



Meraki Solution Guide: Hospitality

Version 1.0, April 2009

Wireless can meet the needs of travelers, vacationers and hotel staff, and offers opportunities to improve hotel operations and increase customer loyalty. Moreover, it does so at significantly lower cost than wired broadband infrastructure. This document summarizes the requirements for, as well as the unique benefits of, a modern wireless network for hotels and resorts. It also describes how IT professionals can use the Meraki system to meet those requirements.

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www.meraki.com

660 Alabama St.
San Francisco, California 94110

Phone: +1 415 632 5800

Fax: +1 415 632 5899

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1 Growing Demand for Wireless in Hospitality

As mobile devices such as laptops, smart phones, and PDAs have proliferated to become essential accessories for travelers, so has the demand for Internet access increased at hotels and resorts. Wired broadband has been used in the past to meet some of this need, but wired deployments are expensive and limited in their ability to provide connectivity regardless of a guest's location on the property.

As a result, wireless LAN has become a requirement to attract lucrative business travelers as well as a potential differentiator among leisure travelers. Wireless LAN can meet the connectivity needs of travelers and hotel staff, and offers opportunities to improve hotel operations and increase customer loyalty, all at significantly lower cost than wired broadband infrastructure.

In the next two sections of this solution guide, the basic requirements for a hospitality wireless network deployment are examined. Then, ways in which a wireless network can offer additional services to increase customer loyalty, improve operational efficiencies and create new revenue streams are discussed. Finally, the Meraki approach to wireless networking is explored as an efficient, cost-effective way to meet these needs and provide such value-add services.

2 WLAN in Hospitality: Basic Requirements and Benefits

While the benefits of wireless networks in hospitality settings are becoming well understood by savvy hotel and resort managers, achieving these benefits has often been a complex, expensive and labor-intensive undertaking. There are good reasons for this: covering a large, sprawling resort with multiple buildings or a thousand-room hotel is far more difficult than merely putting up an access point in the hotel lobby. Performance, security, reliability and cost constraints add to the challenge.

In this section the requirements of both guests and staff for a hospitality wireless network are explored.

2.1 Reliable, Widespread Indoor and Outdoor Coverage

Today's hotel guests need connectivity throughout the hotel grounds, such as in their room, poolside or in the lobby or conference center, making widespread coverage mandatory. In order for hotel staff to fully utilize the wireless LAN (WLAN), they need to be able to access the network from anywhere on the grounds with their laptop, PDA or a handset enabled with Voice over IP (VoIP). In addition, latency-sensitive applications such as VoIP require a consistent and reliable signal, as well as widespread coverage.

2.2 Serve Multiple Constituencies

The initial reason for deploying wireless at a hotel may be to serve guests. However, in order to be fully utilized, the network will more than likely need to serve several different user groups, each with different needs. Employees require secure access to the corporate LAN. Hotel guests need access to the Internet without inconvenience. Conference attendees need to be able to VPN back to their home office during breaks to check corporate email.

2.3 User Authentication and Guest Access

Required for allowing a single network to serve multiple user groups is the ability to authenticate users and to provide custom levels of access and security to each group. Guests and visitors may only need Internet access while the hotel corporate staff needs full access to the WLAN in order to access secure locations such as share drives and printers.

To provide guest access, management must have the option of allowing either open access to guests and visitors, or requiring authentication. One such authentication option is a guest portal (or "splash page") that requires a guest to enter a password.

There are two typical guest access scenarios that should be supported to give management flexibility:

1. Free access:

Typically, in this scenario, the user is directed to a splash page when first connecting to the network. They may need to accept terms of service to click through and gain access to the web, or they may need to enter a user name and password provided by the front desk.

2. Fee-based access:

The hotel may decide to offer fee-based wireless access. In this case, integrated billing is required, enabling the guest to securely enter credit card information and access the network on a pay-as-you-go basis, or pay for blocks of time with unlimited usage.

In addition, in order for hotel staff to be able to securely use the network, it must properly authenticate user credentials against a pre-authorized list of users.

2.4 High Performance

Hospitality networks must be able to deliver consistent performance even when there are high concentrations of users, for example, in a conference center or meeting room. In addition, voice and video applications are becoming more common, requiring traffic prioritization. Networks must also ensure that a small number of data-hungry guests cannot take over the network, crowding out everyone else.

2.5 Physical Appearance and Security

Wireless access points (APs) are often mounted in publicly accessible locations throughout the hotel grounds, both indoors and outdoors. As a result, it is important that APs can be easily concealed, if required, or that they look aesthetically pleasing if installed out in the open. In some environments, it is also important to be able to physically secure the APs to deter theft or tampering.

