

WiFiLAN – A Complete OSS

Technical Whitepaper



Version 1.0

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Introduction

WiFiLAN is a network-based service delivery platform for WiFi hotspots and hot zones installed around the world. It provides the various back-office services needed for managing and operating WiFi network for a central location. These services include authentication, billing, provisioning, network setup and configuration, branded portals, auditing, monitoring, CRM and reporting. WiFiLAN helps hotspot providers and ISPs to minimize their capital expenditure by allowing them to make use of the above services on an as-needed basis.

WiFiLAN makes hotspot management easy and cost-effective by:

1. Providing all-in-one solution for hotspot management
2. Allowing operators to manage remote hotspots from a central location
3. Reducing hardware, software and personnel cost by providing a pay-as-you-go payment model
4. Helping operators easily scale their business without incurring cost of maintaining and managing the backend systems

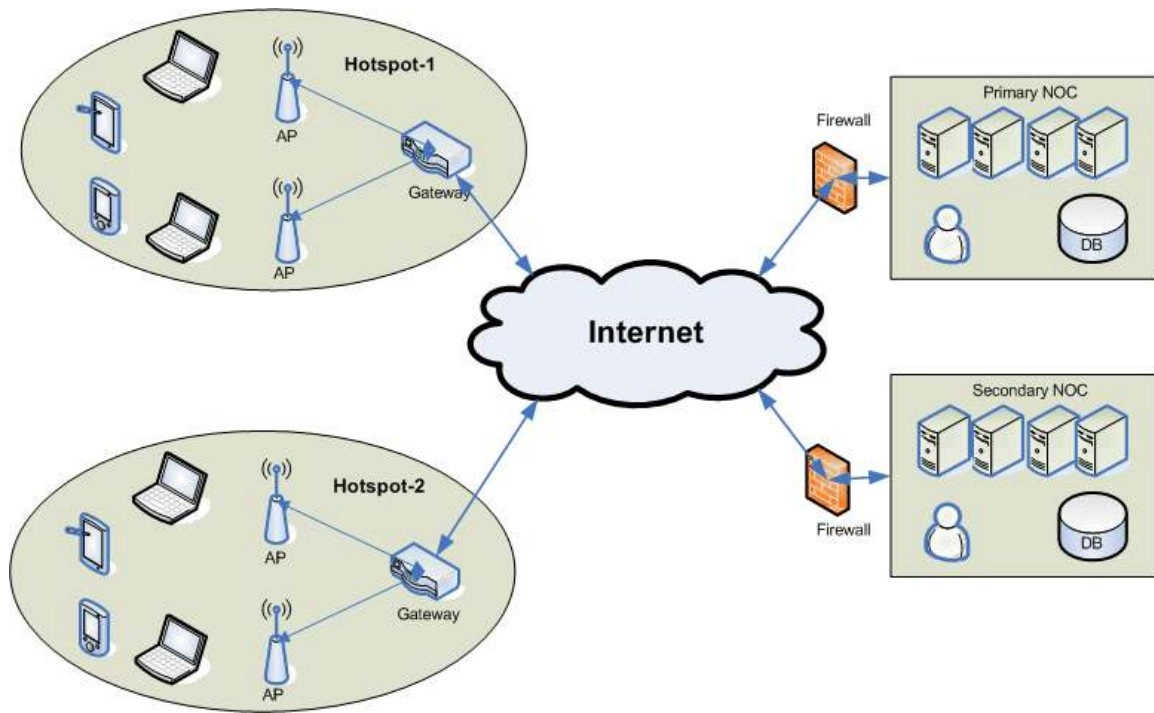
From business perspective, WiFiLAN offers operators range of services to increase their revenues from hotspot venues without incurring high setup and operational cost. Operators can maintain high margins from their hotspots and rapidly scale their business to increase their footprint in the lucrative broadband Internet market.

Scalable and Reliable

WiFiLAN is developed on a scalable, redundant architecture to ensure that the system handles the increase in load as the number of hotspots and subscribers increase. Redundancy is achieved by developing a replication model that allows WiFiLAN to operate on different servers while preserving the consistency of the data. These servers can be located in geographically separate data centers to ensure high reliability and availability of the service. Scalability is achieved by using tiered software architecture that can be segmented on separate servers to improve speed and performance of the servers.

