

# **WLAN Support: The Hidden Costs of Ownership**

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## Executive Summary

Much like the WLAN industry itself, a complete understanding of all the relevant benefits and costs that result from WLAN implementation is in its very early stages. Similar to first generation LANs, many WLAN implementations have grown organically within individual workgroups or departments. Two key drivers have been the relatively low cost of WLAN NICs and APs as well as rapidly growing rates of consumer adoption. In addition, knowledge worker productivity resulting from more flexible application and information access has often been the primary implementation justification.

As the scope of implementation grows, however, and WLANs become increasingly critical corporate assets, increased cost scrutiny and more formalized benefit justification will inevitably result. In this paper, Momenta Research provides a detailed analysis of IT support costs based upon the results of recent research. Our findings provide more detailed insight into the skill sets, costs and time associated with the major lifecycle phases of WLAN implementation.

### **Findings:**

Momenta's research focused upon WLANs supporting hundreds of users. Our findings show:

- ☞ *Product installation and configuration – which is typically performed by senior designer and architect resources – represents 60% of the costs in the WLAN lifecycle.*
- ☞ *On-going management and troubleshooting of the RF airwaves constitutes nearly 60% of the time spent supporting WLANs.*

### **Recommendations:**

The most effective improvements in support efficiency and cost reduction can be derived from the full or partial automation of the following tasks (in prioritized order).

1. *AP Channel Configuration & Management*
2. *AP Power Level Configuration and Management*
3. *Site Survey Execution*
4. *AP Installation & Configuration*
5. *Performance and Availability troubleshooting within a WLAN*
6. *Performance and Availability troubleshooting between WLANs*
7. *Support for supporting and locating roaming users*
8. *Configuring and managing authentication and encryption agents*

Momenta research believes that the next significant product opportunity is the automation of RF configuration and management that would directly improve support time and cost allocation for support tasks 1 through 5 and indirectly improve time and cost for support tasks 6 and 7. This is a significant opportunity whose implementation can positively impact up to **70%** of the current WLAN support time and cost. Based upon this analysis and our review of Propagate Networks AutoCell™, it is our belief that this technology has the potential to significantly reduce the cost of WLAN ownership while using an approach that is totally consistent with the 802.11 standards.

## Wireless LAN Management – Still at the Starting Block

In a number of documented cases, WLAN implementation has resulted in soft dollar benefits that have ranged from \$450 to nearly \$7,000 worth of increased knowledge worker productivity per end user. To date, most of the documented WLAN business case analyses have primarily focused largely on increased productivity improvements.

But behind these benefits are additional support costs. An erroneous assumption that is sometimes made is that WLAN implementation is little more than the installation of wireless NICs on a set of laptops complemented by the installation of a few APs at select locations within a departmental office area. In addition to increased professional productivity, it is sometimes assumed that IT also directly benefits through a substantially reduced cost for data moves, adds and changes. The latter assumption is dangerously naïve. Recent research conducted by Momenta shows a significant amount of time and cost can be required for IT to design, install, configure and support a WLAN, much more than has been the case for more traditional wired LANs. This is due to the facts that:

- 1. WLAN management technology is in its infancy*
- 2. WLAN management automation has been virtually non-existent*

The results are longer service delivery cycle times and increased costs for tasks that are functionally similar to those performed for existing LANs.

In some cases, WLAN support tasks do not even have a functional counterpart in tethered networks. Let's take the WLAN site survey as a practical example. The objective of a site survey is to either define or validate the design of a WLAN by determining its feasibility in the face of the physical obstacles, signal attenuation, random noise and sources of signal reflection that exist within a target WLAN environment. By definition, performing a site survey is not required in more traditional LANs. The design parameters that a site survey elicits either do not apply or are already addressed within the existing infrastructure.

Today, performing a site survey is a very labor-intensive process. Recently, products from a number of vendors have been announced that have the potential to significantly streamline this process. Given that most of these products are still fairly new, it will take some time to determine their actual effectiveness.