2.6 Easy to Deploy and Maintain

Hotels do not normally have large IT staffs to support a complex WLAN deployment or to manage a troublesome network. A wireless LAN needs to be straightforward to install and maintain. Growing a network should not require expensive consultants or time-consuming site surveys. It should be easy to change security policies, upgrade hardware or add or remove administrators. The network should also be manageable remotely from a centralized location, allowing IT administrators to monitor and correct issues with their network from anywhere should the need arise.

2.7 Low Total Cost

As with any business investment, return on the investment must be front and center. Some of the important cost components in building a wireless LAN that need to be managed include:

- Network design and planning
- Installation
- Hardware and software
- Ongoing maintenance

2.8 Future-Proof

Constructing a wireless LAN represents a significant time and resource commitment. It is essential that a WLAN investment last as long as possible. To that end, modular upgrades to the network should be an option. For example, it should be possible to upgrade the APs without upgrading the centralized control system, or to add on a voice over WiFi system without rebuilding the network.

3 Advanced Requirements and Additional Benefits

When a hotel deploys a wireless network, there are benefits other than just meeting the basic expectations of guests. There are several ways in which the network can be leveraged to increase employee operational efficiency. WLAN can also enable hotels to offer services and features that increase the level of service to guests, add value to their stay, increase customer loyalty and offer additional revenue streams.

This section examines ways in which hotel management and employees can use WLAN as a competitive advantage to lower operational costs while simultaneously improving service to guests, increasing customer retention and creating opportunities for new revenue streams.

3.1 VoIP (VoWLAN)

Effective, consistent mobile communications are essential in coordinating a large staff over sprawling grounds and throughout the typical hotel maze of guest floors and underground service tunnels. Cell phones and two-way radios have traditionally been used, but either option presents significant cost and coverage issues. VoIP voice-only handsets, dual voice and data messaging devices and wearable badges offer the benefits of combining voice and data networks with ubiquitous coverage at reduced cost. To utilize effective VoIP mobile access, the wireless network must provide Quality of Service (QoS) functionality as well as mobility for seamless handovers between APs.

3.2 Mobile Room Inspection

One of the greatest causes of annoyance for customers is arriving at the front desk only to be told that their room is not ready. Sometimes the culprit is not a slow or overwhelmed cleaning crew but delayed flow of information to the front desk about which rooms have been cleaned. Use of PDAs and tablet computers can help speed up the room inspection process and provide continuous updates to the front desk about room availability, reducing guest check-in delays.

3.3 Remote Guest Check-in

Guest check-in tends to peak during certain hours, overwhelming front desk staff and resulting in long waits for tired travelers. Roaming staff may check in guests using a wireless-enabled device such as a tablet PC, either in line in the lobby, or, for priority guests, in their rooms. This solution can significantly cut wait times and enable more efficient use of staff. These applications require implementation of 802.11i authentication/encryption for secure wireless credit card transactions.

3.4 Remote Order Taking

Being able to order a drink from a poolside chaise lounge without having to wait in line at the bar can allow guests to fully relax and enjoy their stay with the impression that their every need is being promptly attended to. Point of Sale (PoS) wireless devices such as PDAs or tablet PCs can be used to take orders anywhere, not just poolside, but also by wait staff in restaurants and room service staff in guest rooms. This system improves both the customer experience and staff efficiency by reducing transit time between guest and cash register or kitchen. Similar to remote guest check-in, remote order-taking over a wireless network requires high levels of security including 802.11i.

3.5 Digital Signage

Hotel guests like to be well informed of events happening at the hotel and surrounding areas. The concierge, bellhop and front desk clerks are not always immediately available to provide this information, and printed handouts can run out and are not environmentally friendly. Strategically-located digital signs (widescreen LCDs connected to a PC that wirelessly streams content) in the lobby, elevators and throughout the grounds are a great way to keep guests constantly updated about events, conference schedules, restaurant specials, local weather or any other type of information that guests would value.

3.6 New Revenue Streams

Deploying a wireless network also creates the opportunity to introduce new revenue streams to the organization. Fee-based hotspot access can be provided to guests and/or visitors. In addition, advertising can be sold to appear on the guest portal or on digital signs throughout the grounds, providing direct access to guests for local advertisers and relevant content to guests.

4 The Meraki Approach

In this section we will explain how a Meraki system can help a hotel or resort IT administrator build a robust, secure, and high-performance wireless network. We will begin with an overview of the Meraki system, then examine in further detail how Meraki allows the IT professional to meet or exceed each requirement discussed previously.

