms, wireless infrastructure, mobility software and world-class services programs. 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 retailers, transportation and logistics companies, manufacturers, wholesale and distribution centers, government agencies and healthcare facilities. More information is available at www.symbol.com



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