

MobiMax

4G / LTE Hotspot Routers with Cloud OSS/BSS



Technical Overview

MobiMax 4G Routers + OSS/BSS Solution

Overview

With the advent of 4G networks, the cellular data speed have greatly increased making it possible for 4G to be used as a wireless backhaul for WiFi hotspots. Increasing people need WiFi connectivity while they travel or are on the move. Similarly, there is always a need for Internet connectivity in places which don't have option for wired connectivity.

For example, bus travelers are increasingly demanding value-added services such as Internet connectivity when they book the bus travel. In countries that have poor mobile data penetration, there are viable business models by offering affordable WiFi Internet service over 4G.

Lastly there is lot of demand for using 4G data networks as a primary or backup connectivity options for Kiosks, ATMs, POS terminals, digital displays, etc. Many factories are getting automated and are deploying lot of hand held devices for connectivity. Similarly IOT devices also need 4G backhaul to upload the data to the cloud system.

All the above use-cases need a reliable, affordable and scalable 4G router solution that is easy to deploy and manage from a central console.

Wifisoft MobiMax solution offer a complete 4G WiFi router solution that can be deployed in wide range of deployments. It comes with a cloud management system that provide all the features for managing the remote, mobile WiFi networks from a single dashboard.

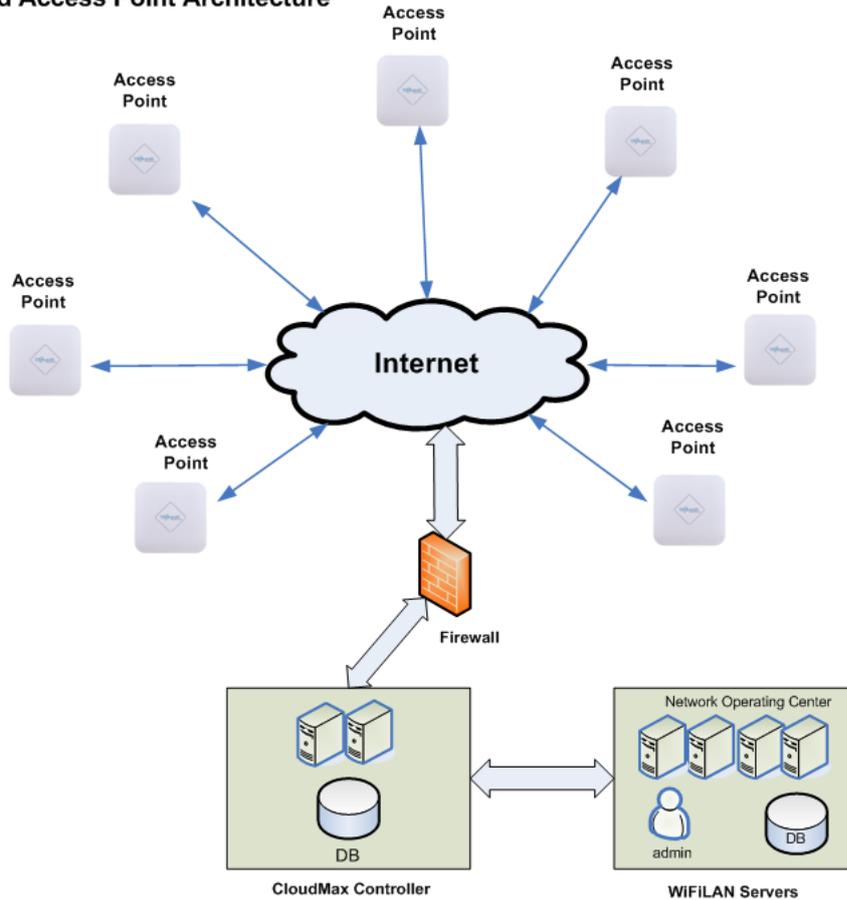
The solution is designed to scale to handle thousands of remote routers and comes with all the necessary features for running a managed WiFi service.