4.1 System Overview

Meraki wireless networking systems are designed from the ground up to build high quality, enterprise-grade networks. A Meraki system has two primary components: wireless access points and a web-hosted Cloud Controller.

Wireless APs are deployed throughout the coverage area and communicate directly with users' wireless-enabled devices. Meraki has different APs for different jobs, including 802.11b/g and 802.11n, single and multiple radio APs, as well as indoor and outdoor devices.

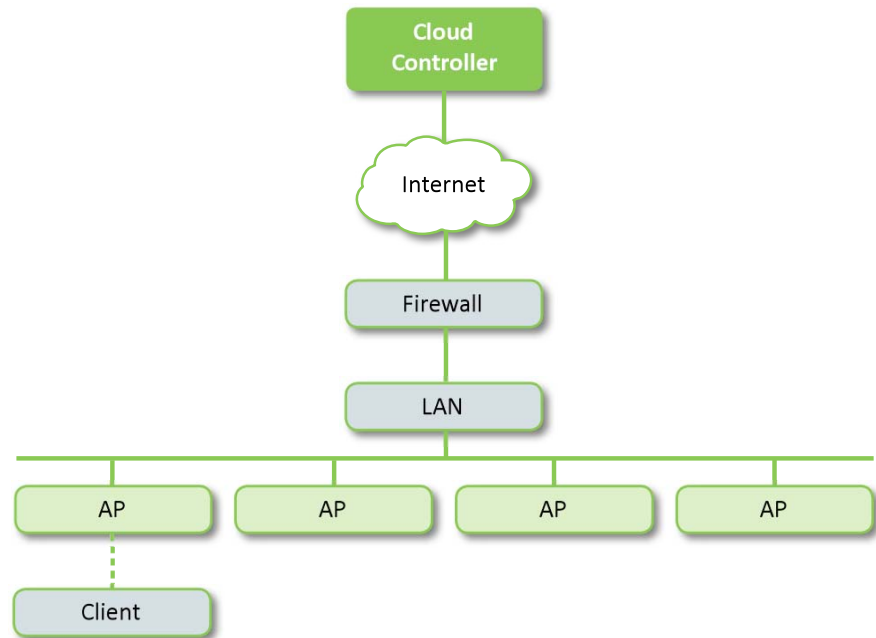
Meraki's web-hosted Cloud Controller lets administrators control, manage, and optimize their network from a centralized location. Unlike older architectures, Meraki's Cloud Controller is provided as a service, eliminating the need for an expensive and difficult-to-install hardware solution.

Figure 1 shows an overview of the Meraki system.

Meraki APs communicate with the Cloud Controller over a persistent tunnel using industry-standard protocols. Administrators log into the Meraki Cloud Controller through a web browser. Over the web, they can access all of the wireless networks in their organization's account.

For more information on the Meraki architecture, see the Meraki Architecture White Paper.

Figure 1 – Meraki Architecture



4.2 Great Coverage

A well-designed wireless network will provide good performance no matter where the client may be. Coverage can be challenging: construction materials, client density, RF noise, and a number of other factors can all effect performance. Meraki has focused on providing a rich set of tools that make it easy for non-experts to build a great wireless network.

4.2.1 Intuitive Visualization Tools

The first step to providing good coverage is making it easy to picture the coverage. Meraki's visualization tools let administrators position access point markers on indoor and outdoor maps. These maps show both the signal strength between the AP and each client as well as the signal strength among access points. When administrators see an area with slow client connectivity, they can do something about it.

4.2.2 Easy to Move and Add APs

If a coverage gap is identified, or a cell's capacity has been reached, Meraki makes it easy to add an access point or reposition existing APs. No special controller or AP configuration is required. Adding an AP is as simple as plugging it in.

4.2.3 Mesh That Works

Mesh networking allows access points to repeat the signal of other access points, eliminating the need to run Ethernet cabling to each AP. Mesh makes it quick to provide enhanced coverage to hard-to-reach areas by just plugging in an AP to power. Meraki's award-winning mesh protocols automatically find the best route back to the wired network, without any manual configuration whatsoever.

4.2.4 QoS and Roaming

Support for QoS and roaming enable deployment of VoWLAN phones to be used across the grounds by staff, wherever there is network coverage, allowing more reliable, lower cost communication between staff members than using traditional cell phone or two-way radio systems.

For more detailed information on how to achieve great wireless coverage, see the Meraki Network Design Guide.

4.3 High Availability

Meraki systems provide high availability in several ways.

First, the hosted approach eliminates the hardware controller, which is often a single point of failure. Instead, Meraki networks run off of a number of globally distributed data centers.

