

WIFILAN

Cloud WiFi OSS/BSS



Technical Overview of

WIFILAN OSS/BSS

WiFiLAN – Centralized RADIUS & Billing Solution

Introduction

WiFiLAN is an OSS/BSS software or service for managing public Wi-Fi hotspots and enterprise networks. WiFiLAN is specially designed for managing public Wi-Fi networks and incorporates all features necessary to operate remote hotspots from a central console.

This solution is ideal for any network operators who want to control wireless access through captive portals, control guest access, monetize and control remote networks through a single management interface.

WiFiLAN offers range of services which include access management, RADIUS service, captive portals, bandwidth management, policy control, user management and provisioning, problem tickets, hotspot billing, voucher management, social media logins, LDAP/AD and GSuite integration, NMS and monitoring, partner management, advertisement and much more.

WiFiLAN can be either installed in private or public cloud infrastructure. When deployed in public cloud, the network operator will be provided web-based access to manage the networks. The private instance provides the flexibility to host the software in private data center and also whitelabel the software as per the customer needs.

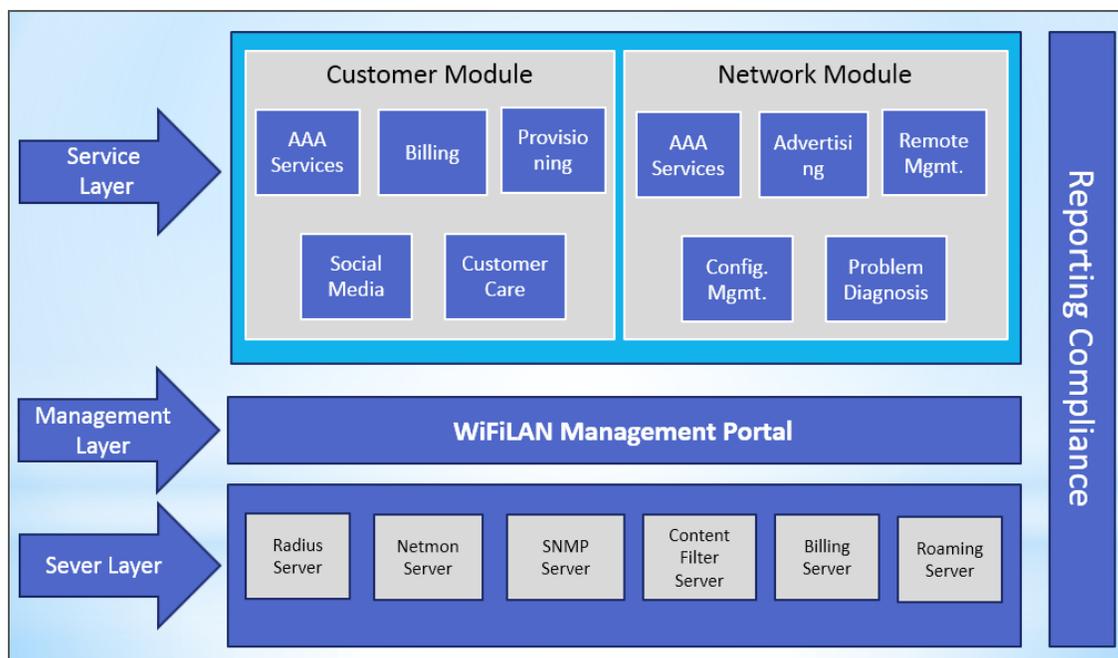
WiFiLAN is a multi-tenant software i.e. it allows multiple operators to use the same instance. Each tenant will have separate account for access and data for each tenant is stored and retrieved separately.

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.

WiFiLAN Architecture:

WiFiLAN is built on a tiered architecture which allows it to scale vertically and horizontally. The service layer consists of various servers like RADIUS server, billing, monitoring, advertisement, etc. There is a web-based management layer that runs on the server layer. Finally there are various services that run on the management layer. The services are divided into two parts – customer module and network module. The customer module handles various customer related services like authentication, billing, provisioning, self-care and more. The network module handles NMS services like configuration management, firmware, notification and alerts, monitoring and more. Finally the reporting and compliances runs across various sections to provide a complete visibility into the system.



WiFiLAN - Features

User Authentication

WiFiLAN provides end-to-end user authentication service for both public and private networks. It provides a RADIUS service to authenticate users using username-passwords, vouchers, social media credentials, mobile numbers, 802.1x, Active Directory and various other methods.

