

Minimizing the costs of owning and operating a wireless LAN

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Contents

A Capital Idea	4
Lower cost per managed AP	5
Single infrastructure for service delivery and monitoring	5
Multi-mode support	6
LAN evolution, not revolution	6
Fault tolerance	7
Smooth operations	8
Simplified deployment	8
Improved operational efficiency	8
Fewer trouble tickets	9
The Alcatel difference	11

Minimizing the costs of owning and operating a wireless LAN

More and more enterprises are recognizing the value of wireless LAN (WLAN) technology. Mobility increases business profitability through improved productivity, enhanced real-time communications, and new business applications.

While the benefits of wireless technology are fairly tangible, the cost of owning a wireless LAN are difficult for network managers to predict. What impact does the new technology have on existing products, policies, and procedures? Is there a significant learning curve to implement the new solution? How difficult is the new network to manage? How long will it last?

As is the case with any networking technology, there are both capital and operational investments associated with deploying a new WLAN. However, the degree to which this affects a company's bottom line is governed by the features and functionalities of the WLAN solution itself.

Alcatel distinguishes itself from other WLAN solutions by offering maximum WLAN functionality with best-in-class cost of ownership. Minimal hardware and software costs are incurred when using the Alcatel wireless enterprise platform. Furthermore, the Alcatel solution works with existing LAN equipment, rather than replacing it. This helps IT staff to maximize previous investments in networking equipment. In addition, the Alcatel solution automates many of the key tasks required for day-to-day WLAN operations, such as channel assignment and access point (AP) power output, thereby dramatically simplifying deployment procedures, reducing ongoing operational burdens, and extending the life of a wireless network. When coupled with advanced management tools for simplified configuration, monitoring, maintenance, and troubleshooting, Alcatel provides an extremely robust WLAN solution that is cost effective for any enterprise environment.

Minimizing the costs of owning and operating a wireless LAN

A Capital Idea

A move to wireless technology requires the unavoidable investment in new hardware and software. However, the extent to which a new WLAN solution affects capital expenditures can vary dramatically.

Alcatel minimizes WLAN investment costs in several ways. To illustrate some of the specific cost savings, this paper will use a sample enterprise with the following characteristics:

- Building type: Hard (solid) walls and structural (open) ceilings
- Building size: 675,000 square feet
- Number of wireless users: 1,500
- Existing LAN: Ethernet with power over Ethernet (PoE) capabilities

Alcatel saves on WLAN capital expenditures

- No need for point appliances (security, mobility, IDS, etc.)
- Integrated solutions for monitoring and traffic delivery
- Supports multiple 802.11 band (a/b/g)
- Works with existing LAN switches, security servers, and third party APs
- Cost effective network resiliency

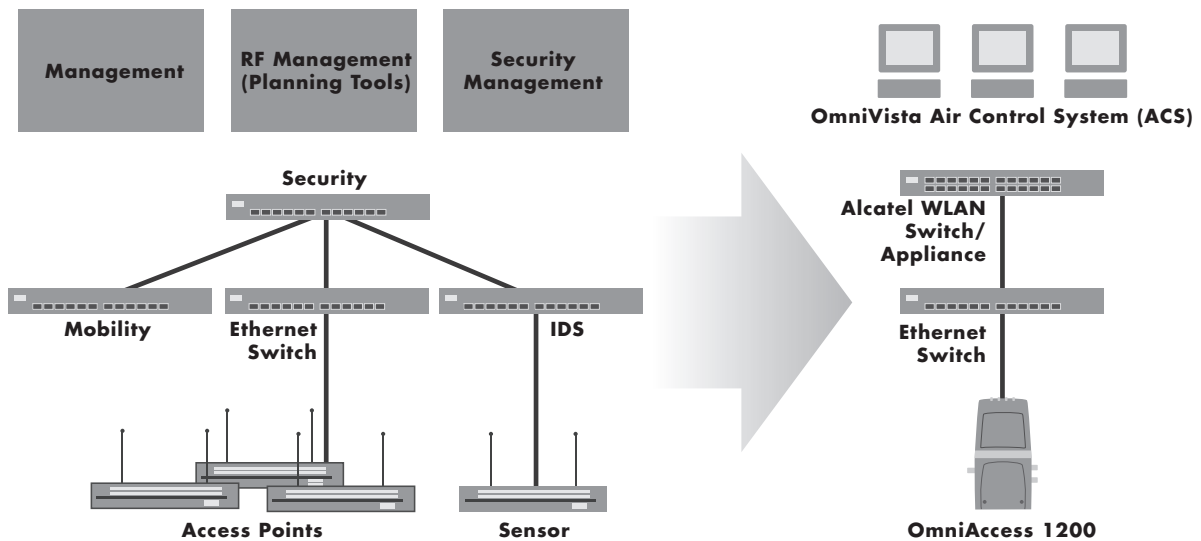
Alcatel's WLAN eliminates the need for point appliances, while traditional WLAN solutions lack inherent security and mobility capabilities. As a result, enterprises using traditional solutions are forced to deploy a variety of different appliances to address these deficiencies.