In addition to the site survey, numerous other support tasks are required that either have no direct equivalent or require substantially more effort than their tethered counterparts. Collectively, these tasks constitute the "hidden iceberg" of WLAN support time and cost and, as such, they have received little, if any, coverage in WLAN business cases or ROI analyses that have been published thus far.

Momenta's research shows that performing these tasks can result in \$50 to \$200 worth of annual support cost per drop. Therefore, factoring their cost into any WLAN ROI analysis as well as understanding the products and technologies that can effectively reduce some, if not all, of their labor intensity is an extremely important step in business case development. This is especially important

given an increasing number of industry studies that are reporting increasing growth in the support cost slice of the Total Cost of Ownership (TCO) pie.

## Support Time and Cost Allocation

Knowing the amount of incremental WLAN support task cost without understanding the underlying contributors is of limited value. In order to address this question, Momenta Research recently analyzed the TCO allocation associated with the implementation lifecycle of a number of different WLANs. In general, we found that support costs were often the largest portion of the TCO. Depending upon network size and vendor, support costs were approximately 45% of the TCO. Capital costs were a distant second at about 35% with maintenance consuming the remaining 20% (Figure 1). Specific percentages varied based upon the number of end users supported by the WLAN as well as the vendor of choice for the WLAN infrastructure.