Cloud Managed Hotspots

WiFiLAN provides complete WiFi hotspot management service for managing remote hotspots from a central console. The hotspots can be organized under various tenants and each hotspot can be configured, managed and monitored separately. All services needed to run hotspots such as captive portal management, authentication, hotspot billing, user management, configuration management are handled through WiFiLAN

Branded Captive Portal

WiFiLAN allows administrators to design and host captive portals for each hotspot. The captive portals are designed using a simple web form by selecting or uploading the contents of the web portal. Each portal can be designed with multiple login methods, customized logo, images, text and branded to look-and-feel for the customer. WiFiLAN also provides web space to host these portals.

Login Methods

WiFiLAN captive portal provides options to setup multiple login methods. The login methods are various schemes through which the user can authenticate with the system. Some examples include username-password, vouchers, mobile number/OTP, social media credentials, data capture, LDAP/AD credentials, etc. No separate programming is required to integrate these login methods with the captive portals.

Hotspot Billing

WiFiLAN Cloud provides multiple billing options for hotspot operators to monetize their Wi-Fi setup. These options include credit card billing, PayPal, prepaid/access codes, PMS/Folio integration, usage based billing, tiered pricing and many more.

Vendor Agnostic

WiFiLAN authentication and billing services are vendor agnostic i.e. they are designed to work with different vendors like Cisco, Ruckus, Aruba, Mikrotik, Nomadix, etc. This provides the operators flexibility of choosing the network controllers as per their business needs and budget. WiFiLAN will provide a single interface for operators to manage heterogenous networks.

Please note that the NMS features like configuration management, monitoring, NMS are not available for other vendors. These features are designed to work only with Wifisoft controllers and access points.

Vouchers

WiFiLAN provides various options to setup and manage vouchers or prepaid coupons. Administrators can create multiple batches of vouchers and export them into printable (PDF)

or distribution (EXL) formats. The vouchers can be designed based on time, bandwidth, speed and device restrictions.

Social Media Integration

WiFiLAN provides a seamless integration with social media networks like Facebook, LinkedIn, Google, Instagram and Twitter. The administrators can enable these options on the captive portals so users can authenticate themselves using their social media credentials.

WiFi Advertisement

WiFiLAN comes with built-in ad management and delivery system for WiFi hotspots. This feature allows administrators to run advertisement campaigns and monetize their WiFi hotspots using advertisements. Both image and video ads are supported. Various options are provided to deliver the ads to right users or right locations.

Policy Management

WiFiLAN comes with a full-featured policy manager which enforces various policies on the network users. These policies include restricting time, data or speed access, controlling number of devices, time of days access and allowing or blocking access to certain sites.

AP Controller

WiFiLAN comes integrated with a complete access point management solution. This architecture is based on the cloud-controller model in which all the remote access points are managed and controlled from the cloud-based controller. This eliminates the need to have a physical hardware controller at the site and provides unmatched scalability and flexibility in network implementation.

Reporting & Analytics

WiFiLAN provides extensive reporting and analytics on the data collected from the end users. Both real-time and historical reporting is provided. WiFiLAN provides multiple reports for viewing the bandwidth consumption, data usage, usage trends, revenue reports, social media analytics and many other reports.

WiFiLAN– Benefits

Centralized Hotspot Management

WiFiLAN Cloud provides a simple yet powerful hotspot management in the Cloud. Manage thousands of hotspots centrally without having to incur any extra cost of software, server hosting and maintenance.

Vendor Interoperability

WiFiLAN Cloud uses hardware agnostic design thus allowing operators to use wide range of hotspot controllers and access points depending on their requirements and budget.

Saves Operational Cost

WiFiLAN Cloud provides tools needed to get a new hotspot operational in hours not days. Custom splash pages can be developed using pre-designed web templates within minutes thus saving on programming and design cost.

Wi-Fi Monetization

Operators can monetize their guest access networks using multiple billing options available in WiFiLAN. Implement credit card or PayPal billing with flexible billing plans based on time or bandwidth usage.