The OmniAccess 4012 and 4024 WLAN switches and the OmniAccess 4102 WLAN appliance combine the functionality of several of these distinct solutions into one device including:

- RF management
- Wireless protection
- Security
- Mobility
- VPN concentration

Minimizing the costs of owning and operating a wireless LAN

As a result, with the Alcatel solution, there is no need to purchase numerous separate appliances to handle each of these capabilities. In the sample enterprise above, this is approximately \$245,000 worth of equipment, or 47% of total WLAN capital expenditures (\$522,500). This is a huge cost outlay that can be avoided with Alcatel's integrated WLAN solution.



Lower cost per managed AP - First generation WLAN solutions are extremely costly to implement in a large-scale enterprise environment, because most of the intelligence and cost resides in the AP itself. As hundreds, or even thousands, of these "fat APs" might be used to cover an entire building or campus, these solutions require a significant amount of capital. The enterprise above, for example, would require approximately 225 traditional APs to provide adequate coverage. At approximately \$1,100 per AP, this adds up to just under \$250,000 in equipment costs.

Newer WLAN architectures, such as the one offered by Alcatel, centralize intelligence within a wireless switch or appliance. These devices then push out policy information to "lightweight" APs for execution. As this type of architecture enables entire networks of APs to be managed together, it dramatically reduces the cost of managing a wireless LAN.

When factoring in the price of the switch/appliance, the cost per managed AP in an Alcatel environment is typically 33% lower than the cost of a traditional peer-to-peer AP implementation. In the sample enterprise above, this would be a cost savings of approximately \$112,500.

Single infrastructure for service delivery and monitoring - The RF management, mobility, and wireless protection functions provided by Alcatel are delivered via the same devices (APs) that are used to handle day-to-day traffic delivery. This configuration is dramatically different from other solutions that require one set of APs for monitoring and another set of APs for traffic forwarding.

Minimizing the costs of owning and operating a wireless LAN

For these other environments to provide a minimal level of effectiveness, one monitoring device is recommended for every three APs that are used for service delivery resulting in an extra 33% of equipment - and 33% of cost. For example, assuming 225 Alcatel APs would be required in the above sample enterprise, 300 APs would be required in a competitive solution. Assuming that the average price of these monitoring APs is \$400, the Alcatel solution would save close to \$30,000. (Note: businesses can choose to increase the number of service APs that are managed by monitoring each AP to reduce costs. However, as this ratio increases, the effectiveness of the solution decreases. Too few monitoring APs can easily cause "holes" in the monitoring solution. This prevents the WLAN from collecting accurate information across all APs, which can result in improper analysis of network conditions.)

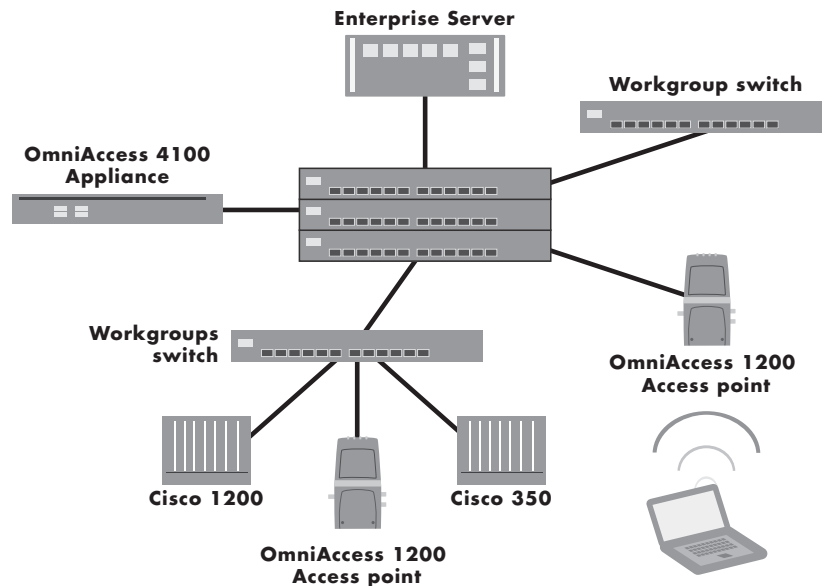
Multi-mode support - The air space is a very finite resource. There is only 83.5 MHz (e.g., three non-overlapping channels in the U.S.) available in the 2.4 GHz band (802.11b), and 300 MHz (13 non-overlapping channels in the U.S.) in the 5 GHz band (802.11a). Even 802.11g, which increases throughput to 54Mbps must deal with the limitation of having only three channels available. Therefore, to address system capacity and plan for future user growth, IT managers should seriously consider deploying dual-band networks (802.11b/g and 802.11a) to ensure their wireless networks are not quickly overwhelmed by success.