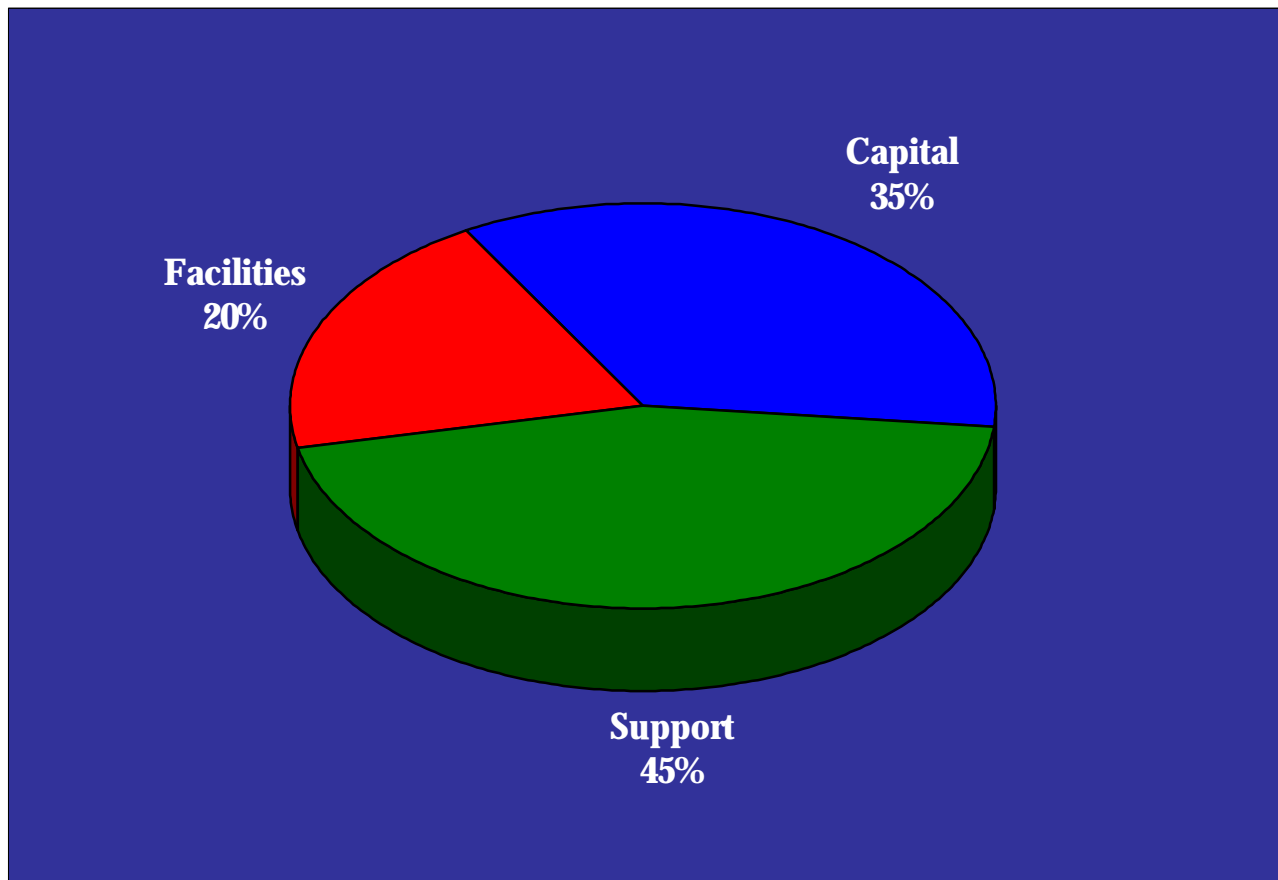


Figure 1 – WLAN Total Cost of Ownership (TCO) Allocation by Cost Category

These results, while somewhat interesting, do not tell the story about which support tasks are responsible for what percentage of support TCO.

From an IT manager’s point of view, understanding the cause of and possible remedies to these high percentage tasks gives greater insight into which vendors and products represent the most effective short and long term investments. These tasks also need to be considered from both a *time* and *cost* perspective in order to understand how to most effectively improve service delivery cycle times as well as reducing overall support costs.

The time and cost breakdown by lifecycle phase for a representative WLAN with several hundred users is shown in Table 1. Note the significant difference in the time and cost allocation results. Here, the most significant amount of time is spent in the support phase while design and installation account for the most significant portion of cost.

	Percentage of Time By Lifecycle Phase	Percentage of Cost By Lifecycle Phase
<b>Design</b>	<b>14%</b>	<b>12%</b>
<b>Installation</b>	<b>4%</b>	<b>27%</b>
<b>Configuration</b>	<b>18%</b>	<b>53%</b>
<b>Support</b>	<b>45%</b>	<b>3%</b>
<b>High Availability</b>	<b>18%</b>	<b>4%</b>

Table 1 – WLAN Time and Cost Allocation by Lifecycle Phase

The causes of these time and cost allocations are:

- ☞ *The four key tasks that make up the support phase (integrating WLAN management with existing management systems and processes, troubleshooting performance and availability problems on the airwaves, troubleshooting performance and availability problems on the network backbone and developing mechanisms to locate roaming users) are the least understood by most support organizations and therefore are more likely to be performed by either a network manager or more junior staff. Complex, vaguely understood tasks performed by less senior resources generally results in a longer cycle time for completion.*

- ☞ *In contrast, design, installation and configuration phase tasks executed on the front end of a major project are more likely to involve more senior staff, including network architects. Therefore, even though their completion times are generally less than the support phase tasks, their total cost is greater than for the support phase simply because the fully loaded cost (including base salary, bonus and benefits) of the responsible individuals is much higher. This illustrates the importance of defining support costs in terms of those incurred by all the individuals responsible for their execution rather than relying on a single weighted (and sometimes meaningless) “average” hourly or daily support cost that is blindly used in support task calculations, irrespective of the complexity, duration or shared responsibility for task completion.*

The support time and cost allocation results point to a common theme – the need for the application of intelligent automation to both reduce the amount of support time required for WLAN implementation and management. This will become especially important as WLAN implementation expands beyond the departmental level and increasingly becomes an enterprise-class service. Based upon our analysis of the amount of cost and time consumed by individual support tasks, the best improvements in support efficiency and cost reduction can be derived from the full or partial automation of the following tasks (in prioritized order).