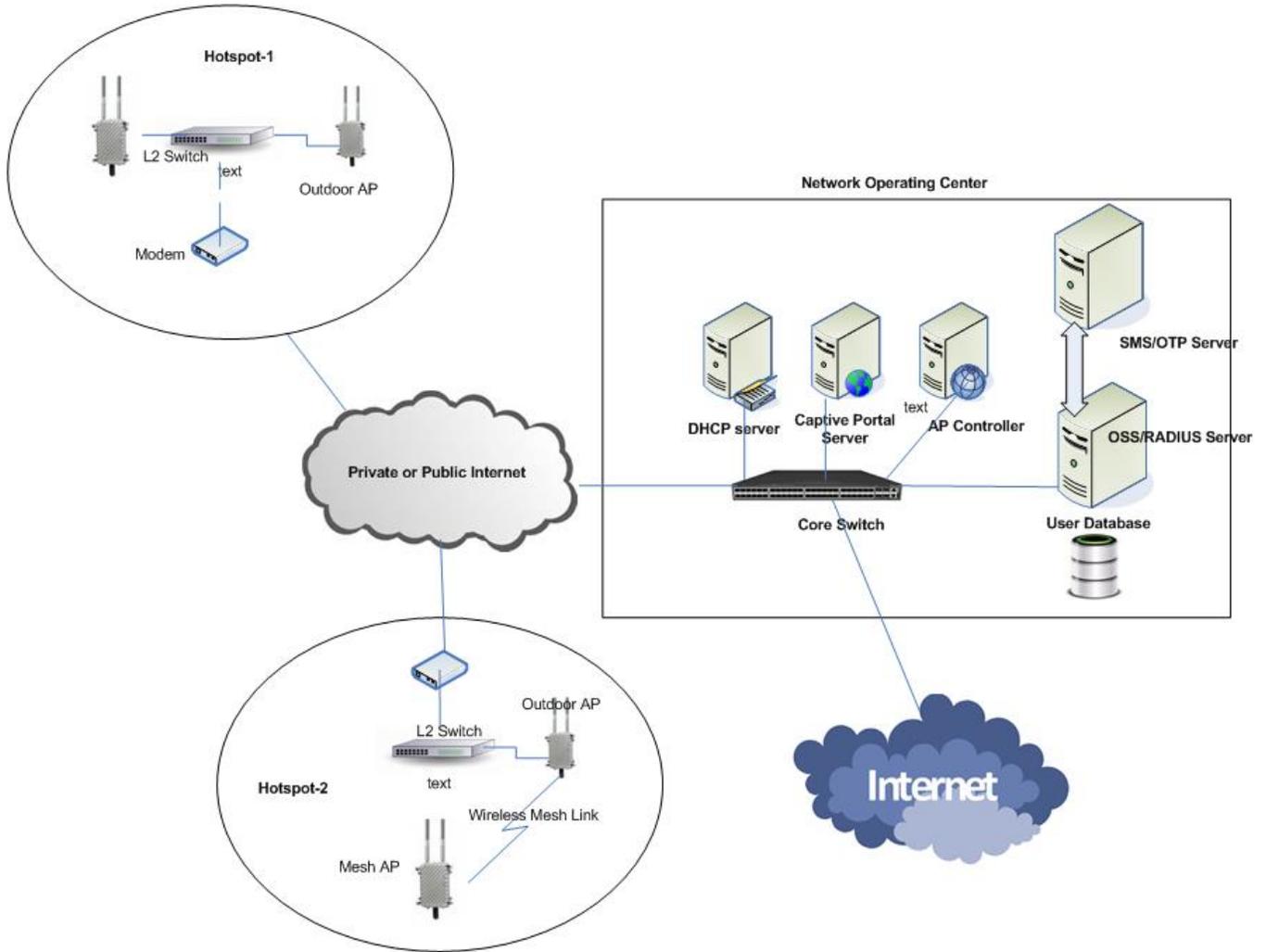
Flexible and Scalable

WiFiLAN Cloud's software architecture makes it extremely customizable and scalable cloud solution. Operators managing hundreds of hotspots need a solution that can be customized to their business needs.

High Availability

WiFiLAN Cloud promises high availability and redundancy to ensure your hotspots operate reliably 24 hours a day, 7 days a week.

Deployment Architecture



AP Controller

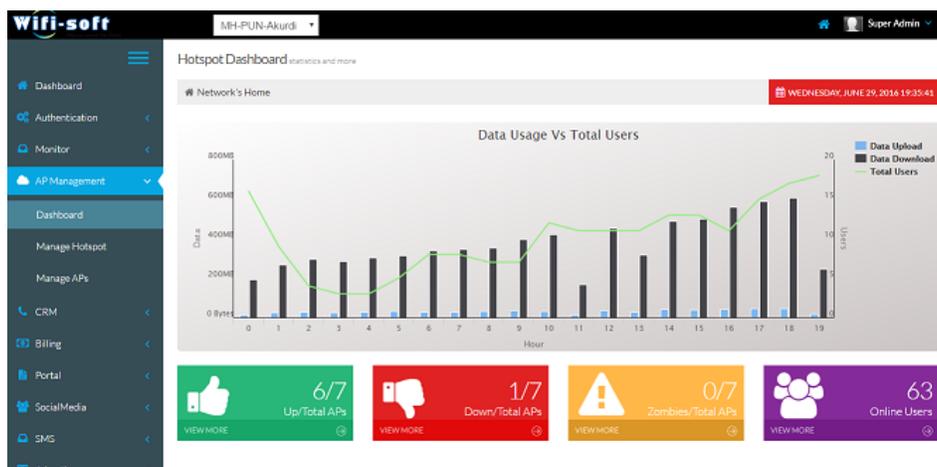
AP Controller is a cloud-based, scalable controller that is installed on a server in the NOC (Network Operating Center). The controller is responsible for provisioning, configuring, managing and monitoring the remote access points. Each access point can be automatically provisioned in the controller and its settings can be adjusted in the central dashboard.