Cloud Controller Architecture

The new paradigm for managing remote networks is based on cloud architecture. In this architecture, the remote routers or access points are managed centrally through a cloud controller. The controller provides all the NMS and monitoring features to deploy, configure, monitor and upgrade the remote devices.

The diagram below depict how the cloud controller architecture works.

Cloud Access Point Architecture



This is a central controller architecture where only access points are installed in remote venues and managed centrally using a controller. The controller communicates with the WIFILAN OSS/BSS within the data center and is responsible for managing and monitoring the remote access points. Each access point is programmed to periodically checkin with the controller and update its configuration. The cloud controller communicates directly with WIFILAN OSS/BSS for captive portal and AAA.

MobiMax Access Points

Wifisoft offers range of 4G/LTE routers under the name of MobiMax and UniMax. These are designed to work in both indoor and outdoor environments. The routers comes with built-in 4G/LTE modem that works in the GSM bands in the respective countries.

It is important to contact Wifisoft in advance to check if the 4G modem is ccompatible with the GSM bands that the operator plans to use for LTE connectivity.

The 4G routers can be designed with special power circuits that are needed to handle the power fluctuation in vehichular and outdoor environments. The power supply can regulate the power and absorb the voltage flucatuations in the power supply. This protects the internal circuits and prevents it from damages.

Each 4G router is also hotspot-enabled i.e. operator can run a full-featured hotspot service on the 4G router. It is ideal for operators who wish to run a hotspot service using the router and manage the Internet connectivity.

The models are divided primarily based on number of SIM cards it supports. We provide single and dual SIM card router models. In case of dual-SIM, both SIMs can be active at the same time and connected for two separate cellular networks.