Enterprises do not want to deploy separate WLAN infrastructures to support each mode of 802.11. Alcatel avoids this by providing multi-mode support in every OmniAccess 1200 AP. The actual cost savings of this approach depends upon specific network dynamics. If one were to assume, for example, that equal sized networks were deployed to cover the entire enterprise above in b/g and a, then the Alcatel solution would require 225 fewer APs than some alternative solutions. This would save approximately \$90,000.

LAN evolution, not revolution - Wire line networks have been around for quite a long time. They work, and corporations have already invested significant amounts of time and money into their development. Therefore, WLANs must coexist with existing LAN infrastructures, not replace them. Alcatel addresses this requirement in several ways.

For one, Alcatel WLAN appliances enable IT staff to build a wireless network as an overlay on top of existing Ethernet LANs. By leveraging high-speed uplink ports on these devices, they can easily connect to existing Ethernet switches and provide RF management, mobility, and security functions to any APs connected to the switches. This eliminates the need to re-purchase wire-line switching functionality when it already exists in a LAN environment.

Minimizing the costs of owning and operating a wireless LAN



In addition, Alcatel was designed to integrate with existing corporate security schemes. It is proven to be interoperable with leading 802.1x and RADIUS services, and seamlessly integrates with existing IPsec schemes. For example, Alcatel WLAN switches and appliances can terminate IPsec clients from leading vendors, off-loading existing VPN servers and enabling IPsec sessions that can roam with mobile users. Or, if preferred, IPsec sessions can be passed-through the Alcatel platform to third-party IPsec servers. In addition, the Alcatel solution can map existing wire-line QoS and VLAN schemes into the wireless network, ensuring seamless network operations regardless of the underlying medium.

Alcatel can also easily integrate into corporate environments with existing wireless LAN deployments. Traditional third party access points from leading vendors can be managed by a centralized Alcatel switch or appliance. A variety of functions can be performed on these devices, such as software configuration, mobility management, and power output. Additional features can be extended to those devices that support the Lightweight Access Point Protocol (LWAPP).

Fault tolerance - Business-critical networks must be reliable. Loss of network connectivity can have a direct impact on profitability. Some WLAN solutions address this requirement by enabling access points to be dual-homed to multiple wireless switches. If a switch fails, all APs connected to that switch continue to function via the backup switch to which they are hard-wired. Unfortunately, this architecture only addresses the switch-side of the problem - it does not address the loss of an AP. Furthermore, providing resiliency in this way is usually quite costly, because for every switch port that is providing service to an AP, another is being used in standby mode to provide backup in the event of a failure. As a result, this architecture requires twice as many switch ports and significantly more cabling than competing solutions.

Alcatel addresses the above issues by building fault tolerance directly into the RF domain. Using RF intelligence, the Alcatel network detects the loss of a switch/appliance and "herds" users to the best available device via the air space. Furthermore, the Alcatel system can detect the loss of an AP, and

Minimizing the costs of owning and operating a wireless LAN

intelligently adjust the power output and signal strength of adjacent APs to compensate for the loss. By handling fault tolerance via RF intelligence, no unnecessary cabling or hardware costs are required. By some estimates, this can save 40% of the costs associated with deploying a competitive WLAN solution.

Smooth operations

While capital costs are usually the easiest to quantify, operational costs can have the largest impact on an enterprise environment. The introduction of a new technology into an existing network environment can be particularly costly if not handled properly. Alcatel helps to keep day-to-day costs to a minimum by automating the key tasks associated with wireless deployment and operations. This flattens the learning curve for wireless LANs, and reduces the burden on IT by minimizing hands-on management.