How it works

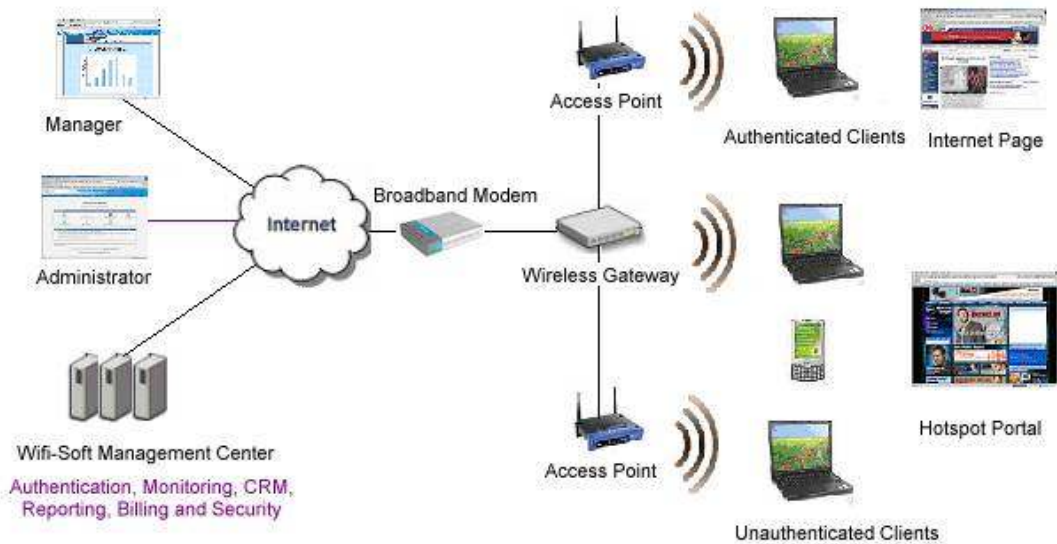
WiFiLAN services run on servers in a NOC (Network Operating Center). The typical hotspot installations using WiFiLAN are shown below.



Hotspot-1 and hotspot-2 are separate hotspots in public venues, each connected to the Internet via a separate broadband connection. The hotspot gateway/controller is configured to communicate with Wifi-soft's primary and secondary NOC (Network Operating Center) over the Internet.

Each NOC runs set of servers to provide backend services to the remote hotspots. The hotspot gateway generates an authentication request to the RADIUS server running in the NOC. The authentication request contains the username and password for the subscriber. The RADIUS server performs authentication and returns back the response along with session parameters. Upon receiving a successful response, the gateway starts a new session for the subscriber.

The gateway/controller may be connected to one or more access points (APs) to increase the coverage area and resides on a publicly routable IP address. The gateway generates authentication requests, maintains user sessions and terminates them when the user is disconnected from the network.



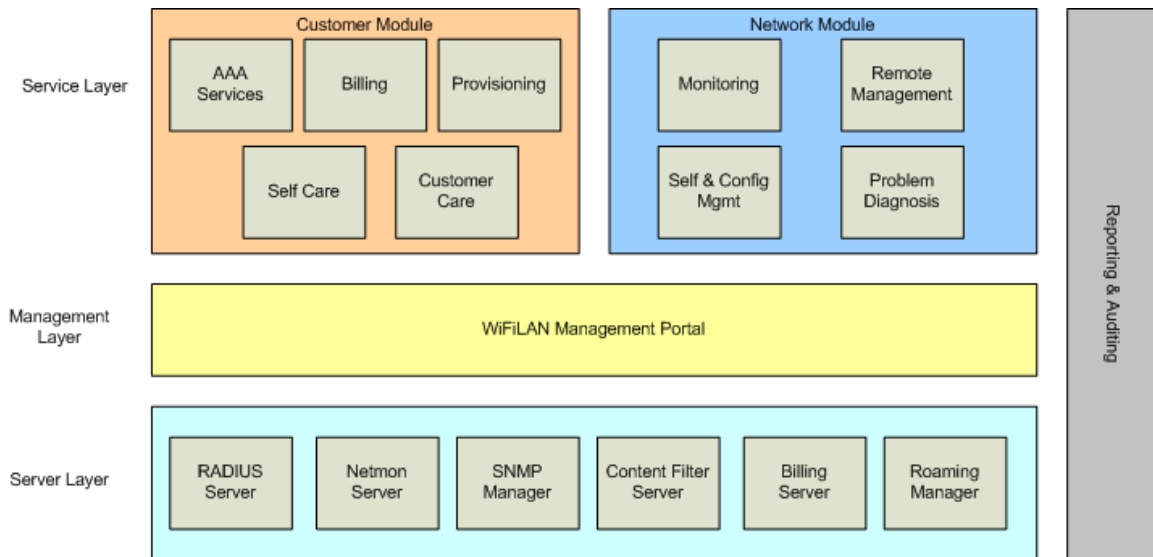
The gateway communicates with Wi-FiLAN servers over the Internet. Since the authentication information is passed over the Internet, we usually recommend using encrypted schemes like CHAP, MSCHAP for authentication.