The access points are designed to communicate with the controller periodically through a secure tunnel and report the statistics of its health and end users. This data is displayed to the administrator through various reports.

The controller is designed to manage any WifiSoft branded access points – indoor or outdoor.

The AP controller is responsible for wide range of functions such as

- 1. AP discovery and provisioning**
- 2. AP Management**
- 3. Configuration Management**
- 4. Firmware upgrades**
- 5. RF Management**
- 6. Automatic channel selection**
- 7. AP monitoring and built-in NMS**
- 8. Usage and bandwidth statistics**
- 9. Events and Alarms**
- 10. Wireless Meshing**
- 11. IPv6 compatible**
- 12. Traffic analysis**
- 13. Device profiling and identification**



#	Hotspot Name	Status	Access Points	Online Users	Date Created	Action
1	Turnkey	100% UP	Total: 3 2 UP 1 DOWN	0	2015-12-10 13:19:22	[Action]
6	Turnkey A13	100% UP	Total: 1 1 UP	0	2016-02-15 05:22:15	[Action]
12	Turnkey A4	100% UP	Total: 1 1 UP	0	2016-02-15 06:37:46	[Action]
14	Turnkey A6	100% UP	Total: 1 1 UP	0	2016-02-15 06:46:27	[Action]
20	Turnkey B11	100% UP	Total: 1 1 UP	0	2016-02-15 06:23:49	[Action]
21	Turnkey B12	100% UP	Total: 1 1 UP	0	2016-02-15 06:26:13	[Action]
23	Turnkey B14	100% UP	Total: 1 1 UP	0	2016-02-15 06:35:34	[Action]
24	Turnkey B15	100% UP	Total: 1 1 UP	0	2016-02-15 06:37:14	[Action]
26	Turnkey B2	100% UP	Total: 1 1 UP	0	2016-02-15 05:38:34	[Action]
29	Turnkey B5	100% UP	Total: 1 1 UP	0	2016-02-15 05:57:36	[Action]

AAA Server

WifiSoft provides a highly scalable and flexible AAA solution for authenticating and accounting the user login sessions on WiFi hotspots. RADIUS protocol is the most widely used communication mechanism for the ISPs and service operators. The RADIUS server is responsible for the following activities:

1. Authentication of users/devices on the WiFi hotspots
2. Enforcing login policies that control the time, data and speed users get during each login
3. Authorizes users to access certain services e.g. Internet
4. Tracking the session records like MAC address, IP address, session statistics, upload and download bytes, etc
5. Enforces attributes based restrictions on the end users

The AAA server is highly scalable to accommodate millions of user logins an hour. The server can setup in failover and redundant mode to ensure maximum uptime for the end users.

The AAA server support wide range of authentication schemes like CHAP, PAP, MSCHAP, EAP and many others that are used for securing the communication between the AAA server and remote devices.

Captive Portal

WiFiLAN OSS/BSS has a very comprehensive captive portal system which allows administrators to define wide range of captive portals. Our solution offers flexibility of configuring a captive portal for each hotspot and multiple options on the captive portal for branding and advertisements.

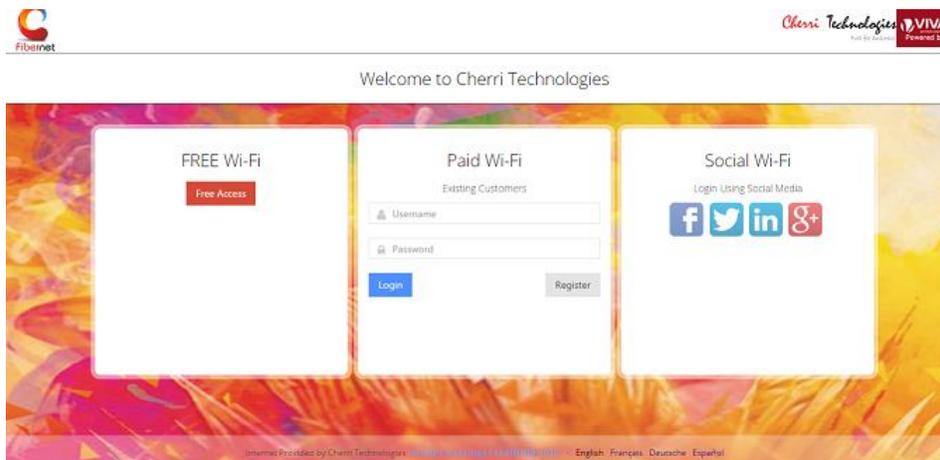
Each captive portal offers option to set logo, branding, images, terms & conditions so the administrator have a full control on branding of the service.