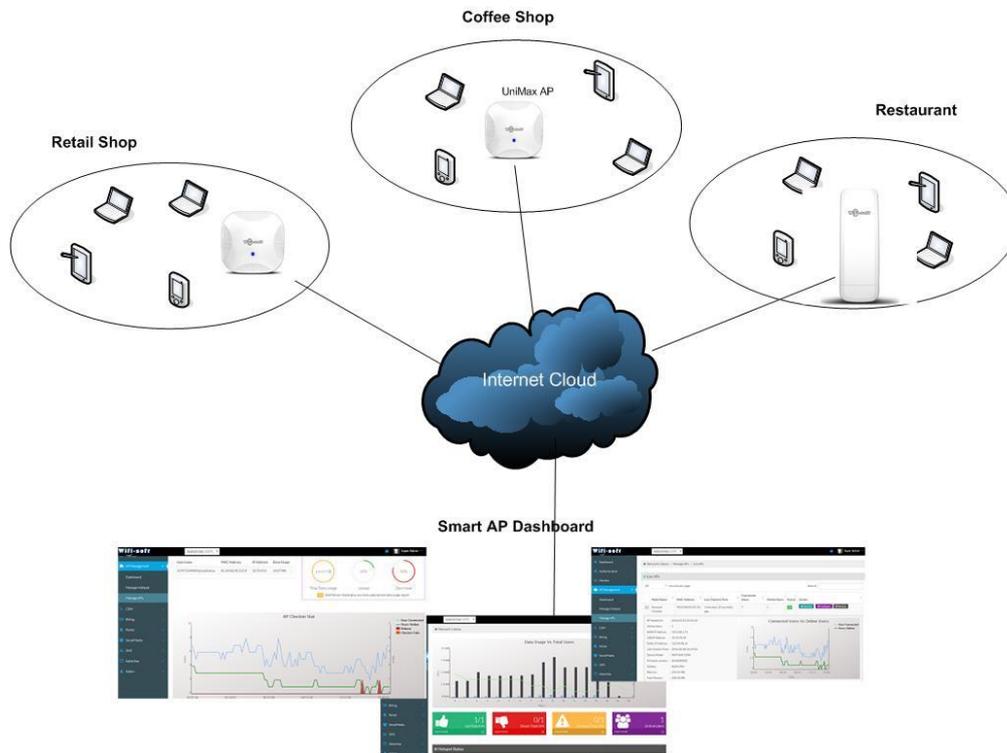
Models

The various access point models available from Wifisoft are as follows –

Model Number	Description	Picture
UM-705N	Type: Indoor Enclosure: Metal Band: Single (802.11n) Mgmt: Cloud, Controller, Standalone Antenna: 5 Dbi External (Fixed) Transmit Power: 500mW RF: 2x2 MIMO 300 Mbps Power: 12V DC	
UM-710N	Type: Indoor Enclosure : Metal Band: Single (802.11n) Mgmt: Cloud, Controller, Standalone Antenna: 5 DBi external (2.4GHz) Transmit Power: 500mW RF: 2x2 MIMO 300 Mbps Power: POE	

UM-720AC

Type: Indoor and Outdoor
Band: Dual (2.4 & 5 GHz)
Enclosure: Metal and Plastic
Mgmt: Cloud, Controller, Standalone
Antenna: 5 DBi internal (2.4 & 5 GHz)
Transmit Power: 500mW
RF: 2x2 MIMO 1200 Mbps
Power: POE



Network Design

The diagram below shows how the solution will be deployed at multiple hotspots and how it will be operated from the central NOC. The architecture is designed to be scalable, flexible and easily manageable and deploys the cloud managed controller along with the OSS/BSS solution.

Each access point is capable of working as a hotspot router/gateway. It issues IP addresses to the clients and is responsible for captive portal redirection. The captive portal is served from the central web server. All APs are controlled, managed and configured centrally.

The 4G router/AP will use 4G/LTE backhaul for Internet connectivity. There is also an option to use wired WAN connectivity through broadband, fiber or other terrestrial Internet technologies. The operator has an option to use the wired WAN as primary connection and 4G as a backup connection.

The network operating center will have the OSS/BSS and NMS servers that will be responsible for wide range of functions ranging from AAA services, captive portal, online billing, vouchers, bandwidth and policy management, URL logging, Subscriber management, Accounting, analytics and reporting and more. In addition, it will also host access controllers that will be responsible for handling the traffic and management of remote hotspots.

Access Points form a separate control plane over secure tunnel to the controller. This connection is used to push configuration changes, firmware updates and retrieve the health of each AP periodically.

The AP controller works along with our OSS/BSS solution. The OSS/BSS solution is deployed in redundant configuration to provide maximum uptime and failover. The failover is automatic without human intervention.

The OSS/BSS server may interface with external systems like payment gateway, SMS gateway using their API.

All the customer data is stored in relational databases and automatic backups and archives are maintained by the system.

Cloud Managed AP Features

1. **Cloud Controller**
2. **AP Discovery & provisioning**
3. **Remote Firmware upgrades**
4. **Multi-tenant administration**
5. **Zero Configuration Setup**
6. **Central Configuration Management**
7. **AP Health Monitoring**
8. **RF Management**
9. **Hotspot Enabled**
10. **Events & Alarms**
11. **Mesh Enabled**
12. **Cloud-based NMS**

Cloud Controller

Smart APs are configured through a cloud-based controller instead of a hardware controller. Each access point is designed to create a secure tunnel back to the cloud server hosting the controller. The tunnel is used as control plane for the access point and all configuration and management traffic is passed between the controller and access point through the tunnel. The cloud controller provides complete management and monitoring functions for the access points

AP Discovery and Provisioning

The controller provides AP provisioning functions that allows admins to configure the access points very quickly. The zero configuration setup makes it really easy to configure and deploy the access points.

Remote Firmware upgrades

The access points need to be upgrades periodically. The cloud controller provides version control and automatic firmware upgrade functions for the access points. Administrator can select the firmware to upgrade on the remote access points. The cloud controller also functions as a repository for the firmware versions.