Wi-FiLAN uses a combination of primary and secondary NOC to ensure that the customers get reliable back-office services. The hotspot controllers/ gateways are configured to automatically switch over to the secondary NOC in case the primary goes down. This failover mechanism ensures high availability and reliability.

Each NOC is protected by a firewall and is constantly monitored for any security breaches. Administrators manage the NOC services using the Wi-FiLAN management portal. The billing server inside the NOC interfaces with the merchant account gateways like Authorize.Net or PayPal to carry out credit card billing transactions.

Wi-FiLAN Architecture

Wi-FiLAN is based on a tiered architecture as shown below. The service layer contains two modules – Customer Module and Network Module. The customer module is responsible for providing various services like authentication, billing, customer care to the end users. The network module is responsible for managing and monitoring the network elements of a Wi-Fi network. Both these modules make use of the management layer that provides a web-based interface to the underlying server layer.



The server layer is composed of various WiFiLAN servers that handle the requests from the service and management layer. The RADIUS server provides Authentication, Authorization and Accounting (AAA) services to the customers. The Netmon server is responsible for monitoring individual network elements. SNMP manager handle remote network management. Billing server handles billing and payment processing for the customers. Content filtering server (optional service) is used at hotspots to filter out unwanted content. WiFiLAN also supports roaming with other service providers using the Roaming Manager.

The web-based management layer provides a secure way of managing and configuring the servers. Administrators can create new subscriber accounts, add or modify hotspot settings, track problem tickets, run billing transactions, design customized, branded portals and generate various reports using this interface.

Reporting and auditing functions are available across all the layers. Administrators can generate over 35 different reports either in graphical or tabular format. Each report can be saved to a file or printed for future reference.

System Requirements

Since WiFiLAN is a hosted service, operators do not need any special hardware or software to use WiFiLAN. Any PC with an Internet browser and an Internet connection can access WiFiLAN.

WiFiLAN Benefits

WiFiLAN has integrated a wide range of features in a single management console. This makes the task of managing remote WiFi network really easy thus allowing the wireless operator to easily scale their business.

Operators reap instant benefits from WiFiLAN features either by increasing their revenues or saving in operational and setup costs. Some of the major advantages of WiFiLAN features are highlighted below:

#	Feature Description	Advantages
1	Subscriber authentication	<ul style="list-style-type: none"> • Centralized user management saves time and money • Reliable and efficient service improve customer satisfaction
2	Flexible billing plans	<ul style="list-style-type: none"> • Design billing plan to suit your business needs • Introduce new offers and services without hassles • Improve revenues by offering range of purchase options to the customers
3	Custom, branded portals	<ul style="list-style-type: none"> • Promote your brand • Improve visibility and market presence • Click and customize interface saves time and efforts • Increase revenues through advertisements
4	24x7 network monitoring	<ul style="list-style-type: none"> • Improve network reliability by round-the-clock monitoring • Fix network problems before an angry customer calls • Detect and fix network problems before failure occurs
5	Remote network management	<ul style="list-style-type: none"> • Centrally manage dispersed network hardware • Save cost by avoiding truck rolls or site visits • Improve operational efficiencies
6	Customer self-care portal	<ul style="list-style-type: none"> • Save call center cost • Improve customer satisfaction
7	Detailed reports and audits	<ul style="list-style-type: none"> • Gain in-depth visibility into operations • Helps make timely improvements in hotspot service • Streamlines billing processes
8	Network data repository	<ul style="list-style-type: none"> • Avoid loss of installation and network data • Improve time-to-fix by providing accurate information to network team
9	Content filtering	<ul style="list-style-type: none"> • Avoid unwanted content at public hotspots • Ensures that brand image is not tarnished by errant web surfer

10	Automated User provisioning	<ul style="list-style-type: none"> • Increase subscriber signups • Reduce call center cost • Improve customer satisfaction
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Feature details

Fully automated registration

WiFiLAN provides a fully automated user registration process to help you cut down the cost of acquiring new customers. Our online signup process seamlessly integrates with a merchant account processor of your choice thus allowing your customers to subscribe for your Internet service using their credit cards.