In addition, the Meraki system is engineered to continue running even if the connection to the Cloud Controller is lost. One of the reasons this is possible is that the Cloud Controller is not in the data path. That is, client traffic flows directly from the AP to its destination. In the event of a lost connection, some services, such as remote management, are not available, but client traffic continues to route.

Finally, Meraki networks tolerate access point failures well. Even when deployed in a mesh configuration, fail-over from one node to another occurs nearly instantaneously. Clients seamlessly move to a different AP and continue operation. Administrators can also elect to receive email alerts when failure events happen, allowing them to respond to an issue quickly.

4.4 Serve Multiple Constituencies

It is important to be able to meet the needs of multiple groups of users, including employees, guests, and specialized devices, each with their own set of service parameters.

To meet this requirement, Meraki networks allow administrators to create multiple virtual access points (VAPs). Each VAP has its own identity, including Service Set Identifier (SSID), security, and other policy settings. The table below shows a typical configuration when a hotel needs to support corporate staff, guests, and maintenance staff using wireless VoIP phones.

Service Parameter	Virtual AP 1	Virtual AP 2	Virtual AP 3
Users	Employees	Guests	Phones
Security	Access to LAN	Internet only	Access to LAN
Client bandwidth	Unlimited	5 mbit/s	Unlimited
Quality of service	Normal	Normal	High
Authentication	802.1x / LDAP	Open	WPA2-PSK
SSID	Corp	Guest Access	Corp – Priority

Each Meraki access point can have up to 4 VAPs. Furthermore, VAPs can be created with just a few clicks.

4.5 Robust Security

Hospitality WLAN solutions need to have a broad set of security tools available to match the needs of different user groups within the network. We describe some of the most common configurations below.

4.5.1 Authorized Users

In this approach, particularly useful for hotel guest access, each wireless LAN user receives a unique username and password. The same username and password could be given out to all guests, or they might each use their room number and a specific password to segregate hotel guests from visitors. The user list can be stored on an existing database, e.g., RADIUS, LDAP, or Microsoft Active Directory server. Alternately, Meraki can host the user list. Users provide their login credentials through either a web page portal (hosted by Meraki), or using an industry standard 802.1x client. Support for 802.11i authentication standards enables hotels to deploy handheld credit card authorization devices for remote guest check-in and order taking and ensures security of their guests' personal information.

4.5.2 Pre-Shared Keys

In the traditional approach to wireless security, users are given a common "pre-shared" key. The IT department may put the key on each employee client device, or distribute the key itself. WEP was the first key technology, but it has since been replaced with the more secure WPA2. A major advantage of the pre-shared key approach is that it is simple and quick to implement. However, it can be difficult to maintain with a large or changing user base.

4.5.3 VPN

Business travelers and conference attendees often need to be able to remotely access their corporate networks via VPN. In this approach, all wireless traffic, including employee traffic, is routed outside the firewall. The segregation of WLAN from LAN traffic can be accomplished using VLAN tagging. Alternately, Meraki has a built-in LAN isolation feature, which will prevent wireless clients from routing traffic to LAN addresses.

4.6 Easy and Secure Guest Access

With support for pre-shared key authentication, multiple VAPs, branded splash pages as well as integrated billing services, Meraki makes offering customized, hot spot guest access policies to guests and hotel visitors easy. For example, free access can be offered to guests who authenticate by entering their room number while fee-based access can be offered to visitors with a branded splash page that prompts entry of credit card information. If the hotel does not have their own integrated billing system, Meraki will handle the transactions and send the hotel a monthly check.

4.7 High Performance

Meraki systems are engineered to provide the throughput needed to keep up with a large number of demanding users in an office setting. There are a number of techniques used to provide that performance.

4.7.1 802.11n

The underlying radio hardware has a significant effect on the overall system performance. When high performance is a requirement, Meraki recommends deploying dual-band 802.11n access points, like the Meraki MR14 or MR58.

The following table shows how the radio performance of a dual-band 802.11n Meraki system in a typical mixed-client environment:

Access Point	Client Traffic	Total Client Traffic
2.4 GHz 20 MHz channel	75% 802.11g clients @ 36 Mbps 25% 802.11n clients @ 104 Mbps	53 Mbps
5 GHz 40 MHz channel	100% 802.11n 2x2 clients @ 216 Mbps	216 Mbps
Total traffic (half-duplex)		269 Mbps

For more information on 802.11n, see the Meraki 802.11n White Paper

The use of dual-radio 802.11n APs is one of the keys to getting high performance; however, high quality access points alone are not enough.