Alcatel saves on WLAN operational costs

- RF intelligence minimizes site survey costs (self-configuration)
- Centralized policy creation and enforcement simplifies WLAN management
- RF intelligence provides real-time network optimization
- Self-healing network reduces trouble tickets
- Management tools provide expert visibility into the air space

Simplified deployment - Alcatel saves significant time and money during deployment by minimizing the need for site survey tools. Since AirView can dynamically adapt to changes in the RF environment, there is limited need to perform extensive site surveys to determine "optimal" radio placement and configuration. The network will take care of itself once deployed. As a full site survey might cost approximately \$5,000 for every 20,000 square feet, the Alcatel solution might save close to \$170,000 in the sample enterprise.

In addition, by creating a WLAN solution that is self-configuring and self-optimizing, the IT staff will require less in-house RF expertise. No new administrative resources are required to support a new wireless network. Furthermore, expensive training in RF technology is not required. Alternative wireless solutions would require two new full time staff members to handle the day-to-day WLAN management of the above environment. A typical Alcatel solution, on the other hand, would require half of a new resource. Therefore, the Alcatel platform could conceivably save close to \$150,000 in annual salary costs, and tens of thousands of dollars in training costs.

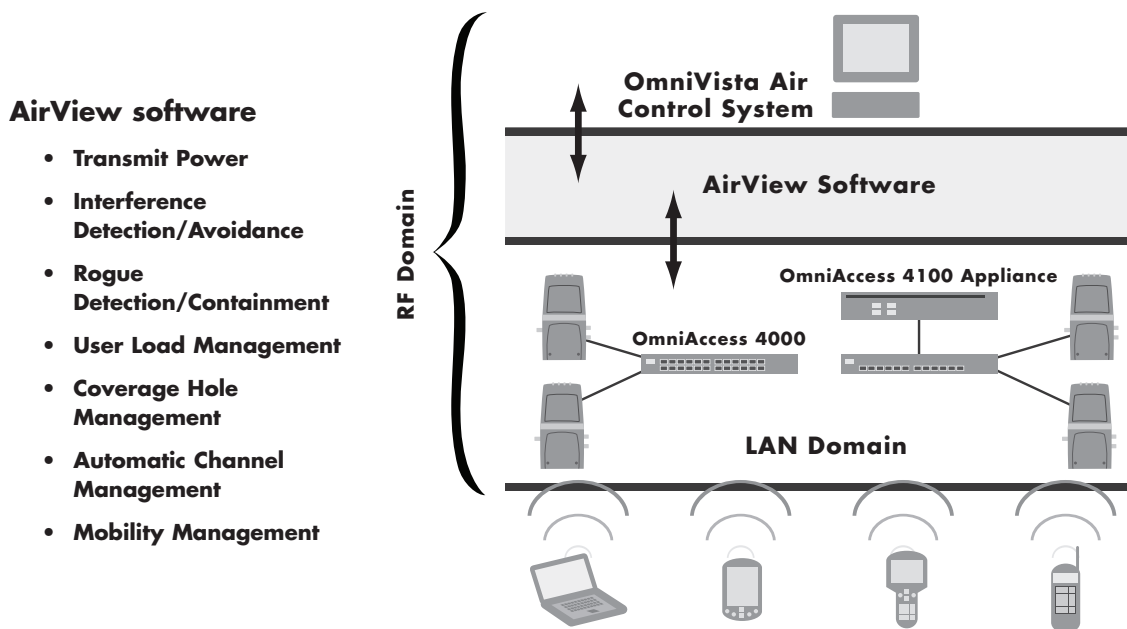
Improved operational efficiency - By concentrating intelligence within a switch/appliance, Alcatel provides a centralized view of an entire wireless network. This enables policies (e.g., QoS, security, virtual LANs, etc.) to be easily created and enforced across thousands of access points, without requiring each AP to be managed on an individual basis.

Minimizing the costs of owning and operating a wireless LAN

Alcatel's AirView software further reduces management costs by dynamically adapting the WLAN in real-time to ensure optimal coverage and capacity.

For example, channel assignments, power levels, traffic load, and other network characteristics are constantly adjusted to accommodate changing RF conditions and user profiles. By creating a network that performs self-configuration in real-time, network administrators are relieved from the burden of minute-by-minute WLAN monitoring and maintenance. Some WLAN solutions offer automated RF prediction and site survey tools to help reduce the daily burden of operating a wireless LAN. While these tools do alleviate some management tasks, they still require significant resources.

For example, IT personnel are often required to interpret the results of these tools and determine how the wireless LAN should be reconfigured to account for detected changes. In addition, as these tools are run at scheduled intervals, they do not detect and adapt to changes in real-time. As a result, the IT staff is required to keep constant vigil on the network to ensure seamless operations regardless of the events that are transpiring, such as when employees are congregating for an impromptu meeting, when someone places a phone call or when an interference source appears that is disrupting service. Alcatel's WLAN solution with its ability to handle dynamic RF intelligence in real-time, offers dramatic operational costs savings over alternative platforms.