Multi-Tenant Management

Cloud controller provide multi-tenancy setup for managing access points. So, the same controller instance can be used across multiple customers and each customer can manage multiple networks. All the settings are stored for each tenant and administrator gets a consolidated view of complete network.

Zero Configuration Setup

Each access point is designed to automatically download the configuration and firmware from cloud controller. This makes the access points really easy to setup and configure. The access point can be setup by just installing the access point and adding the MAC address of the AP in the dashboard. The AP will get configured within minutes and will be ready to be used.

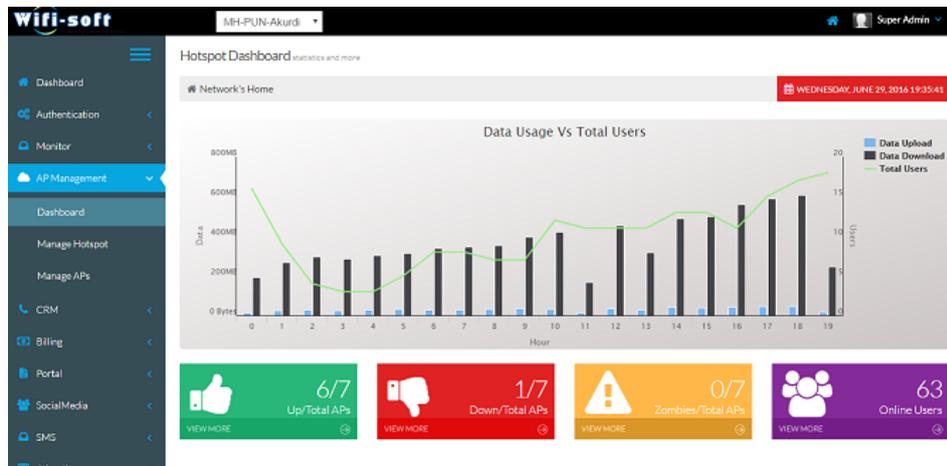
Central Configuration Management

All access point settings are stored centrally on the cloud controller and are pushed to the individual AP when the AP checks into the controller. This allows administrator to

easily update the settings on remote access points. Administrator has an option to update individual settings or settings of all access points in the network or group of networks.

AP Health Monitoring

The cloud controller also functions as a complete NMS and monitoring system for remote access points. The current health of the access point is recorded periodically and displayed on the dashboard. Administrator can also view the complete history of the access point over 24 hours. Statistics like the Tx/Rx rates, bandwidth consumption, connected users, channel utilization are displayed using graphs.



RF Management

The cloud controller provides single console to change the radio settings of the access points. Settings like operating channels, transmit power, SSID, wireless security and more can be configured through the dashboard.

Hotspot Enabled

Each access point is capable of operating hotspot service. The hotspot service consist of a captive portal, RADIUS authentication and user redirection. The access point also functions as a DHCP server for the end clients. When the user enters the login credentials on the login page, the access point is responsible for interfacing with the RADIUS server to authentication the users.

The screenshot shows the 'Hotspot Management' section of the Wifi-soft interface. It displays a 'Hotspots Summary' table with the following data:

#	Hotspot Name	Status	Access Points	Online Users	Date Created	Action
1	Turnkey	66% 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 04:37:46	[Action]
14	Turnkey A6	100% UP	Total 1 1 UP	0	2016-02-15 04:46:27	[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]

Events & Alarms

The controller is also responsible for showing events and alarms for each access point and network. The events are logged in the controller and administrator can view and search through the events for diagnosing the network problems. The alarms are categorized into different levels and admin can receive alerts for the alarms.

Mesh Enabled

Each dual-band access point is capable of meshing with the neighbouring access points. The mesh is self organizing and self healing. Mesh enables access points to communicate with each other and find the best route to the gateway.