4.7.2 Channel Planning and Optimization

Since wireless spectrum is shared among multiple APs and clients, it is important to put different APs on different channels to maximize performance. The Meraki Cloud Controller keeps networks running at peak capacity by automatically finding the best set of channels for each of the APs to use, whether the access points are wired or meshed. Furthermore, since changing channel settings can briefly interrupt client access, Meraki allows the administrator to control when channel changes take place, e.g., only when approved by the administrator or when the office is closed at night.

4.7.3 No Controller Bottleneck

Since Meraki APs do not send data packets through a hardware controller, there is no need to worry about controller backplane or port capacity. In addition, the Cloud Controller does not introduce any latency between the client and its host, which can occur with a hardware-based controller.

For example, imagine a client is talking to a file server in the same building. In a hardware controller-based solution, traffic must flow from the AP to the controller, and then back to the file server. The further away the controller is, the higher the latency. In the Meraki solution, traffic flows directly from the client to the file server.

4.8 Physical Appearance and Security

Unlike servers and switches, access points often need to be mounted in public spaces such as hotel lobbies and guest rooms. Aesthetics can sometimes be an important consideration. Meraki access points are designed to blend into hotel and resort environments. They feature internal antennas, small LEDs, and mounting options that can hide all wiring. They can also be mounted in areas like walls, dropped ceilings, or even in the plenum space, which is sometimes required by building codes. Where physical security is a concern, some Meraki APs can be padlocked to their mount plates, which also prevents the Ethernet cable from being unplugged.

4.9 Easy to Install and Maintain

Hospitality WLAN systems can be difficult for non-experts to design, install, and maintain, leading to expensive and time-consuming implementations. Meraki has gone to great lengths to simplify these processes.

4.9.1 Wiring

Whether APs are mounted on walls, ceilings, or in the plenum space, access point wiring can end up taking a significant amount of time. Power over Ethernet is the simplest and cheapest way to power access points. PoE reduces expensive electrical wiring work by making use of existing Ethernet cabling. All Meraki 802.11n APs support the 802.3af PoE standard.

The use of mesh can also greatly simplify the wiring task. Meraki mesh works out of the box with zero configuration, making it easy to plug in repeaters where there is no convenient Ethernet port. The use of multiple radios on an access point also greatly improves the performance of mesh access points.

4.9.2 Intuitive User Interface

The use of a web-based browser with a streamlined interface means that even non-experts can configure and maintain a Meraki network. There are no rigid configuration files and no need to learn a new command line syntax.

4.9.3 Automatic Upgrades

Finally, unlike legacy systems requiring manual upgrades which may be time-consuming and disruptive, Meraki keeps the system software up-to-date automatically.

4.10 Low Total Cost

As with any business infrastructure investment, it is imperative to consider all the cost elements of a wireless network. The total cost of a wireless network has several components, including the hardware, installation, wiring, training, and maintenance.

Meraki offers benefits in each of these cost buckets. The following table shows where cost savings are possible.

Cost Component	Legacy	Meraki	How?
Controllers/Appliances	\$\$\$	-	Use the cloud
Wiring	\$\$\$	-	No dedicated wiring
Installation	\$\$\$	\$	Plug and play; no controller config
Access points	\$\$\$	\$	Move intelligence from AP to the cloud
Training	\$\$	\$	Intuitive, web-based management
Upgrades	\$	-	Automatic web upgrades

A Meraki solution is an efficient way to deploy wireless throughout an organization.

4.11 Future-Proof

Meraki provides both 802.11b/g and 802.11n access points. Organizations that decide to deploy b/g today have a seamless upgrade path to 802.11n technology, should the need arise. It is also possible to deploy a mixed network, putting 802.11n in areas with high use, and b/g in less heavily trafficked areas.

Meraki also provides an upgrade path beyond 802.11n. One of the key attributes of a Cloud Controller is that it never becomes obsolete. If a company decides to upgrade its access points two or three years down the road, the Meraki Cloud Controller is guaranteed to be compatible.

5 Conclusion

As the desire for travelers to have Internet connectivity continues to grow, wireless is becoming a necessary part of the amenity offering for any competitive hotel or resort. Hotels need widespread, reliable coverage, security, performance, and manageability, all without complexity or additional cost. Meraki's complete wireless LAN offering can help IT organizations deploy hotel wireless quickly, easily, and at a price that is easy on the bottom line.

6 References

1. Meraki Network Design Guide
2. Meraki Architecture White Paper
3. Meraki 802.11n White Paper
4. Meraki Guest Access White Paper

These reference documents are available for download at meraki.com.