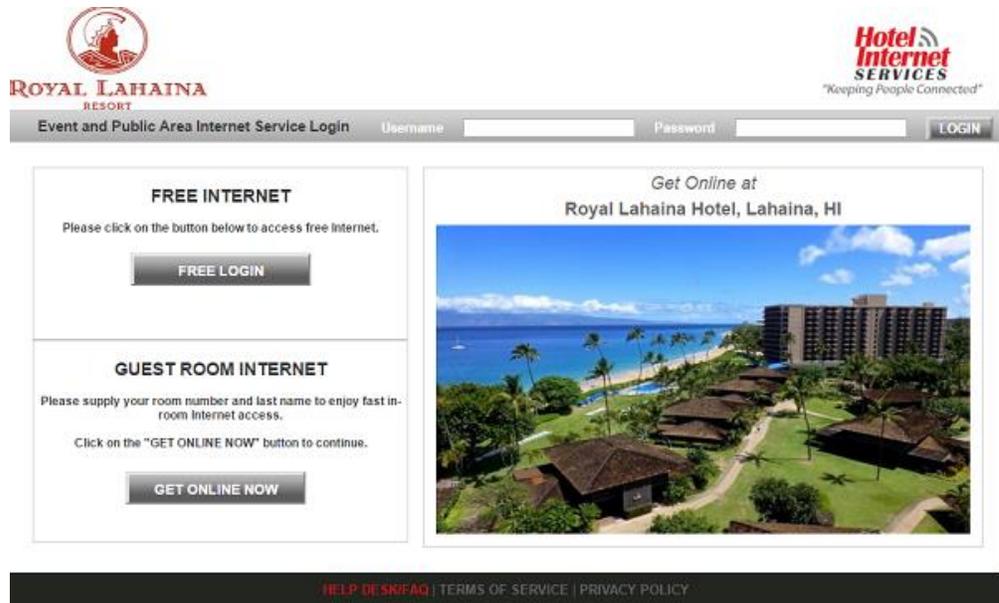
We also help can build custom captive portals based on requirements of the project and host them on a secure web server.

Our captive portal system offers following options

1. **PAID (credit/debit/Bank Transfer/Wallet)**
2. **FREE ACCESS (click-through / T&C access)**
3. **SMS / OTP (Requirements for TRAI/DOT compliance)**
4. **PREPAID VOUCHERS**
5. **SOCIAL MEDIA (Facebook, Twitter, LinkedIn, Google, Instagram)**
6. **DATA CAPTURE**
7. **USERNAME/PASSWORD**
8. **ADVERTISEMENT BASED ACCESS**

Here are some examples of the captive portal





Subscriber Management

WiFiLAN OSS/BSS provides the user management module. This module allows administrators to manage users, track usage, enforce restrictions and generate reports for each individual hotspot.

WiFiLAN OSS/BSS provides a comprehensive API for provisioning the users from the captive portal and interfaces with the billing module to charge the users for bandwidth usage. Administrators can view detailed session history and bandwidth usage for each user.

Bandwidth Management

WiFiLAN OSS/BSS provides comprehensive bandwidth management capabilities for controlling the bandwidth and duration for each users Internet session. Bandwidth management is one of the important elements for any public network since it ensure fairly allocation of bandwidth and provides a good browsing experience to the end users. WiFiLAN allows administrator to define bandwidth rules and policies using simple web interface. These restrictions can be enforced on user groups or individual users thus allowing administrators to finely tune the bandwidth policies