Unlike our competition, we provide you an option to use your own merchant account so that the funds get deposited directly in your account. The registration process is invoked from the splash page thus allowing new users to signup without any human intervention.

Branded Captive portals

Branded splash pages are necessary to establish a brand image and give a professional look to your business. With WiFiLAN, you can design a professional looking splash page with your custom logo and images with a click of mouse. The click-and-customize feature allows you to select a page layout from a list of templates and then customize the page with your company logo, images and custom text.

The changes are reflected on the live system immediately thus saving you the time and efforts of designing your splash pages and maintaining them on your web server.

24x7 Network Monitoring

Many outdoor installations are prone to failure due to various natural and unnatural causes. A lightning strike can damage your AP radio or strong wind may change the direction of your antennas. A workman may inadvertently cut the cable that connects your AP to your gateway. All these failure are generally found only when an angry customer calls the call center. In worse case, the operator loses revenue since the customers do not receive coverage in their area.

WiFiLAN provides an integrated network monitoring service that monitors all network elements round the clock. The service tunnels through the hotspot controller to monitor the access points installed inside the network. All monitoring results are displayed on a central console in WiFiLAN so that the administrator gets a real-time view of all the remote networks.

In short, network monitoring helps your improve the reliability and uptime of your network and thus directly affects the bottom line of your business.

Reporting

WiFiLAN provide over 35 different reports for administrators to gain visibility into their hotspots and manage their business. Our reports are mainly categorized into four categories:

1. User reports
2. Network reports
3. CRM reports
4. Billing reports

<h3>Usage Reports</h3> <ul style="list-style-type: none">Number of session, unique usersUsage per day-of-the-weekUsage per hour-of-dayBandwidth usageCustomer stickiness	<h3>Network Reports</h3> <ul style="list-style-type: none">Reliability of devicesBandwidth usage, traffic reportSignal quality, SNRChannel usage
<h3>CRM Reports</h3> <ul style="list-style-type: none">Ticket SummaryProblem trend analysisAgent performance & productivity	<h3>Billing Reports</h3> <ul style="list-style-type: none">Revenue by date, plan or locationCredit reportAccount receivableExpensesPrepaid and Promotion Usage

The user reports display the usage statistics and user trends for the hotspots. Network reports display live network status (monitoring details), reliability and other important technical information about the wireless network. CRM reports track the statistics on problem tickets and helps analyze problem trends. Finally the billing reports display summary of billing data including revenue by location, revenue by plan, refunds, fraud analysis and promotional statistics.

Customer care portals

Support calls are expensive. In many cases, the customers call the call center when they are unable to solve the problem or lack the information to solve the problem themselves. These calls can be reduced if the customer is given correct information and control to manage their account themselves.

WiFiLAN provides range of tools along with self care portals that allow customers to manage and view their account information on their own. This reduces the support calls resulting in lower call center cost and also improves customer satisfaction.

Prepaid Coupons

Many small public venues like cafes or restaurants prefer to use prepaid coupons to control access to their hotspots. The coupons can be sold at the counter or distributed to the clients of the location on a purchase. The location owners need options to customize these coupons based on time duration, validity period or bandwidth usage.

WiFiLAN provides a very flexible prepaid generation module. Operators can generate unlimited prepaid coupons with different usage restrictions such as usage duration, validity period, number of sessions or bandwidth usage. For example, a hotel owner can generate 4-hour prepaid coupons that are valid for 3 days. Or, a marina owner can generate prepaid coupons that are valid between 1st May and 31st July.

WiFiLAN also generates branded prepaid cards in PDF format that can be directly printed using a normal printer. An example of the card is shown below:



Conclusion

With rapid growth of wireless enabled devices along with ever expanding need of people to remain connected with the Internet, the hotspot operators and service provider have a huge opportunity to increase their revenues in the coming years. However, they need a robust, reliable and feature-rich back-office to help them scale their business while keeping the operational costs low.

WiFiLAN offers a complete, integrated and reliable operational support system to help the operators improve their operational efficiency, reduce cost and increase their hotspot revenues. WiFiLAN is device agnostic and provides wide range of backend services including authentication, billing, reporting, network management, monitoring, branded portals and optional customer care.

Over 350 hotspots around the world use WiFiLAN to improve their Internet service and maximize their returns. Join them and find out why they are a happy customer of WiFiLAN.