Fewer trouble tickets - Network troubleshooting can be costly. Responding to reports, isolating faults, and resolving problems takes a significant amount of time and resources, which equates to money. Alcatel dramatically reduces troubleshooting costs with dynamic RF intelligence. AirView dynamically detects events that could potentially harm wireless service, such as noise, interference, rogue devices, and heavy traffic load. It then adjusts channels, power output, service delivery, and other WLAN parameters to ensure that

Minimizing the costs of owning and operating a wireless LAN

the network is not adversely affected. The Alcatel solution is self-healing, ensuring the wireless problems are addressed before they impact the end user.

Those problems that are not dynamically addressed with AirView can be easily diagnosed using the OmniVista Air Control System (ACS) software, which provides graphical analysis and trending tools for rapid fault detection, isolation, and correction. ACS gives the IT staff visibility into the air space. For example, the following types of WLAN characteristics can be easily observed for an entire wireless enterprise:

- **Traffic load** - The IT staff can see exactly how much bandwidth is being used throughout their entire wireless network, which helps WLAN managers to track network performance and plan network growth accordingly.
- **Interference** - Traffic from overlapping 802.11 sources that might interfere with wireless LAN performance is easily identified.
- **Noise level** - The OmniVista Air Control System illustrates non-802.11 noise
- **Signal strength** - The OmniVista Air Control System collects information on signal strength and signal to noise ratio (SNR) to evaluate network coverage.
- **Network topology** - The OmniVista Air Control System graphically depicts the location of all Alcatel equipment and third party access points to facilitate device configuration and management.



Alcatel provides invaluable management tools that dramatically reduce the costs of network troubleshooting. As a single trouble ticket can cost as much as \$50 to resolve (this number includes IT staff time, plus a loss

Minimizing the costs of owning and operating a wireless LAN

of productivity), a network the size of the sample enterprise above might spend close to \$20,000 per year in troubleshooting costs. Alcatel's self-healing capabilities and advanced monitoring tools are estimated to avoid 75% of these costs, saving \$15,000 a year in operational expenses.

TCO summary basis

Building type:

Hard (solid) walls and structural (open) ceilings

Building size:

675,000 square feet

Number of wireless users:

1,500

Existing LAN:

Ethernet with Power over Ethernet (PoE) capabilities

TCO Summary		
	Traditional WLAN (Peer to peer)	Alcatel
Investment Costs		
• Site Survey	\$170,000	N/A
• WLAN Infrastructure (a/b/g)	\$337,000	\$225,000
• Point Appliances	\$245,000	N/A
- RF Management		
- Mobility		
- IDS		
- Security		
• Monitoring AP's	\$30,000	N/A
Total	\$782,500	\$225,000
Annual Operating Expenses		
• Salary (for 2 IT staff)	\$200,000	\$50,000
• Trouble ticket costs	\$20,000	\$5,000
Total per year	\$220,000	\$55,000

Minimizing the costs of owning and operating a wireless LAN

The Alcatel difference

Alcatel minimizes capital investments in wireless technology by combining RF management, mobility, security, and intrusion detection in a single platform. The Alcatel solution eliminates the need for separate appliances and monitoring devices, which can account for over 50% of WLAN investment costs. In addition, by leveraging a hierarchical architecture, Alcatel replaces the need for standalone APs, which can reduce infrastructure costs by approximately 33%. Furthermore, by simultaneously supporting multiple bands of 802.11 (a/b/g) in a single infrastructure, Alcatel eliminates the need for dual WLAN infrastructures, which can save up to 50% of total investment costs. Finally, Alcatel uses RF intelligence for fault tolerance, eliminating the need to dual-home all APs to multiple switches. This reduces the switch capacity and cabling required for a WLAN deployment by as much as 50%.

The Alcatel solution reduces deployment and operations costs in several ways. The automated RF intelligence provided by the ACS creates an environment that is self-configuring, minimizing the need for manual site surveys. Furthermore, the Alcatel system is self-optimizing and self-healing, reducing the amount of WLAN trouble tickets and minimizing the level of in-house RF expertise that is required to manage a wireless deployment. Finally, ACS software provides a robust interface that simplifies day-to-day management and increases visibility into the air space for better monitoring and analysis capabilities. With these capabilities, enterprises save hundreds of thousands of dollars in ongoing WLAN operational expenditures every year.

Alcatel offers the highest level of WLAN functionality in the industry with the lowest total cost of ownership. This makes Alcatel the clear choice for enterprises looking to deploy business critical wireless networks.

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