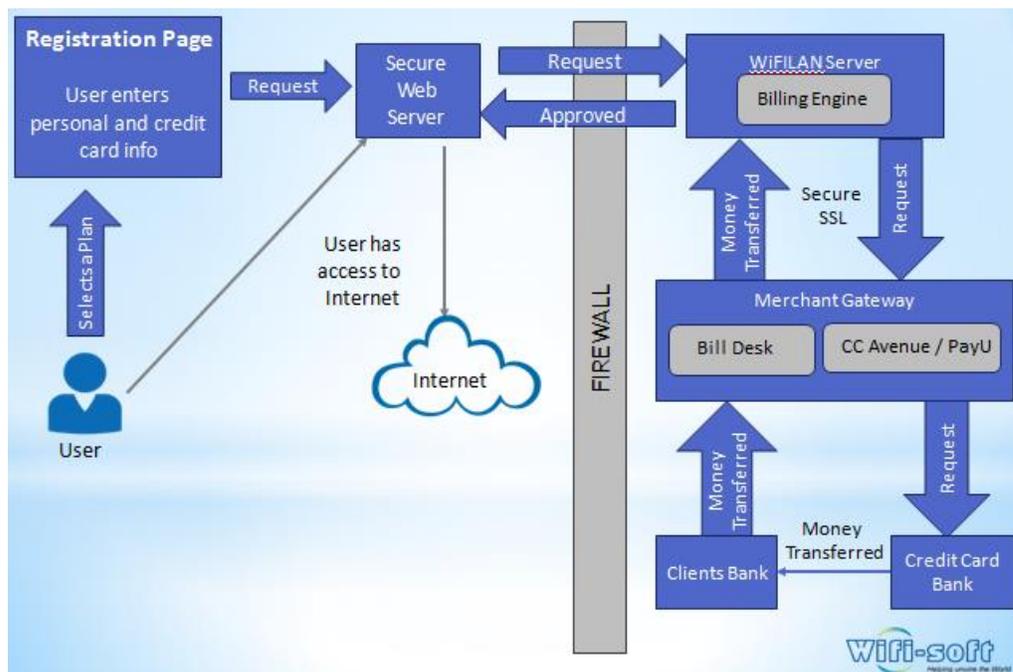
Following are some examples of bandwidth management

1. Provide 512 Kbps Free Internet session for limited time (e.g. 1 hour)
2. Capping users to 1 GB per day
3. Allowing users to purchase data based plans e.g. 1 GB, 5 GB with validity period

4. Allowing users to purchase unlimited plans with restricted speed e.g. 512 kbps
5. Restricting users to only 2 devices
6. Allowing users to login from certain devices concurrently
7. Restricting users to specific hotspot

Payment Gateway Integration

WiFiLAN offers a comprehensive payment/billing solution for public hotspots. This includes online payment using credit / debit / bank transfer / wallet / PayPal and other payment methods.



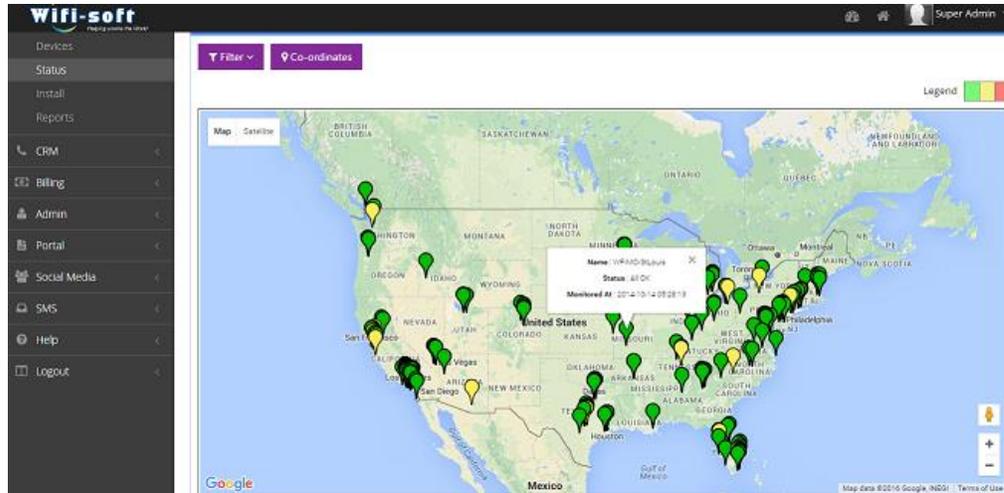
We also offer feature-rich voucher management system for prepaid billing. These vouchers can be fully customized and branded. Each voucher can be tracked using the batch and serial number to generate an audit trail.

Network Management Solution (NMS)

WiFiLAN and AP controller have a built-in NMS solution that allows administrator to monitor the status of the complete network from a single console. The NMS system is designed to seamlessly work with the remote access points and learn the current health of the network. It constantly keeps track of the critical RF parameters, online users, the data throughput, uptime and other important indicators of the WiFi hotspot.