1. AP Channel Configuration & Management

*Many of today’s WLAN products require a Network Manager to manually configure explicit AP channel usage settings (one of eight in 802.11a; one of three in 802.11b) in order to maximize signal strength and minimize interference. This is one area where automation state of the art is rapidly improving.*

2. AP Power Level Configuration and Management

*Similar to Frequency Channel setting, many current products require a Network Manager to manually configure explicit signal power setting in order to optimize signal strength versus consumed power on each AP. This approach clearly minimizes the flexibility of the WLAN in its ability to rapidly respond to varying traffic load conditions. Once again, this is an area in which automation state of the art is rapidly improving.*

3. Performing a Site Survey

*As previously mentioned, a site survey is an analysis of the area to be covered by a wireless network. The site survey is performed in advance of the design and installation of a wireless network in order to gain a clear understanding of the target network's operating environment. The site survey provides the decision basis for the type of network to implement, the type of wireless networking products to deploy, and how to deploy them.*

4. AP Installation & Configuration

*Since most APs are fairly lightweight devices, physical installation and placement time is fairly minimal in many cases. However, for physical security reasons, APs may be required to be installed in locations that strongly inhibit access and/or tampering by unauthorized personnel*

5. Performance and Availability troubleshooting within a WLAN

*In this case, the Network Manager is troubleshooting connectivity, availability and/or performance problems being experienced by WLAN end users located in the same WLAN. One of the biggest unknowns is the effort required to accurately and effectively troubleshoot airwave performance and/or availability problems that are either due to misconfigured frequency settings, SSIDs and/or AP-specific power settings. The main reasons are the nature of more complex distributed troubleshooting required either between APs and end stations or between neighboring APs.*

6. Performance and Availability troubleshooting between WLANs

*Here, the Network Manager is troubleshooting connectivity, availability and/or performance problems being experienced by WLAN end users located in different parts of the network. These problems may be between WLANs or between a WLAN and a wireless end user currently attached to the wired network, in the case of roaming*

7. Support for supporting and locating roaming users

*This task is a composite of two tasks. By definition, end user roaming can occur from one WLAN to another or between a WLAN and a wired connection at some remote point in the network. Therefore, the mechanisms to find roaming users will differ greatly by product. One approach is the case in which supporting switches store their own specific attributes about each user and associate those attributes with each User ID that is maintained on the Triple-A server. Other approaches (such as Cisco's Aironet product family) require the use of Mobile IP, which has been in existence for some time, but can also be very complex to configure and troubleshoot, especially as the number of WLAN users increases. The wrong technology choice, especially with respect to the configuration and management of end station IP addresses as well as end-to-end tunnel (IPSEC or otherwise) management, can potentially more than negate any savings that result from the reduction or elimination of wired LAN Moves, Adds and Changes.*

## 8. Configuring and managing authentication and encryption agents

*In order to support network logins from wireless end user clients as well as provide effective encryption, intelligent agents that support both proxy authentication and encryption over the airwaves are supported on a number of vendor-specific APs. In fact, it is this specific set of security management features that differentiates one vendor's product set from another. The location of End User Authenticator Agents varies by product. For example, the Authenticator proxy resides in Symbol technologies Axon Mobius Switch versus in the AP. By contrast, the Authenticator Agent for the Cisco Aironet is in the AP itself. With some vendor products (e.g. the Trapeze Networks Mobility Switch), additional Triple-A server data must be configured for each WLAN user in order to enable the Mobility Switch Network to reliably manage inter-WLAN roaming without causing disruption of existing network sessions.*

To date, a number of vendors have addressed one or more of the items in the above list. No one to our knowledge has successfully addressed all eight. Most recent vendor announcements have focused on initial automation support for tasks 3 (site survey), 7 (roaming user support) and 8 (distributed authentication management). Momenta Research believes that the next significant product opportunity is the automation of RF configuration and management that would directly improve support time and cost allocation for tasks 1 through 5 and indirectly improve time and cost for tasks 6 and 7. This is a significant opportunity whose implementation can positively impact up to 70% of the current WLAN support time and cost. Based upon this analysis and our review of Propagate Networks AutoCell™, it is our belief that this technology has the potential to significantly reduce the cost of WLAN ownership while using an approach that is totally consistent with the 802.11 standards.