The NMS system comes with an integrated alerting and performance tracking system. The alert system will immediately send email/text notifications to the administrators

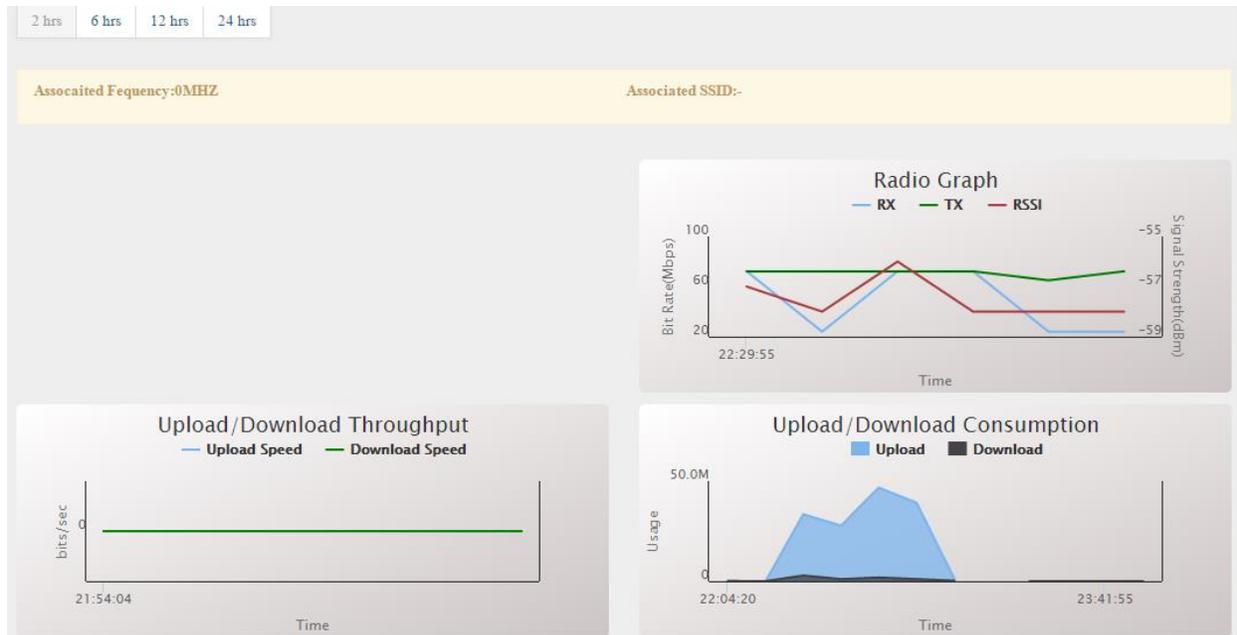
when any remote network or APs goes down. Each AP also periodically communicates with the NMS system and reports all the performance metrics to the central dashboard. This allows the admin to monitor the overall health of the network and fine tune the network parameters as and when required.



Wireless Clients

10 records per page Search:

	MAC Address	IP Address	Username	Rx Bit Rate	Tx Bit Rate	Checkin Time	RSSI	AP Name	Status
+	30:C7:AE:08:14:A4			72.20 Mbps	72.20 Mbps	2016-10-29 23:47:11	-61 dBm	Tumkey A10	Connected
+	84:10:0D:BC:2E:FC	10.68.181.0	84:10:0d:bc:2e:fc	6 Mbps	26 Mbps	2016-10-29 23:47:11	-72 dBm	Tumkey A10	Online
+	A8:66:7F:42:AE:E2	10.68.181.6	a8:66:7f:42:ae:e2			2016-10-29 23:47:11		Tumkey A10	Online
+	90:B6:86:F1:6C:0D	10.68.181.2	DC_20161029_572583@tumkey	24 Mbps	130 Mbps	2016-10-29 23:47:11	-55 dBm	Tumkey A10	Online
+	C8:1E:E7:D5:FF:93	10.68.181.4	c8:1e:e7:d5:ff:93	58.50 Mbps	43.30 Mbps	2016-10-29 23:47:11	-72 dBm	Tumkey A10	Online



System Logs

WiFiLAN also is responsible for storing the system and user logs in a central repository. The WiFiLAN system is integrated with the storage server which will be responsible for storing and archiving user logs, system logs, AP monitoring status, user browsing logs and session statistics.

All logs are properly archived and stored for record keeping on the servers. Administrator can easily access the logs when required and provide the information to law enforcement agencies.

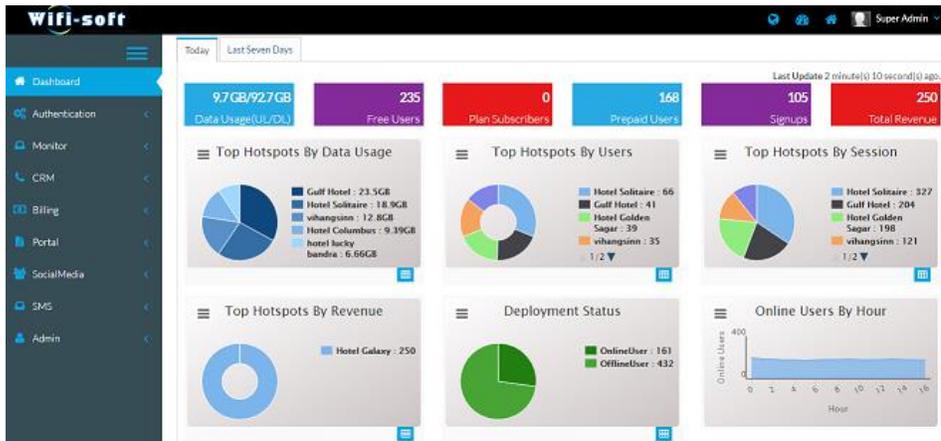
Reporting and Analytics

WiFiLAN provides extensive reporting and analytics of the data collected from the WiFi hotspots and user. Over 75 different reports are integrated in the WiFiLAN system that provides administrators a comprehensive view of the network.

Many reports can be viewed in summary or detailed view. The summary view provides a graphically summary of the data thus allowing administrators to view the overall statistics of the hotspots. The detailed view provides low-level details of the data and provides an option to the admin to export the data for further analysis.

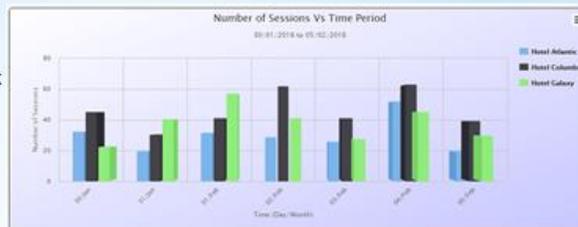
#	Report Name	Summary View	Detailed View	Description
1	Online Users Report	Click here	Click here	This report displays location wise and detailed information about login users.
2	Accounting Report	Click here	Click here	This report displays location wise and detailed information about accounting details.
3	Signup Report	Click here	Click here	This report displays location wise and detailed signup details.
4	Unique Users Report	Click here	Click here	This report displays location wise and detailed Unique users details.
5	Session Report	Click here	NA	This report displays location wise and Session details.
6	Day Wise Average Traffic Report	Click here	NA	This report displays location wise Session Traffic over Days.
7	Average Traffic Distribution over Duration Report	Click here	NA	This report displays location wise Session Traffic over Hours.
8	Session Traffic Length Insight Report	Click here	NA	This report displays location wise Session Traffic Length Insight.
9	Device Brand Distribution Report	Click here	Click here	This report displays location wise and detailed device vendor count.
10	Device Type Distribution Report	Click here	NA	This report displays location wise device type and their count.
11	AAA Report	Click here	NA	This report displays location wise Summary.

Here are some examples of reports available



Usage Report

- Number of Sessions per day/week
- Unique Users
- Hourly Usage
- Social Media Analytics
- Client browsers, devices



Network Report

- Bandwidth usage, traffic report
- Reliability Report
- Traffic Report
- NMS Report



Billing Report

- Revenue by date, plan and location
- Prepaid code revenue
- Credit Report
- Account receivable
- PMS Reports

Social Media Report

- Gender Distribution
- Dwell Time Report
- Visitor Logs
- Daily Traffic Distribution By Time



The 'Social Media Overview' chart is a stacked area chart showing the number of visitors from four social media platforms: Facebook (blue), Google+ (black), LinkedIn (green), and Twitter (orange). The x-axis represents dates from 01 Jan 2018 to 01 Feb 2018. Facebook consistently shows the highest number of visitors, with several peaks reaching approximately 150. Google+ and LinkedIn show smaller, more fluctuating visitor counts, while Twitter has the lowest and most stable visitor numbers.



The 'Dwell Time - Daily Trend' chart is a stacked area chart showing the number of visitors categorized by dwell time intervals. The x-axis represents dates from 01 Jan 2018 to 01 Feb 2018. The y-axis represents the number of visitors, ranging from 0 to 200. The categories are: Less than 5 min (blue), 5-15 min (black), 15-30 min (green), 30-45 min (yellow), 45-60 min (red), and 60 min or more (purple). The 'Less than 5 min' category is the most prominent, with peaks reaching about 150. Other categories show much lower visitor counts, with '60 min or more' being the least frequent.

WiFiLAN also provides automated reports via email to be delivered to the administrator so they will remain abreast of the status of the network, usage, performance metrics, bandwidth usage, user registrations and other relevant data via email.